

Addendum Report
To
Structural Appraisal of

Malting and Brewster Houses,

Barley Mow Estate,
Barleycorn Way,
Poplar, London E14 8DE

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1.0 Executive Summary

As part of the July 2018 structural appraisal report, further internal investigations of the building were recommended due to the limited number of flats tested. Further tests were carried out to other flats and the level 1 slab in August and September 2019. However, additional testing of a level 1 flat was recommended. The additional investigations were carried out to void a level 1 flat to confirm its construction.

The flat 4 Brewster House on level 1 was made available for testing. The lower ground bin store was also made available. The investigation found 6mm diameter plain reinforcement bars in the top and bottom layers of the slab. The slabs were found to fail under overloading pressures of a severe non-piped gas explosion.

The cast insitu slabs under the flat appear to have been cast over a woodwool type product, used originally as a thermal insulation layer. The woodwool allowed concrete grout and fines to separate from the concrete matrix, resulting in honeycombing of the concrete soffit, and poor concrete cover to the reinforcement. The embedded reinforcement bars show signs of extensive surface corrosion.

The defective concrete soffit will require careful removal of the woodwool layer, followed by grit blasting of the exposed reinforcement bars and removal of loose aggregate. The remaining slab would then be repaired using a sprayed concrete patch repair method to fill the voids and provide satisfactory concrete cover to the reinforcement bars.

The level 1 slabs forming the lounge and kitchen will require additional strengthening steel strutting beams to provide lateral restraint to the flank wall in cases of a severe non-piped gas explosion. Due to restricted access to the transformer room, alternative steel columns may be used to provide lateral restraint to the flank walls.

It is vital given the findings of the investigation carried out that the possibility of a non-piped gas explosion is eliminated.

The use of gas cylinders or similar pressurized containers which contain volatile materials should be banned and measures should be taken by Tower Hamlets Homes to advise residents and ensure that such potentially explosive items are not used or stored within the building including the lower ground floor private lockup units and storage cupboards located adjacent to the stair and lift cores.

2.0 Brief

On the instruction of Carl Alleyne of Tower Hamlets Homes, Wilde Carter Clack (WCC) were asked to carry out additional investigations to a level 1 flat which is of cast insitu construction.

The investigations would allow a review of the structural condition to withstand a severe non-piped gas explosion in accordance with the *Handbook for the Structural Assessment of LPS Dwelling Blocks for Accidental Loading* published in 2012 by the Building Research Establishment.

3.0 Building Description

Brewster and Malting House are 14 storey high-rise tower blocks over a lower ground floor car park. The lower ground level cast insitu reinforced concrete walls support the level 1 / podium slab which is also of cast insitu reinforced concrete construction.

The lower ground floor under the main building is divided into separate units with reinforced concrete cast insitu walls located directly under and supporting the precast concrete load bearing cross and flank walls of the high-rise building over. These rooms are used for private storage lockup units, plant and transformer rooms.

The central podium slab under the footprint of the high-rise block, forms a rectangle shape and is surrounded by a skirt of reinforced concrete slabs, beams and columns, to provide vehicle access lanes and covered car parking. The outer podium skirt structure is separated from the central main high-rise level 1 structure on all sides by a movement joint.

The public access corridor to the flats on each floor of the main building includes two separate storage cupboards, one adjacent to the lift core and the other adjacent to the stair core. These storage cupboards are rented by individuals not necessarily occupying a flat on the same floor. It was reported that THH have cleared some of these cupboards as part of their risk management, however the storage cupboards are still in use.

4.0 Investigation

The initial site investigations were carried out in June 2018, and included a durability assessment of the concrete and reinforcement on the elevations and two rooms of two flats.

Due to the limited number of flats investigated, it was recommended further flats be investigated to confirm the initial findings, including a review of level 1 and lower ground floor elements of the building. Following a review of the level 1 investigation additional testing of a level 1 flat was recommended.

The areas of further investigations included Flat 4 Brewster House located on level 1, and the bin store room directly below Flat 4, in January 2020.

5.0 Findings

The report of the investigations to Flat 4 have not been issued as yet, however initial site observation were carried out.

The level 1 slab under the flats is of similar cast insitu reinforced concrete construction to the adjacent exposed concrete areas, however, it appears to have been cast over a woodwool type product often used to provide some thermal insulation. Currently the woodwool is hidden from view by a separate sprayed material which was reportedly used for fire proofing.

The investigation of the level 1 floor slab exposed defective concrete due to the use of a woodwool type product under the slab and low concrete cover. This has resulted in extensive surface corrosion of the poorly embedded reinforcement bars.

The investigation found 6mm diameter plain reinforcement bars in the top and bottom layers of the slab. The top layer of embedded reinforcement was exposed and found not to continue across the mid-span of the slab panel, which is satisfactory and not unusual.

A single core was taken from the defective concrete for strength and chemical testing.

6.0 Structural Appraisal

The level 1 slab supporting the flat rooms was found with defective concrete across the slab soffit with low cover to the embedded reinforcement bars which showed extensive surface corrosion. These slabs should be repaired by removing corrosion from the reinforcement and with a concrete patch repairs to provide concrete cover. Assuming normal concrete adhesion to the reinforcement, calculations show the bars are satisfactory for normal loading but are undersized under loading of a severe non-piped gas explosion, and therefore the slab panel may fail.

If the level 1 slab failed it would no longer provide lateral support to the adjacent load bearing cross walls. The flank wall is particularly sensitive to this form of instability, resulting in possible disproportionate collapse. The non-flank cross walls are laterally supported by a slab on each side and therefore, failure of one slab would still leave another un-effected slab to laterally support the load bearing cross wall.

The level 1 slab flank panel would therefore require additional steel strutting beams to provide lateral support to the flank wall. Where access to the slab soffit is restricted alternative steel columns may be used to provide lateral support to the flank walls. The level 1 repair and strengthening works are in addition to the conclusion of the July 2018 Structural Appraisal Report.

The private storage units located off the access corridor on each floor level represents a potential risk location for the storage of gas bottles. A gas explosion within a storage cupboard could result in the failure of a load bearing wall which may result in a disproportionate collapse event. This risk must be managed by the Landlord. Options include removing the private storage cupboards from public general, or carry out regular inspections of the storage cupboards as part of the typical building inspection / public area cleaning cycle.

General safety measures are recommended to ensure no explosive materials or gas bottles are stored in the private lower ground lockup units.

7.0 Conclusion

As recommended in the December 2019 Addendum report, additional testing was carried out within a Level 1 flat.

The investigation uncovered defects in the level 1 slab. Some minor defects in the car park podium slab will require concrete repairs.

Simplified calculations show the level 1 slab under the flats would fail in upward flexure or bending assessment criteria, under a severe non-piped gas explosion. Failure of the flank slab may cause instability of the flank wall, resulting in disproportionate collapse. Therefore, additional strengthening steelwork beams will be required under the level 1 lounge and kitchen to provide lateral support to the flank wall. Due to access restrictions to the transformer room, steelwork columns may provide an alternative method of strengthening.

The lower ground areas are typically used as private lockup storage. The Landlord is to manage and prevent the risks of a severe non-piped gas explosion in these areas. Options include:

1. Carry out regular checks to all of the private lockup storage units as part of the regular building inspection. The frequency of the inspections is to be determined by the Landlord based on their own risk assessment.
2. The Landlord gaining control and ownership of these private units, thereby preventing the possibility of storage of gas bottles. Regular inspections of the rooms may still be needed with this option.

Similarly, storage cupboards adjacent to the lift and stair cores were in general use and measures need to be taken to prevent the possibility of storage of gas bottles. This could be achieved by the building management voiding these areas and regaining ownership of these storage. An alternative approach would be to carry out a risk review and carry out regular inspections the storage cupboards, possibly as part of the general corridor cleaning programme.

It is vital that bottled gas or cylinders containing similar volatile or potentially explosive materials should not be used or stored in the building.

8.0 Next Steps

Based on the additional investigations the need for the strengthening works as previous detailed have been confirmed.

Additional works are noted as follows:

1. Steelwork strengthening works are required to the level 1 slab located under the lounge and kitchen.
2. Concrete patch repair works are required to the underside of the defective level 1 slab.
3. Concrete patch repair works of localised areas of defects within the car park podium structure.
4. Determine the future use of the corridor storage cupboards.

Measures must be taken to ensure gas bottles are not stored in both the private storage units and storage cupboards. These measures may include regular policing, or registering users and restricting use of the storage units, or gaining full control of the cupboard units to preventing its use for storage.

9.0 Scope of works

We have to advise that the investigation work is limited to that set out in the report. We have not inspected those parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect. Latent defects may exist in the structure which can only be discovered by further detailed investigation.