

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. The additional investigations were carried out to decanted flats in order to verify the initial findings and to the podium and lower ground areas which had not previously been investigated.

The flats 12 & 14 Brewster House, Flat 15 Malting House were decanted and made available for testing. The common areas of the lower ground and the podium slab of both Houses were made available.

The aim of the investigations of Flat 12 was to confirm the nature and extent of hollowcores within the precast slab panels of the bedroom, lounge and kitchen. In addition, limited exposure of the embedded reinforcement confirmed similar results to the initial investigations.

The investigation of Flat 14 & 15, exposed the embedded reinforcement in the slab panels of the lounge, kitchen, bedroom and lobby rooms. The embedded reinforcement in the lounge and bedroom slabs were confirmed to be similar to the initial investigations.

The embedded reinforcement in the lobby slab panels of flats 14 & 15 was found to be pairs of 12mm diameter plain and 16mm diameter ribbed bars. Calculations show the embedded reinforcement bars are satisfactory for normal loading, but indicate the slab panels may fail under loading from a severe non-piped gas explosion.

The findings of embedded reinforcement from the additional investigations have confirmed the recommendations for strengthening of the slab panels made in the previous Structural Appraisal report, dated July 2018.

The investigation of the podium structure exposed the embedded reinforcement in the cast insitu concrete walls and slab. Calculations show the reinforcement bars are satisfactory for normal loading. The investigation did not expose the top layer of embedded reinforcement. Therefore, assuming no top layer reinforcement is present, the slab panels would fail under upward abnormal loading of a severe non-piped gas explosion. This was found to be critical for the floor slabs located under the lounge and kitchen, which are private garages.

In order to minimise the risk of disproportionate damage of the flank wall from a severe non-piped gas explosion, it would be necessary to ensure explosive materials or gas bottles cannot be stored or used in these storage units. Measures include regular policing or taking over ownership of the units. Alternative, if there are no further investigation of a ground floor flat, strengthening works using steel beams positioned under the slab will be needed to provide lateral support to the

flank wall. These works are in addition to the recommendations made in the previous Structural Appraisal report, dated July 2018.

**It is vital given the findings of the investigation carried out that the possibility of a non-piped gas explosion is eliminated until strengthening measures are in place.**

**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 garages located directly below the footprint of the tower.**

## **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 flats and the car park areas of Malting and Brewster House, as recommended in the July 2018 Structural Appraisal Report.

The further investigations would aim to verify the findings of the initial investigations.

## **3.0 Building Description**

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

The lower ground floor is divided into separate 'rooms' with reinforced concrete walls which are located under the load bearing cross and flank walls of the high-rise building over, which they support. The 'room' usage varies from private garages, currently used as storage rooms, and various building services 'rooms'.

The central podium slab under the footprint of the high-rise block is surrounded by a skirt of reinforced concrete slabs, beams and columns, and provides vehicle access lanes and further car parking areas. The podium skirt structure is separated from the central main high-rise podium structure by a movement joint.

## **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 investigation in two rooms of Flat 22 (5<sup>th</sup> Floor) Malting House and Flat 34 (8<sup>th</sup> Floor) Brewster House.

Due to the limited number of flats investigated, it was recommended further flats be decanted to allow investigations to confirm the initial findings as well as review the car park areas of the building.

The areas of further investigations included:

- Internal investigations in Flat 12 Brewster House, located on the 2<sup>nd</sup> Floor, started in August 2018.
- Internal investigations by Martech, in Flat 15 Malting House, located on the 3<sup>rd</sup> Floor and Flat 14, Brewster House, located on the 3<sup>rd</sup> Floor, starting in September 2019.
- Investigations by Martech, of the podium slab and lower ground level walls and slab soffits, starting in September 2019

## **5.0 Findings**

The detailed results of the additional investigations are provided separately in Martech's report.

Flat 12 (2<sup>nd</sup> Floor) Brewster House was decanted and made available for the purpose of the investigating the hollowcores within the precast concrete slab panels, as part of investigations into possible strengthening options. The exposed embedded reinforcement bars in the lounge and bedroom were found to be similar to the findings of the initial investigations.

Flat 15 (3<sup>rd</sup> Floor) Malting House and Flat 14 (3<sup>rd</sup> Floor) Brewster House were decanted and the investigation exposed 6mm diameter plain embedded reinforcement bars in the lounge, kitchen and bedrooms. This was confirmed to be similar to the findings of the initial investigations, which were found to be undersized in the previous Structural Appraisal report. The Flat 15 slab panel the spanning across two adjoining bedrooms was found to have embedded reinforcement of 12mm diameter.

The podium slab and lower ground level walls and slab soffit were investigated by exposing the reinforcement in the cast insitu concrete elements, to determine their type, size and spacing of bars. The slab and wall bars were found to be reinforced with square twist bars. The bars have a yield strength of 410N/mm<sup>2</sup>, as historic information would suggest these cold worked bars have a high yield.

The investigation of the podium slab exposed the bottom layer embedded reinforcement but did not confirm top layer embedded reinforcement over the slab panels. No ground floor flats were available and therefore the investigation was unable to confirm if embedded reinforcement bars were located in the top layer of the cast insitu podium slab. Further, the archive drawings do not include drawings which would indicate embedded reinforcement in this area of the building.

Additional concrete strength tests were carried out on the podium slab and lower ground level walls and slabs ranged from 44 to 73N/mm<sup>2</sup>. The results determined a characteristic concrete strength which was satisfactory and was similar to initial investigation results.

The podium investigation found the concrete of the lower ground floor walls and podium slabs to be of generally good quality and comparatively high strength. The reinforcement has good cover in most locations, with some areas showing localised defects related to low concrete cover or water ingress.

## **6.0 Structural Appraisal**

The embedded steel reinforcement bars exposed in the lounge and bedrooms of the flats which were investigated, matched the previous investigation findings. The Flat 15 bedroom slab exposed 12mm diameter bars. Calculations show the reinforcement was undersized under loading of a severe non-piped gas explosion, and therefore the slab panel may fail. The previous report recommended strengthening of these flat slab panels remains unchanged.

The embedded steel reinforcement bars exposed in the lobby slabs of Flats 14 and 15 were found to be pairs of 12mm diameter plain and 16mm diameter ribbed bars. 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. The lobby slab panel therefore require strengthening as previously recommended.

The embedded steel reinforcement bars exposed in the podium slab and walls were found to be 10mm square twist bars. Calculations show the slab embedded reinforcement bars are satisfactory for normal loading, but based on no top layer embedded reinforcement bars, the slab failed under upward abnormal loading of a severe non-piped gas explosion.

If the 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 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.

Therefore, safety measures are recommended to ensure no explosive materials or gas bottles are stored in these private and unsupervised areas. Otherwise, further

investigations to expose the embedded reinforcement of a ground floor flat could allow further structural calculations to be carried out. It is possible the exposed top layer of embedded reinforcement bars may be of satisfactory size to justify the slab under loading of a severe non-piped gas explosion.

Lastly, if the embedded reinforcement bars are found to be too small or it is decided not to carry out further investigations, then additional flank slab strengthening may be carried out using steel beams positioned under the slab to provide wall lateral support.

## **7.0 Conclusion**

As recommended in the previous report, additional flats were provided for further internal investigation of the building, as well as investigations to the podium slab and supporting walls.

The investigations to the new flats were able to confirm the original findings, and therefore the strengthening recommendations to the flat slabs remain unchanged.

The investigation was not able to confirm embedded reinforcement bars in the top layer of the podium slab in the lounge and bedrooms. It is therefore assumed there is no reinforcement bars located in the top layer of the concrete slab above the lounge and kitchen. Therefore, under a severe non-piped gas explosion, the podium or ground floor flank slabs would fail under the upward flexure or bending assessment criteria. Failure of the flank slab may cause instability of the flank wall, resulting in disproportionate collapse.

The lower ground areas under the lounge and kitchen are typically used as private garages. Measures must be taken to prevent the risk of a severe non-piped gas explosion in these areas by the following means:

1. Carry out regular checks to all of the private storage units / garages. The frequency of the inspections is to be determined by the Landlord based on their own risk assessment.
2. The Landlord should gain control and ownership of these private units to prevent the storage of gas bottles.
3. Carry out further investigations of a ground floor flat over these areas.
4. Provide additional strengthening beams to the underside of the podium flank slabs.

**It is vital that bottled gas or cylinders containing similar volatile or potentially explosive materials should not be used or stored in the building until further investigation is complete and the necessary strengthening works have been carried out.**

## **8.0 Next Steps**

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

Further to the previous recommendation, measures must be taken to ensure gas bottles are not stored in the private storage units, as noted above. This can range from; regular policing of the units, the Landlord gaining control of the garages under the flank slab, further investigating ground floor flats, or strengthening the ground floor flank slab.

## **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.