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Report on Structural Inspection

at

xxx Road

Redland

Bristol

Report No. xx

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Structural Design - Structural Surveys - Site Investigation

**xx Road
Redland
Bristol**

1. Introduction

On the instruction of Mrs.xx, a structural engineering inspection of the above property was carried out on xx 2012. Movement had been noted, so an engineer's inspection was commissioned to investigate the movement and recommend any remedial measures.

This inspection is limited to an examination and report on the structural fabric of the building and covers the present condition and adequacy of the load bearing members only. The inspection is further limited to surface features without the removal of floor coverings, fixtures or fittings or the opening up of the fabric by lifting floorboards or plaster and other finishes from walls and ceilings etc.

We have not inspected woodwork or other 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.

2. Description

The property is a two storey house probably built in the 1930's. It is located at the south end of a terrace of four similar properties. The house is about 6 m wide x 8 m deep with a single storey rear extension about 3.5 m wide x 4.5 m deep.

The walls appear to be solid masonry about 230 mm thick and the roof is clad in concrete interlocking tiles.

3. Observations

3.1 Front (West) Elevation

This wall is fully rendered and Tyrolean coated. The Tyrolean appears relatively recent but it is understood that it is more than six years old. There is a square two storey bay.

Generally the wall is plumb, but at the right hand front corner the wall is leaning out by about 40 mm. The wall is free of any significant cracking. There is only hairline cracking extending from the curved porch-head towards the front corner.

3.2 Side (South) Elevation

This wall is fully rendered and Tyrolean coated.

At the front corner the wall is leaning out by about 40 mm. This lean reduces along the wall so that at the rear corner the wall is reasonably plumb.

There is a minor crack. This passes up the front side of the breakfast room window and then diagonally across to the landing window and then steeply up from the landing window to the eaves. The crack increases from zero at the render bellcast to an estimated 1-2 mm at the eaves. This is in Tyrolean which is known to be older than six years.

There is no evidence of any similar cracking at the opposite end of the terrace at No. 162 or at the facing property, No. 154. Similar cracking is evident at No. 150 where there is a tree in the footway similar to the tree in front of this property.

3.3 Rear (East) Elevation

This wall is fully rendered and Tyrolean coated.

The wall is reasonably plumb. There is crazing to the render below the rear render. This is due to render failure.

3.4 Side (South) Elevation of Extension

This wall continues in the same plane as the side elevation of the main house.

At the junction between the two there is clear evidence of four stitches about 600 mm long. There is no evidence of any crack re-opening since this work was carried out more than six years ago.

Below the kitchen window there is a ragged vertical crack in the Tyrolean coated render. There is no evidence of a crack below the bellcast. The crack increases from 2 mm at the bellcast to 4 mm at the sill. The crack appears sharp and relatively recent.

3.5 Rear (East) Elevation of Extension

This wall is fully rendered and Tyrolean coated.

The wall is reasonably plumb at the left hand south-east corner and is leaning out by about 30 mm at the right hand north-east corner.

3.6 Side (North) Elevation

This wall is fully rendered and Tyrolean coated.

The wall is plumb and free of any significant cracking. However, at the junction between the wall and the main house there is a crack which increases from zero at the dining room window sill to about 5 mm at the extension eaves. The crack is sharp and appears to be recent.

3.7 Trees and Shrubs

In the footway there is a mature tree with a trunk diameter of about 600 mm. This is pollarded to a height of about 7.5 m.

On the north boundary with No. 158 there is a small weeping willow. This has a trunk diameter of about 120 mm. The tree is located 2.4 m from and opposite the kitchen window in the centre of the elevation. The concrete paving is humped up around the tree.

3.8 Drains

Drainage from the extension collects at a 1 m deep inspection chamber in the rear lawn about 2 m beyond the extension.

This chamber appears to collect drainage from the rest of the terrace. It discharges towards the south, apparently between the garage and the old inspection chamber in the drive. The drain appears to be clear and free-flowing.

3.9 Roof Space

The roof is of traditional construction with 50 mm x 100 mm rafters spanning over single 75 mm x 170 mm purlins. The purlins are propped from the spine wall. The roof is tied from front to rear by 50 mm x 100 mm ceiling joists.

The roof structure appears sound. The party wall and the rendered chimney breast all appear to be sound.

3.10 Internal

3.10.1 Ground Floor

Decorations are clearly several years old.

The floor is reasonably level in both directions.

In the front living room there is hairline ceiling cracking across the corner of the room from the hall partition to the front bay.

In the rear dining room there is a series of four hairline diagonal ceiling cracks in a north-west/south-east direction. Above the door there is a 0.5 mm crack passing up to the ceiling and across the ceiling to the spine wall.

In the hall there are faint hairline cracks radiating out from the end of the spine wall towards the stairwell.

In the breakfast room there are 2 hairline diagonal cracks across the ceiling in a north-west/south-east direction.

In the rear extension kitchen there is clear evidence of significant recent movement. A diagonal crack passes up from behind the fridge, through the side window of the kitchen to the ceiling, then along the ceiling to the intersection with the rear wall of the main house. At the window sill above the fridge the crack is 4 mm wide in the ceramic tiles. At the top of the window it is 5 mm wide and along the rear wall intersection it is 7 mm wide. The crack reduces towards the north.

The crack noted at the junction between the north side wall and the rear wall of the main house is hidden behind the soil pipe enclosure but there is movement between the kitchen units and the rear wall of the main house. This movement is about 10 mm.

The ceramic tiles floor slopes down from front to rear by about 15 mm.

3.10.2 First Floor

The first floor joists span from side to side. The floor slopes down from the side wall to the party wall by about 40 mm.

In the front bedroom there is noticeable ceiling cracking about 1 mm wide, generally in a north-west/south-east direction but more front to rear than side to side. The crack passes into the architrave at the rear of the front bedroom door where there is hairline cracking.

In the small front bedroom there is hairline ceiling cracking in a south-west/north-east direction and hairline cracking above the front window.

On the landing the crack noted externally above the landing window is visible as a hairline. This passes across the ceiling, through the loft hatch to the spine wall and then into the rear bedroom.

In the rear bedroom, the movement is visible at the ceiling/spine wall intersection and the landing wall/spine wall intersection. The movement here appears relatively recent. The crack between the abutting walls is about 2 mm wide. Across the ceiling there is a series of 3-4 1mm wide diagonal hairline cracks in a north-west/south-east direction and cracking in the party wall and the chimney breast. Parallel with the bathroom/bedroom wall there is a 1 mm crack along the ceiling which appears to be recent.

In the rear bathroom there is hairline cracking in the ceiling in a north-west/south-east direction.

4. Conclusions and Recommendations

4.1 Rear extension

The property has clearly suffered from significant movement. The movement is most starkly evident in the rear extension where recent cracking is visible both internally and externally.

There is not only recent cracking, but it can be seen that repairs have previously been carried out. Four stitches are clearly evident at the junction between the main house and the extension and it is known that this was more than six years ago.

The combination of recent and historic movement suggests that the movement probably started at the time the extension was built and it is probably due to inadequate foundations.

4.2 Works to extension

It is likely that the foundations will require underpinning all around the extension and it is recommended that the house insurers are informed of the problem.

4.3 Main House

The main house has widespread minor cracking.

None of this movement appears to be of structural significance but it appears to be recent and is probably on-going and it will be a continual decorative irritant.

The split along the spine wall which is visible in the rear bedroom links to the crack in the side wall and suggests movement towards the front. However, the diagonal cracks in the rear dining room ceiling and elsewhere suggest movement towards the rear of the party wall.

Apart from the slight outward lean of the front corner of the house the walls are reasonably plumb and the floors are reasonably level.

4.4 Trees

The most obvious potential causes of the movement are the large tree in the footway and the small tree in the rear patio.

It is recommended that the small tree be removed and that the tree in the footway be reduced.

Historically the footway tree had been pollarded to a height of about 5.5 m. In recent decades it has been allowed to grow to a height of about 7.5 m and it is understood that it is pollarded to this height annually. Ideally the tree would be removed but its reduction to a height of 5.5 m may reduce its effect on the house.

4.5 **Works to main house**

It is recommended that the house insurers are informed of the movement in the house.

It may be considered unnecessary to carry out any foundation works but it is likely that regular re-decoration will be required more frequently than would normally be necessary.

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