Capital

Architecture | Surveying | Engineering | Project Management

Fire Spread Investigation Report

9-15 Moss Hall Grove

London

N12 8PE

For
Barnet Homes
2 Bristol Avenue
London
NW9 4EW

11th July 2023

Contents:

1.0 Introduction & Exclusions

1.1 Capital PCC were engaged by Barnet Homes to investigate likely causes for the spread of fire which occurred at a small terrace of four, two storey houses at 9-15 Moss Hall Grove, London N12 8PE which had occurred on the 8th of June 2023.

1.2 The official London Fire Brigade incident report stated the following: *"A row of four terraced houses was alight. One house was completely destroyed by the fire. Most of the adjoining houses were gutted by the fire. All three properties no longer have a roof due to the fire. The roof of a fourth property was also partially damaged. The gardens of all the properties were damaged by the fire".*

"Eight people left the houses before firefighters arrived, and around 30 people were evacuated from surrounding properties. There have been no reports of any injuries."

1.3 The purpose of this report is not concerned with the cause of the fire, or an assessment of risk to life, but will examine the construction arrangements of the properties external walls and roof and whether the constituent materials and construction type actively assisted in the spread fire from the originating property to adjacent properties, at a rate which would be beyond normal expectations.

1. 

Front

2. 

Rear

1.4 It is understood that the fire originated and took hold at the rear of No.11 and rapidly spread to the adjacent buildings either side (No.s 9 & 13), resulting in severe damage to all 3 of the mainly affected properties, with No.15 having some slight damage. As a result of the severity of the damage Barnet Borough Building Control Department have made a recommendation for all fire damaged buildings to be demolished.

3. 

9-15 Moss Hall Grove – Location of vertical compartment party walls

1.5 Barnet Homes have advised they have a significant number of similar archetype residential properties throughout the borough.

2.0 Building Description

2.1 The building consists of a terrace of four, two storey residential houses, with gardens areas to the front and rear, constructed circa 1970.

2.1.2 The houses are of timber frame construction, with 260mm masonry compartment party walls separating the individual dwellings, with cavity masonry flank walls at each end of the terrace. The first floors of the houses are of timber joist construction which is in-built into the separating party walls at either end (photo 4). The front and rear walls are constructed of a timber framed arrangement which are tied to the party walls via a concrete post with mechanical fixings (photo 5). The roofs are timber truss framed, pitched roofs with a concrete tile covering.

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2.1.3 At the front and rear elevations the external wall finish is a mixture of UPVC shiplap cladding and a plywood sheet cladding with an exterior fabric & paint finish (photo 6, 7 & 8) which have been fixed directly to the timber framing structure via timber battens of 35x20mm, there is a slight variance to the extent of the two types of cladding finish between the front and rear elevations. It appears that the UPVC cladding was introduced as a replacement product at some point in the buildings history, most likely at the same point as when the windows were replaced with UPVC double glazing.

2.1.4 Both the timber sheet cladding and the UPVC cladding are considered combustible materials as can be seen in Appendix 1, from the RICS Guidance note "Cladding For Surveyors" issued in March 2021. Generally, UPVC & timber sheet claddings have Euroclass ratings of C/D & D respectively.

2.1.5 The roof eaves soffit and fascia boards are also UPVC and would appear to have been replaced at around the same time with a UPVC product. The soffit boards are vented at regular intervals to provide ventilation into the roof space.

2.1.6 The timber framed walls are generally constructed of 80x35mm studwork vertical & horizontal members, spaced at regular intervals. Within the timber framework panel sections there is existing mineral wool insulation at 25mm thickness, sandwiched between two sheets of building paper within a 100mm cavity (80mm studwork frame + 20mm fixing batten). The internal lining is made up of a single layer of plasterboard with a vapour-check membrane between the plasterboard lining and the timber frame (photo's 6, 7 & 8).

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Wall build-ups for UPVC and timber sheet cladding

3.0 Potential for Fire Spread Across & Within the External Wall

3.1 The legislation in relation to the fire safety of two-storey single dwellings in the UK mainly derives from the Building Regulations, as they fall outside of the scope of the Fire Safety Order 2005 and amendments, which includes provisions provided within PAS9980, due to the generally accepted ease of means of escape for such dwellings.

3.2 The Building Regulation Functional Requirement B4 states:-

External fire spread

B4. (1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another having regard to the height, use and position of the building.

(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

3.2.1 Whilst it is understood that the buildings in question were not built to current building regulation standards, it is estimated that the UPVC cladding elements were added at a point in time more recently than the original construction date, as a result it would not be unreasonable to expect to find some adherence to more modern regulatory Building Regulations functional requirement B4.

3.2.2 Over the years there has been confusion within the construction and property industries generally in relation to the functional requirement of B4 and the more specific guidance contained within Approved Document B, which has indicated that it is acceptable to use combustible products on the external walls of low-rise buildings. In an effort to clarify the issue the Government (MHCLG) issued a circular guidance letter on 01-07-19 (Appendix 2) to regulatory authorities in England to state that the functional requirements of B4 applies to buildings of any height.

3.3 The Building Regulation Functional Requirement B3 states:-

Internal Fire Spread (Structure)

Where appropriate, measures must be taken to avoid internal spread of fire by sub-dividing large, open areas of a building with fire-resistant materials. The spread of unseen smoke and fire within concealed spaces also needs to be impeded.

3.3.1 The only elements which could be considered as potential cavity barriers are the smaller dimension timber vertical battens (35x20mm) fixed to the outer face of the timber structural frame to which the UPVC cladding is then fixed, however this detail is redundant as the combustibility and location of the cladding material allows the fire barrier to be bridged in the event the cladding material does catch fire. To meet the requirement of a cavity barrier a timber batten must be at least 38mm thick, also for a timber batten cavity barrier to be effective it must be fitted tightly between layers of non-combustible material, which is not the arrangement in this case (photo 7). Therefore, this arrangement would not comply with the functional requirement B3

3.4 The timber-framed studwork wall construction to the front and rear elevations is classified as a lightweight timber construction as the main timber frame elements have the dimensional cross-sectional area of 80x35mm, being less than 50mm in any one direction. “Lightweight timber is consumed rapidly under direct fire exposure and therefore, to achieve fire resistance, it is highly reliant on the fire protection it is afforded by being encased” (Table L1 PAS9980).

3.5 Inspections of the walls revealed that the insulation contained within the wall build-up is mineral wool and internal linings are of plasterboard both of which are non-combustible materials.

3.6 Synopsis

3.6.1 It is evident from the UPVC and timber sheet cladding arrangement that can be seen in photo’s 1 & 3 that it bridges the vertical compartment line of the party wall between the individual terrace houses. This bridging of the compartment line by combustible materials creates a route for the spread of flame and fire across the compartment line between properties at the front and rear external walls. This arrangement would not

comply with the functional requirements B3 & B4 and presents a significant risk as evident in this case.

3.6.2 We would therefore conclude that the combustible UPVC & timber sheet cladding fixed directly to the timber battens, acted as a conduit for the spread of the fire from one compartment dwelling to another, laterally across the vertical compartment lines and did not provide sufficient fire resisting encasement to the lightweight timber structural framing.

4.0 Potential for Fire Spread Across the Roof

4.1 Upon inspection of the damaged and exposed eaves it was clear that the soffit and fascia boards to the eaves detail were of combustible UPVC material. The eaves were vented and regular intervals via circular cut-outs to the soffit boards (photo 9)

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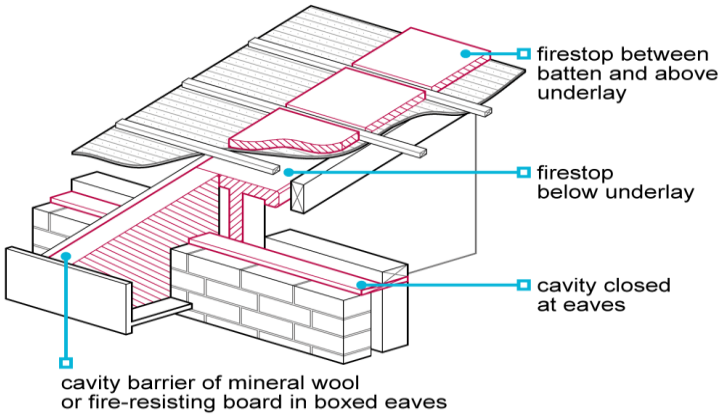
4.1.1 The ventilation cut-outs will have provided an unobstructed pathway for flames and fire to enter the roof eaves, although this is likely to have occurred in any event due to the presence of combustible UPVC soffit and fascia boards.

4.1.2 Photo 10 shows the exposed eaves detail at the vertical compartment line to the front elevation between numbers 13 & 15, it is clear that no fire compartmentation detailing exists within the eaves, allowing an unrestricted route for fire to spread within the eaves from one dwelling to the next.

4.1.3 Modern housebuilding detailing methods require the line of vertical compartmentation to be continued through the eaves and up the roof to the ridge to ensure the compartmentation between dwellings is continuous.

Figure 1 NHBC detail 7.2.16



4.2 Synopsis

4.2.1 It is evident from photo's 9 & 10 that there is no vertical compartmentation within the eaves between dwellings, combined with the use of combustible materials for the soffit & fascia boards plus open roof vents which would not appear to have any intumescent protection. It certainly possible that the fire also spread at roof level across the vertical compartment line due to a lack of fire-stopping compartmentation between the non-combustible roof tile covering and the compartment wall (as per NHBC detail 7.2.16).

4.2.2 We would therefore conclude that the lack of continuity of vertical compartmentation at the eaves and within the roof covering contributed to the spread of fire from one dwelling to another, as a result does not comply with the functional requirement B4.

5.0 Remediation Recommendations

5.1 The recommendation to remediate any properties which have a similar arrangement to meet the Building Regulation functional requirements of B3 & B4 and reduce the risk of fire spread are as follows:-

a) Remove all combustible cladding materials from the external wall surfaces, soffit's and fascia's and replace with non-combustible alternatives e.g. fibre cement sheathing & cladding sheets / boards which achieve Euroclass A2, s1-d0 as a minimum and fire tested under the EN 13501-1:2002 suite of fire tests for CE compliance, in order to provide resistance to external fire spread and sufficient fire resisting encasement to the lightweight timber structure.
b) Ensure all soffit vents are of an intumescent type which have been tested to BS476 Part 22 (1987).
c) Strip back roof coverings at the line of vertical compartmentation & provide fire stopping detailing at the eaves and roof pitch on the line of compartmentation as per the NHBC detail 7.2.16.

6.0 Potential Funding Routes

6.1 There are currently no funding streams available for fire safety works to residential properties below 11m. There are however funding streams available for the upgrade of insulation to properties with an EPC score of D or lower via the Governments SHDF wave 2 funding, with the London Borough of Barnet having secured a tranche of £2.9m

6.2 There is only one Energy Performance Certificate (EPC) lodged on the national register for the four houses in the terrace:-

Number 15 = D

The RdSAP for the EPC has assumed no cavity wall insulation for the timber framed walls, this is incorrect as 25mm mineral wool is present, however the impact of the error on the EPC is likely to be negligible. The EPC states 100mm loft insulation is present, which would indicate there is scope for improvement to current standards. Cavity wall insulation is the number one improvement measure recommended by the EPC for number 15. All in-scope property archetypes would need to be assessed for SHDF funding viability.

6.3 The properties at 9-15 Moss Grove have poor levels of insulation within the wall build-up of 25mm mineral wool, this could be increased to 80mm, without the need to make major alterations to the wall configuration and around openings etc. Other

insulation types may offer better U-value performance e.g. PIR / phenolic foams, however these materials offer diminished combustibility performance which could potentially offset fire safety improvements made elsewhere.

6.3.1 The level of roof insulation within these types of properties is also poor, as a result there could be scope to offset the cost of undertaking the fire safety work by combining with a programme of insulation improvements funded by SHDF. It is understood that SHDF funding is capped at £5k per element per property (for EPC D) e.g. wall and roof improvements would potentially be capped at £10k per property. Cost caps are exclusive of administration and ancillary costs.

6.4 Works funded via the SHDF will need to be PAS2035 compliant, therefore they will need to be assessed by a PAS2035 assessor prior to any improvements being undertaken, as a result it is possible that other improvements may be recommended in tandem with improved insulation e.g. window improvements or mechanical ventilation upgrades. SHDF funded works need to be completed and signed off by March 2025 to comply with the funding requirement. Unknown additional SHDF requirements have not been allowed for in remediation budget estimates.

6.5 It should be noted that by using central Government funding for work to leasehold properties can invoke Florries Law, whereby S.20 leaseholder cost recovery is then capped at £15k per leaseholder property within a 5-year period.

https://www.gov.uk/government/news/flos-law-new-cap-for-council-house-repairs-comes- into-force

This should be considered carefully when considering how the funding of works is to be applied.

7.0 VAT Relief

7.1 From April 1st 2022 until 31st March 2027 the installation of energy saving materials (ESM's) will be zero rated VAT. In the context of the proposed remediation / improvement works, this would apply to the proposed loft insulation improvements as an ESM installation. However the situation with the walls is not quite so straight forward, as insulation upgrades as an ancillary element of other works in unlikely to attract the zero rating relief, however we would recommend that expert opinion be sought to clarify this point should the project be approved to proceed.

8.0 Competency Declaration & Quality Assurance

The author of this report has the requisite level of competence with both academic qualifications and over 25 year's experience of property management and construction, including fire safety, having achieved:-

- B.Sc. (hons) in Building Surveying
- Membership of The Chartered Institute of Building
- Membership of the Institute of Fire Engineers
- Associate of the Royal Institute of Chartered Surveyors
- NEBOSH National Certificate in Fire Safety and Risk Management
- Diploma of Domestic Energy Assessment

8.1 This document has been prepared in accordance with our BSI ISO 9001 Quality Assurance procedures and authorized for release.

REPORT AUTHOR & SIGN OFF	
Signed..... Capital PCC ..... **Sean Kelly B.Sc. (Hons) MCIOB MIFireE** Director at Capital PCC Ltd	Date: 13-07-23
CHECKED BY	
Signed..... Capital PCC ..... **Patrick Madigan BSc (Hons) MRICS** Director at Capital PCC Ltd	Date: 13-07-23

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Appendix 1 – Materials Matrix

	High-level risk	Medium-level risk	Low-level risk
Cladding panels	Non-FR ACM PE cored Non-FR HPL panels Natural wood cladding Laminated wood panels in CLT GRP panels PVC cladding boards	FR HPL FR ACM Honeycomb bonded panels Brick slips (see below) Basalt panels (Rockwool*) Composite stone panels Acrylic polymer (corian*) Glass composite Glass-fibre reinforced polymer composite panels (Steni*) Brick slips (see below)	Metal panels Terracotte tiles Natural stone panels Reconstituted stone panels GRC panels Fibre cement cladding Precast brick panels Precsat concrete panels
Brick slips	GRP backed system Insulated brick slip system	Cement particle board board system Magnesium oxide panel backed system	Steel backing (Corium*)
Render systems	Render on EPS insulation render on phenolic insulation		Render on mineral wool
Insulated panels	GRP panels with non-mineral wool insulation core Metal insulated panels with EPS/XOS insulation core	Metal insulated panels with hybrid closed-cell insulation core (QuadCore™ by Kingspan*) Metal insulated panels with PIR insulation core Metal insulated panels with PUR insulation core Metal insulated panels with PF insulation core	Metal insulated panels with mineral wool insulation core
Insulation materials	PIR insulation boards PUR insulation boards XPS insulation boards PF boards		Stone wool insulation Glass wool insulation
Backing wall	Timber frame Timber sheathing boards Insulated Concrete Form (ICF)	SIPs panels Composite metal panels	Concrete Blockwork Brickwork Non-insulated SFS with cement particle sheathing boards SFS with cement particle sheathing boards and mineral wool

Risk levels are as follows:

- **High-level risk:** materials are typically rated as Euroclass B or lower.
- **Medium-level risk:** material are typically rated Euroclass B. However, some material within the specified range of products can achieve Euroclass A.
- **Low-level risk:** materials are typically rated as Euroclass A1 or A2.

Table 1: Typical risk status for different materials

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Appendix 2 – MHCLG Circular Guidance Letter 01-07-19

Ministry of Housing,
Communities &
Local Government

To:

The Chief Executive:
Unitary, Metropolitan, District and London Borough Councils in England
County and County Borough Councils in Wales
The Town Clerk, City of London
The Clerk, Council of the Isles of Scilly
The Sub-Treasurer, Inner Temple
The Under Treasurer, Middle Temple

The Head of Building Control:
Unitary, Metropolitan, District and London Borough Councils in England
County and County Borough Councils in Wales
City of London
Council of the Isles of Scilly

Approved Inspectors

cc: The Chief Executive:
County Councils in England
National Park Authorities in England & Wales

Chair: National Fire Chiefs Council

1 July 2019

Dear Sir or Madam

Requirement B4

The purpose of this Circular Letter is to remind building control bodies of considerations relating to assessing compliance with requirement B4 of Schedule 1 to the Building Regulations 2010 with regard to fire spread over the external walls of a building and, in particular, the application of that requirement to low-rise buildings.

We are issuing this reminder because recent events have indicated that consideration is not routinely given to Requirement B4 and the need to resist the spread of fire over external walls in circumstances where the guidance in the approved document is not specific. As with all the functional requirements in Schedule 1, Building Control Bodies should use judgement to consider the overall intent of Requirement B4, not just comply with specific guidance.

Ministry of Housing, Communities and Local Government
2 Marsham St,
Westminster,
London
SW1P 4DF

Scope of this Circular Letter

The guidance in this Circular Letter applies to buildings and building work in England. This guidance is relevant to projects for which a full plans application is made, or initial notice submitted and for existing projects. Building control bodies may wish to reconfirm that satisfactory evidence has been submitted that the requirements of paragraph B4 of Schedule 1 are being met for existing projects.

Introduction

Requirement B4 of the Building Regulations 2010 requires that – "the external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and location of the building". This requirement applies to buildings of any height.

Approved Document B provides guidance on potential ways to achieve compliance with this requirement Paragraph 12.1 of Approved Document B (Volume 2) says that – "The external wall of a building should not provide a medium for fire spread if that is likely to be a risk to health and safety"[1].

There is further detailed guidance aimed at preventing fire spread over the walls for buildings 18m or more in height.

In December 2018 the ban on combustible construction materials in the external walls of certain high-rise buildings was introduced into the regulations[2].

Consideration

Whilst the use of combustible materials within or attached to the external walls of buildings below 18m are not expressly prohibited, it is necessary to consider the risk from fire spread to health and safety in relation to buildings of any height.

The potential for fire spread and its impact on health and safety can be exacerbated by the way materials are arranged on the building, their combustibility and, for instance, their proximity to escape routes. The risk this presents to health and safety increases with the height of the building and the evacuation strategy, particularly where people sleep in the building. Consideration may also need to be given to any attachments which form part of the external envelope of the building.

Consideration should be given to ensuring that the overall intent of Requirement B4 is being met. Where Building Control Bodies consider that the extent and arrangement of materials and/or attachments to an external wall may not meet the functional requirement

[1] 2006 edition, incorporating 2007, 2010, 2018, Nov 2018, Dec 2018 and April 2019 amendments. Although a new edition of Approved Document B will be issued shortly, it will include the same general guidance as regards the external wall of a building not providing a medium for fire spread if it is likely to be a risk to health and safety.

[2] The Building (Amendment) Regulations 2018 S.I. 2018/1230.

of B4, they should raise this with the person carrying out the work and request further evidence to show that reasonable provisions will be made to meet Requirement B4.

Enquiries
Telephone enquiries on this Circular Letter should be addressed to Technical Policy Division on 0303 444 0000 and all e-mail enquiries to enquiries.br@communities.gsi.gov.uk.

Yours faithfully

Frances Kirwan

Deputy Director

Technical Policy Division
Building Safety Portfolio