

BHP High Rise Controlled Cold Smoke Tests

Background

Brent Housing Partnership (BHP) is an ALMO responsible for the London Borough of Brent's 12,000 social housing properties. BHP are in the process of undertaking a major upgrade to passive fire protection across the borough with approximately £8million being spent in 2013 on high rise blocks alone.

The London Borough of Brent is in the process of a major regeneration project in the Kilburn area. This project consists of numerous old blocks varying in size being demolished and replaced with modern blocks.

Following meetings between BHP and the London Fire Brigade (LFB) potential fire and smoke testing within an abandoned block and the benefits this could provide to the industry was discussed. Unfortunately the LFB were unable to partake at this time however BHP decided to progress the idea.

Initial enquiries and meetings were held between BHP and numerous fire safety professionals, during these meetings the types of tests possible and their benefits and restrictions were discussed. The proposal to undertake tests received unanimous support and it was agreed that although led by BHP other professional bodies should be involved to ensure the integrity of the tests.

Once the initial enquires had confirmed there was sufficient support a block due for demolition in the south Kilburn Area was identified as a suitable test site.

Continued planning was conducted throughout 2013 by BHP, where due to restricted time scales it was decided that live fire tests would not be possible at this time and instead only cold smoke tests could be conducted.

A final team was assembled made up from members of BHP, the Association of Specialist Fire Protection (ASFP), BM TRADA, Hillmoore Fire Protection and Gerda Security.

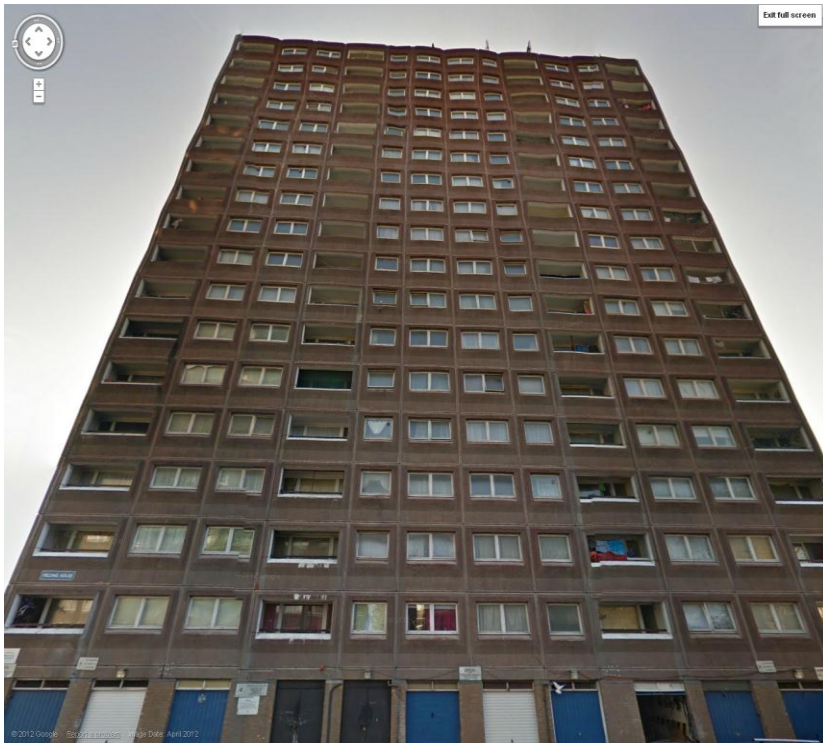
The block was fully vacated and handed to developers responsible for the demolition, Network Housing in November 2013. The tests were scheduled for week commencing 25th November 2013.

BHP High Rise Controlled Cold Smoke Tests

The Building

Fielding House, Cambridge Road, Kilburn is an eighteen storey high rise tower block. The construction type is a bison block made of reinforced preformed concrete panels. The block consists of one hundred and sixty seven flats and two enclosed staircases.

External Views



Gavin Pierson (Gas & Fire Safety Manager)
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






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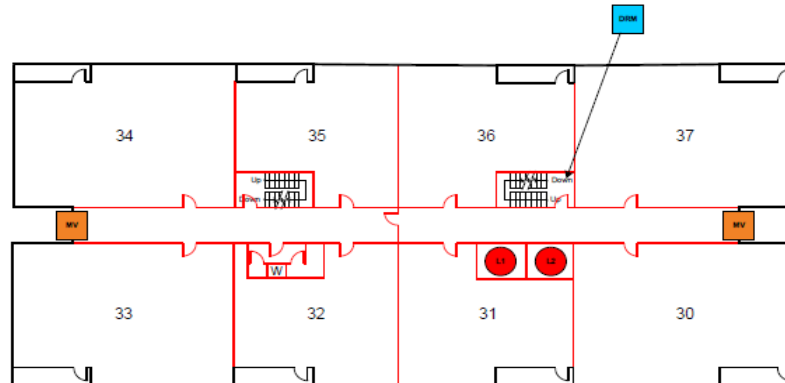
Map of the Block and Surrounding area



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Internal Communal Floor plan

SYMBOLS	
	Main Access Point
	Premises Information Box
	Dry Rising Main
	Fire resisting construction
	Lift 1
	Lift 2
	Manual Vent



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Test Planning

On Friday 22nd November 2013 the site was attended by Gavin Pierson (BHP) and Ross Newman (BM TRADA) in order to plan the tests. The 3rd floor was selected as most suitable.

Following this site visit it was agreed that two primary tests would be conducted.

Test 1

Two flats opposite each other were selected (Flat 31 and 36), one would have all compartment breaches fire stopped internally and have an FD30s front entrance door installed and the other would have no modifications.

Each flat would be pressurised with cold smoke and the results would be analysed. This would include tracking any leakage of smoke to the flats either side, above, below and the communal corridor outside.



BHP High Rise Controlled Cold Smoke Tests

Test 2

Similar in nature to test 1 but carried within the communal stairwells on the 3rd floor. There are two stairwells on the 3rd floor, one stairwell would have an FD30s communal door installed and any compartment breaches fire stopped and the other would have no modifications.

All other doors on the 3rd floor communal corridor would be sealed with 1000 gauge polythene and the corridor would be pressurised to 20p.a. with cold smoke. Again any smoke leakage would be analysed from the communal corridor into the stairwell.

Pre test Installations

On Thursday 28th November 2013 the site was attended again by Gavin Pierson (BHP) and contractors GERDA and Hillmoore Fire Protection. The following works were undertaken in preparation for the tests.

Flat 31

No modifications. The front entrance door is a solid core 44mm thick door, the door has no intumescent seals or smoke seals. There are compartment breaches from electrical services in a riser in a cupboard by the front door (pictured), pipes in a hallway cupboard and shared ducts in the bathroom.



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Flat 36

Contemporary Range FD30s front entrance door installed by GERDA Security (Pictured).



Compartment breaches sealed by Hillmoore Fire Protection in the following locations

- Internal electrical riser in cupboard by flat entrance (Pictured).
- Service pipes in hallway cupboard (Pictured).
- Services pipes and extract system in bathroom



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Communal Stairwell (by flat 35)

FD30s communal Door set style FDS01 installed by GERDA Security.

Penetration within communal lighting junction box sealed with intumescent sealant by Hillmoore Fire Protection.



Communal stairwell (by flat 36)

No modifications, the communal door is a 54mm door with Georgian wire screen, the door had no intumescent seals and a brush smoke seal in typical condition for a door of its age. There is a potential breach to the compartment via a communal lighting junction box.



BHP High Rise Controlled Cold Smoke Tests

Testing

On Friday 29th November 2013 the site was attended by Gavin Pierson (BHP), Wilf Butcher (ASFP), Ross Newman (BM TRADA), Stephen Hayden (BM TRADA) and Danny White (Gerda Security) to conduct the tests.

In the living room of flat 36 evidence of incense previously being burnt in the doorway was found (Pictured). For the purposes of these tests we decided to install the pressure unit in the living room doorway to simulate a fire started in this area (Pictured).



BHP High Rise Controlled Cold Smoke Tests

Flat 31 (Unmodified)

Once set up the flat was pressurised to 20pa and cold smoke was introduced by a portable smoke machine. Members of the team were located outside the flat door and the floors above and below to monitor any smoke spread. Below are the conditions found at 30 second intervals.

0.0 seconds - 20pa confirmed and cold smoke introduced.

30 seconds - Major smoke leakage occurring from the right hand meeting edge of front entrance door.

60 seconds - Visibility in the communal corridor outside the test flat has started to decrease as smoke continues to leak from the front entrance door. Smoke leakage has started to appear in that flat above the test flat.

1 minute 30 seconds – Visibility in the communal corridor outside the test flat continues to decrease further.

2 Minutes - Visibility in the communal corridor outside the test flat has now decreased to approximately 1 metre.

2 Minutes 30 seconds - Substantial smoke leakage is now occurring in the flat and communal corridor on 4th floor above the test flat.

3 Minutes – Smoke has now starting to leak from the communal duct in 4th floor corridor above test flat.

3 Minutes 30 seconds – Smoke leaking from skirting boards within flat above test flat, flat door also leaking smoke into communal corridor.

4 Minutes - Visibility in communal corridor outside flat is now down to less than half a metre. There is minor smoke leakage from communal duct on 5th floor, 2 floors above test flat.

4 Minutes 30 seconds – There is now zero visibility in the communal corridor outside the test flat. Visibility on the 4th floor corridor above the test flat has now started to decrease and the smoke leakage on the 5th floor 2 floors above the test flat is increasing.

5 Minutes – Test Terminated

BHP High Rise Controlled Cold Smoke Tests

Flat 36 (Passive fire protection upgraded)

As with flat 31 once 20pa pressure was achieved cold smoke was introduced by a portable smoke machine. Members of the team were located outside the flat door and the floors above and below to monitor any smoke spread. Below are the conditions found at 30 second intervals.

0.0 seconds - 20pa confirmed and cold smoke introduced.

30 seconds - Very minor smoke seen in communal corridor from the communal duct.

60 seconds – No signs of any smoke leakage.

1 minute 30 seconds – No signs of any smoke leakage.

2 Minutes - No signs of any smoke leakage.

2 Minutes 30 seconds – No signs of any smoke leakage.

3 Minutes – No signs of any smoke leakage.

3 Minutes 30 seconds – No signs of any smoke leakage.

4 Minutes – No signs of any smoke leakage.

4 Minutes 30 seconds – No signs of any smoke leakage from the test flat, surrounding areas or floors above and below.

5 Minutes – Test Terminated *

*On termination of this test the smoke operator exited the flat allowing a plume of smoke to enter the communal corridor, the front entrance door then self closed returning the smoke leakage to zero.

BHP High Rise Controlled Cold Smoke Tests

Communal stairwell (Unprotected – near flat 36)

For the communal stairwell tests the pressure unit was installed in the cross corridor door. The communal corridor was pressurised to 20pa and cold smoke was introduced by a portable smoke machine. Members of the team were located within the communal staircase and on the floors above and below to monitor any smoke spread. Below are the conditions found at 30 second intervals.

0.0 seconds - 20pa confirmed and cold smoke introduced.

30 seconds – Almost instantly smoke has started to leak from the top of communal door into the communal stairwell.

60 seconds – There is now substantial smoke leakage from communal door which is causing visibility to reduce. There is also smoke starting to leak from the communal lighting junction box.

1 minute 30 seconds – Visibility in the communal stairwell has now significantly deteriorated.

2 Minutes – Smoke is now entering the stairwell at bottom right hand corner of the door. Visibility within the stairwell has continued to reduce.

2 Minutes 30 seconds – Smoke continues to leak into the stairwell from the gaps around the door further reducing the visibility.

3 Minutes – Visibility in the stairwell on the 3rd floor is now reduced to approximately 1 metre and the smoke has spread up as far as the 6th floor within the stairwell and down to the 3rd floor.

3 Minutes 30 seconds – There is now what is considered zero visibility in the stairwell within the 3rd floor stairwell.

4 Minutes – The smoke is continuing to leak through the door and visibility is now seriously deteriorating in the stairwell on the floors above and below.

4 Minutes 30 seconds – Smoke is now leaking from the stairwell into the communal corridor on the 4th floor and visibility on the 5th and 6th floor stairwell has been seriously affected. There remains no visibility on the 3rd floor.

5 Minutes – Test Terminated

BHP High Rise Controlled Cold Smoke Tests

Communal stairwell (Protected – near flat 35)

As with the unprotected communal stairwell test the pressure unit was installed in the cross corridor door. The communal corridor was then pressurised to 20pa and cold smoke was introduced by a portable smoke machine. Members of the team were located within the communal staircase and on the floors above and below to monitor any smoke spread. Below are the conditions found at 30 second intervals.

0.0 seconds - 20pa confirmed and cold smoke introduced.

30 seconds - No signs of any smoke leakage.

60 seconds – Very small sign of smoke leakage from top left of door near hinge. Leakage stops almost instantly.

1 minute 30 seconds – No signs of any smoke leakage.

2 Minutes - No signs of any smoke leakage.

2 Minutes 30 seconds – No signs of any smoke leakage.

3 Minutes – No signs of any smoke leakage.

3 Minutes 30 seconds – No signs of any smoke leakage.

4 Minutes – No signs of any smoke leakage.

4 Minutes 30 seconds – No signs of any smoke leakage through either the communal door or the lighting junction box.

5 Minutes – Test Terminated *

*On termination of the test the smoke operator entered the communal stairway from the communal corridor. A plume of smoke entered stairwell as with the protected flat test the door then self closed returning the smoke leakage to zero.

BHP High Rise Controlled Cold Smoke Tests

Test Findings

These tests were a unique opportunity for Brent Housing Partnership and the fire safety industry as a whole to really demonstrate the benefits of passive fire protection.

The volume of smoke that spread and the distance it travelled in such a short time within the unprotected areas surprised all who took part in these tests.

In contrast the protected areas fully contained the smoke and did not allow any movement which is essential in a real life fire.

Like many social housing providers Brent Housing Partnership are in the process of an extensive programme of upgrades to passive fire protection with our housing blocks. The results of these tests are a fantastic reminder that the work we have done to continue to undertake upgrading passive fire protection really does create a safer environment for our customers and will save lives in the future.

Brent Housing Partnership would like to give special thanks to the following organisations and companies who assisted with these tests. Without their invaluable assistance these would not have been possible.

- **Association For Specialist Fire Protection**
- **BM TRADA**
- **Hillmoore Fire Protection**
- **Gerda Security**

