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Report on
Structural Inspection
at
18 Roker Park Avenue, Ickenham UB10 8ED

EXECUTIVE SUMMAY

This report covers an Engineer's inspection of a property for the purpose of identifying and assessing structural defects.

It concludes that the main building is experiencing progressive cracking which appear to be because of adjacent trees. The conservatory building is significantly damaged by cracking due to tree subsidence and is recommended to be demolished. The two large conifers in the rear garden are recommended to be removed.

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1.0 INTRODUCTION AND BACKGROUND

1.1 Ikem Design has been appointed by the owner of the above property, to report on the structural condition of the building. This was prompted by several cracks visible on the walls, particularly at ground floor at the rear of the building. This report covers issues from a structural point of view.

1.2 A visual inspection of the site was carried out on 30 July 2022.

1.3 This report is produced based on a visual non-disruptive inspection of the property. Inaccessible parts of the structure, which are covered or unexposed, have not been inspected.

1.4 No monitoring, long term investigation or testing of construction materials have been carried out at this stage.

1.5 This report is prepared solely for the named client and their professional advisers, and no liability is extended to any other person who may seek to rely on it.

2.0 INFORMATION ON THE SITE AND SURVEY

2.1 The property is a three-bedroom detached house, with one reception room at ground floor. The original house is estimated to date from the middle 20th century. It is of a traditional 1960's construction consisting of cavity masonry external walls with masonry internal walls. A conservatory with brick external walls was added to the original construction.

Front Elevation View of property

Rear Elevation View of property

2.2 The property is constructed as follows:
Main external walls of original house: 290mm thick cavity masonry.
Internal walls: Solid single skin internal walls at ground and first floors.
Roof: Pitched slopes, clad with slate tiles.
Floors: Timber joists and boarding.

2.3 The condition of the drains and manholes were not established. There is a manhole at the left side garden and another manhole located approximately 1.4m from the rear of the property. This suggests the drain runs along the rear and left side of the property.

2.4 There are cracks visible externally on the rear and left flank walls of the conservatory. The crack widths range from 0.5mm to 15mm. The cracks appear at the bottom, top and sides of the windows.

2.5 On the right and rear walls of the conservatory, the windows appear to have separated from the adjacent walls on one side. This has created a significant opening which has been infilled. As these gaps have been filled, their exact width could be established. However, the width of the infill appears to vary from 5mm to 35mm.

2.6 Internally, there are various cracks visible on the conservatory walls. The crack widths range from 5mm to 25mm.

2.7 The conservatory is rotating away from the adjacent walls of the original house. This rotation has created a gap that varies from 5mm to 50mm, although this gap has previously been infilled.

2.8 There are two hairline cracks on the rear external walls of the main house. These cracks appear at the bottom corners of the window and run diagonally to the ground. crack widths range from 0.5mm to 2mm when viewed externally.

2.9 There are various cracks internally at ground floor mainly towards the rear of the building. These crack widths range from 1 to 5mm and are visible above door openings, which are typical weak points in a building.

2.10 There is a significant crack seen internally at ground floor between the kitchen and conservatory. This crack appears at the top of the wall and varies from 0.5mm to 10mm.

2.11 Internally at first floor level, there is a crack visible in the rear bedroom at the junction between the wall and ceiling. There is another crack in the hallway at the junction between the rear bedroom and the front right bedroom. The crack widths range from 0.5 to 5mm.

2.12 There are no other structurally significant cracks at first floor level.

2.13 There are two tall trees at the rear garden at approximately 4.5 metres opposite the conservatory. These are conifers and appear to be pine or Douglas fir trees. These two trees are within a zone of influence where they can cause subsidence[1]. Trees can cause subsidence damage to buildings through normal growth functions. Clay shrinkage subsidence occurs where tree (or vegetation) roots extract moisture from the soil causing it to shrink, which could in turn cause building foundations to move and walls to crack.

2.14 There is another tree which appears to be an Elder located approximately 6m away from the rear wall of the house. This tree is not yet fully mature to cause subsidence although the distance means it could affect the building when fully mature. This type of tree is also a low water demand tree.

2.15 There are two oak trees in the adjacent rear neighbour's garden located approximately 11 metres from the rear of No 18 building. The adjacent garden is approximately 1 metre lower than No 18 garden and the trees appear not to be at full height.

2.16 There is another conifer located at 7 metres from the rear left corner of the building. This tree is not fully mature yet.

3.0 CONCLUSIONS

3.1 It appears the two large conifers in the rear garden opposite the conservatory are causing subsidence of the building due to their proximity, maturity, and water demand nature. The conservatory is affected more than the main building as it is closer to the trees, and the foundations are likely to be shallower than the main building.

3.2 At the time of the inspection, the conservatory building appears to be significantly damaged by subsidence. As it is a single storey structure, it cannot be classified as unsafe but the cost of a possible repair and strengthening work will likely exceed rebuilding.

3.3 The oak trees in the adjacent neighbour's garden are within a zone of influence where they can cause subsidence. However, their proximity, height and natural ground level suggests they are unlikely to be the cause of subsidence at No 18.

3.4 It is possible that drain running along the rear and left side of the property may be leaking or have leaked in the past. Leaking drains will soften the soil locally and weaken adjacent foundations, causing subsidence. The walls adjacent to the drains have not cracked significantly which suggests that a leaking drain is not causing subsidence.

3.5 The floors of the building do not appear to be deflecting beyond what is expected at this stage.

3.6 The roof structure of the entire building appears to be in good structural condition.

3.7 There were no other significant structural problems identified in the property.

4.0 RECOMMENDATIONS

4.1 The two large conifers at the rear of the garden are recommended to be removed. If these trees have Tree Preservation Orders, permission should be sought from the local council prior to removing them.

4.2 The conservatory building should be demolished. The homeowner may choose to rebuild it on new foundations that are deep enough to cater for tree roots and subsidence.

4.3 Based on the current evidence, cosmetic crack repair may be carried out to the existing cracks in the original building if the visual impact of the cracks is causing an uneasy feeling.

4.4 Whether crack repairs are carried out or not, it is recommended that the cracks are monitored over the years to verify if they are getting worse.

4.5 Underpinning or other foundation strengthening measures are not recommended for the main building at this stage.

4.6 In general, it should be noted that significant structural alterations, such as the creation of openings in loadbearing walls, or the addition of an extension or loft conversion will change the pattern of loading on the walls and foundations. These works should not be undertaken without consideration of the risk of structural damage. An engineer's guidance should be sought in this event and an application for Building Regulations approval will also be necessary in most cases.

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REFERENCES AND NOTES:

[1] NHBC Standards: Part 4 - Foundations

[2] Extract from Buildings Research Establishment website

BRE Digest 251: Assessment of damage in low-rise buildings[2].

Six categories of crack are identified, which linked the width and number of cracks to the type of repair that was appropriate.

Damage categories with descriptions of typical damage. Ease of repair in italics.

0 - Hairline cracks of less than about 0.1mm which are classed as *negligible*. No action required.

1 - Fine cracks that can be treated easily using normal decoration. Damage generally restricted to internal wall finishes; cracks rarely visible in external brickwork. Typical crack widths up to 1mm.

2 - *Cracks easily filled*. Recurrent cracks can be masked by suitable linings. Cracks not necessarily visible externally; some external repointing may be required to ensure weather-tightness. Doors and windows may stick slightly and require easing and adjusting. Typical crack widths up to 5mm.

3 - *Cracks that require some opening up and can be patched by a mason*. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weather-tightness often impaired. Typical crack widths are 5 to 15mm, or several of, say, 3mm.

4 - *Extensive damage which requires breaking-out and replacing sections of walls*, especially over doors and windows. Windows and door frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted. Typical crack widths are 15 to 25mm, but also depends on number of cracks.

5 - *Structural damage that requires a major repair job, involving partial or complete rebuilding*. Beams lose bearing, walls lean badly and require shoring. Windows broken with distortion. Danger of instability. Typical crack widths are greater than 25mm, but depends on number of cracks.

In general, categories 0, 1 and 2 with crack widths up to 5mm can be regarded as ‘aesthetic’ issues that require only redecoration. Categories 3 and 4 can generally be regarded as ‘serviceability’ issues, that is, they affect the weathertightness of the building and the operation of doors and windows.

Category 5 presents ‘stability’ issues and is likely to require structural intervention.

BRE Digest 251, and in particular the table above, is now used widely in the industry as a way of categorising cracks and determining whether any intervention is necessary.

It should be stressed that these comments are a simplification of the assessment needed to properly classify damage to housing. Several factors, including whether the widths of the cracks are increasing with time, can affect the classification. BRE Digest 251 should be consulted when carrying out any assessment and a building professional should be consulted where damage is significant.

APPENDIX – PHOTOS

Cracking at rear of conservatory and infilled gap at joint with main house

Infilled gap where conservatory is rotating away from original house

Conifers at rear garden opposite conservatory building

Cracking inside conservatory

Crack in ground floor wall between kitchen and conservatory

Gap at first floor rear bedroom between wall and ceiling