SPACE

CONSULTING
STRUCTURAL
ENGINEERS

SURVEY REPORT

STRUCTURAL CALCULATIONS

154 Royal College Street,
London,
NW1 0TA

Project No. 190508

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Signed

Mr K Jeetun BEng(Hon) MSc CEng MIStructE

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Professional Indemnity Insurance
Period of cover – Ongoing
Policy Number – RPA0001393
Limit of indemnity - £2,000,000 any one claim
Insurers – Royal & Sun Alliance Insurance Plc

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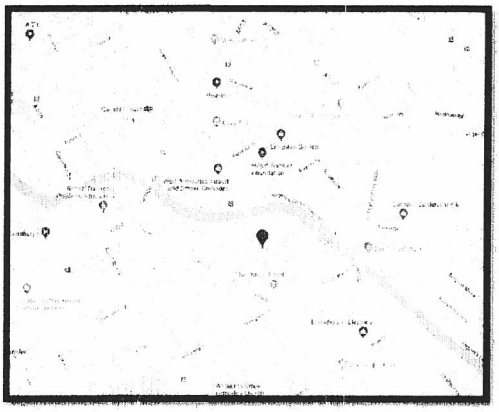
CONTENT

1 Preamble

Space Consulting Structural Engineers Ltd were appointed on the 10/05/19 to undertake a visual structural survey to suspected wall movement, suffered internally and externally at 154 Royal College Street, NW1 0TA. The Structural Engineers surveying the property was Kevin Jeetun.

The inspection was carried out on the 14th May 2019 at around 12pm. The weather was sunny with clear skies.

The property is located fronting Royal College Street 5min walk from the Overground railway station. The property is situated within a heavily built up area of mixed commercial and residential zones. The building was formally a mid-terrace but due to the removal of the end house, it is now an end of terrace with limited rear garden space.



Location Plan – Image from Google maps

The external façade of building is of solid wall construction (9inch brickwork) supporting timber roof and timber upper floors. The roof is a Butterfly roof or V-roof formed using timber sections. The floor is all timber joisted spanning front to back and tied to the building front, central spine and rear elevation.

The existing foundations are unknown at the stage but likely to be shallow due to the age of the building. We would assume the foundations to be bearing onto London Clay formation.

Kevin Jeetun Qualifications

BEng (Hons)
MSC
CEng
MIStructE

Career Summary – Previous Employers

Kevin Jeetun started his professional career at Royal BAM (Graduate/Project Engineer) in 2002. During his time with BAM, he worked in retail, residential and commercial sectors with ranging structural components and materials. Structural elements included concrete and steel frames, flat slabs, post-tensioning, bridges, and large-scale extensions. He managed fees, staff and design, delivering projects on time and within budget. Clients list includes Tesco Ltd, ASDA, Sainsbury's, Abbeygate, Helical Bar, Berkeley Homes, Pfizer and Crawley council PFI.

Kevin then moved to Gyoury Self Partnership in 2007 (Senior Engineer) working as a team leader. Kevin managed many projects simultaneously, focusing on budget, staff, and client satisfaction. He managed projects with a team of technicians and draftsman, aiming to maintain high levels of communication and performance. He had been the lead engineer of projects from large £3m warehouses to small domestic extensions, dealing with a full range of materials and foundation types. This role also included reporting on crack damage, subsidence and general structural surveys for homeowners, estate agents, and mortgage lenders.

Kevin then moved to Pinnacle in 2009 where he became an Associate. He Managed internal design teams with production of buildable value engineered designs, including checking and approving of designs. Other responsibilities included,

- Performance reviews on other members of the design team.
- Mentoring graduate and project engineers with designs and institutional affairs.
- Establishing contracts with client and novation agreements.
- Arranging site investigations and building/land surveys for pre-development works.
- Providing a friendly direct contact for the client to resolve general design issues and offer advice.
- Communication with other disciplines externally to ensure flow of information.
- Safe designs focusing on CDM aspects
- Cost management
- Structural reports and investigations

Kevin's current position is managing director of Space Consulting Structural Engineers Ltd where he undertakes designs and manages workload. He continues and is regularly involved with reports on crack damage and subsidence for legal representatives.

2 Observations

The property is situated along a level road with no significant gradients. When looking at the front of the building, it is very apparent that the window and decorative arches are non-symmetrical. The front façade looks distorted to an extent where obvious movement has occurred.

The coping to the roof looks to be sagging to a max around the centre of the span between the 2 upper floor windows. The brickwork also looks to be following the same pattern. The cladding above the ground floor shop unit is also deflecting, following a similar shape to that of the roof coping but with a higher deflection. The arches over the first-floor windows are slanted leaning toward the centre and similarly to the header courses over the upper floor windows.

The windows at first and upper levels are not rectangular and forming the shape of a parallelogram, Voids and crevices can be seen from a distance along the joint of the window frame and brickwork.

The front wall is not only sagging towards the centre but is also not vertical. The wall starts to lose verticality at first floor and continues to the roof level. Therefore, the degree of non-verticality is far greater at second floor level.

Upon closer inspection of the window frames, cracks can be seen at the joint between the frame and brickwork. We understand that the building was repointed and renovated but cracks are still clearly visible, some greater than 3mm.

Internally, it is obvious to see the ceilings and floors are not horizontal and falls are felt all over with the deepest sag towards the middle of the building. Skirting boards can be seen coming away from the wall and significant plaster cracks along the interface between walls and ceiling.

The roof consists of a butterfly style timber frame and sagging can be seen at the valley point, which is down the centre of the building.

At ground floor within the commercial unit, there is a steel post in the middle of the external glazing. This is located directly below the line of the sag in the wall. We understand there was an existing timber beam spanning the full width of the building supporting the 9inch brickwork. We understand that due to the abnormal deflection seen in the beam, the steel post was installed to provide additional support as a long-term solution.

In addition to the post being installed we understand the walls were repointed due to the severity of the cracking, and brickwork reinforced using Helifix bars.

The adjoining building which would have been the end of terrace has been demolished. We do not believe to be significant at this stage.

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3 Conclusions / Recommendations

We believe the wall has suffered from a major structural defect by virtue of the failure of the existing timber beam located at the base of the wall above the shopfront glazing. The over deflecting beam has meant the wall to be self resistive to its self-weight, together with the load from the floor joists and roof rafters. The wall acting as a shear wall panel, will have only limited resistance up to a point where stress levels exceed the allowable, creating cracks in the mortar and brickwork. Once cracking starts the walls commences its movement instigated by the greatest deflection point in the timber beam (the central point). The wall therefore moves over time bringing down everything that is relying on the wall for support, ie, floors, roof and window lintels.

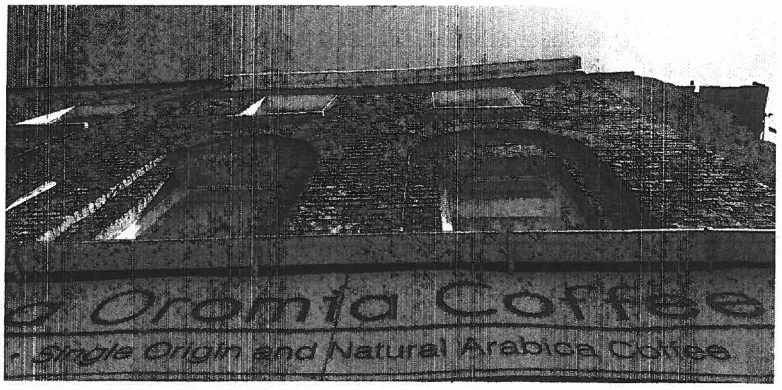
It is apparent the sag in the beam was detected and rectified using the steel column which would have stabilised the wall. However, the lifespan of the front façade has been compromised especially by the new cracks that have opened around the windows. The non-vertically of the walls means the brickwork is over stressed and relying on 'panel action' to hold itself back.

The most concerning part of the wall are the arched lintels over the first-floor windows. Arches rely on symmetry to avoid any over stressing at any points along the arch. This can be seen with some blown sections of mortar which will lead to failure and eventual collapse.

Our recommendation is to rebuild the front elevation, leaving a section of the side panels to maintain stability whilst the central portion is removed. The contractor should remove each brick and stack for reuse. The removed section should commence at shopfront beam level as this is the location where the sagging started. The new wall should be built creating an exact replica of the existing including all arches and indentation, stitched and bonded into the remaining side panels. A carefully created method statement should be drawn up proposing the sequence of works to ensure a safe and structurally adequate rebuild.

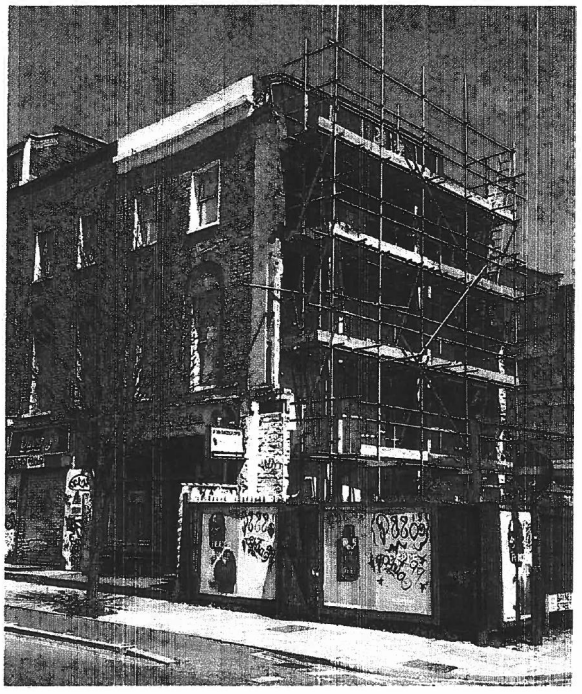
Upon the rebuild, we would also suggest installing brick reinforcement to provide additional resistance to the entire wall.

4 Photographs

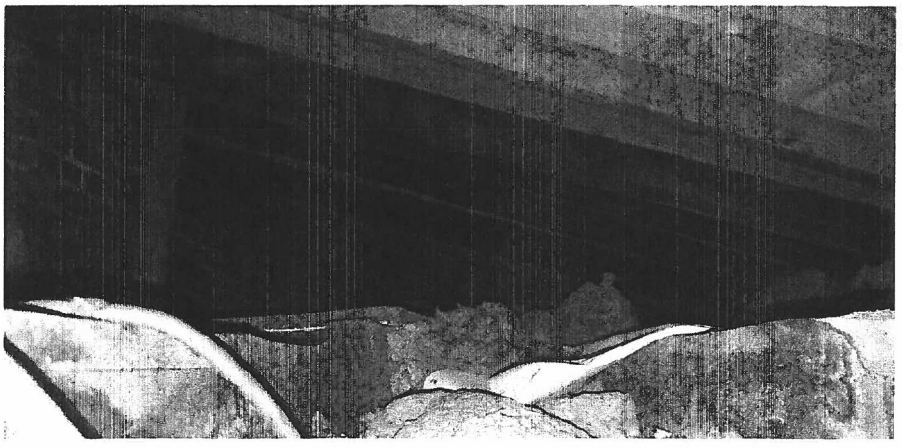


Pic 1 – View of front elevation at street level

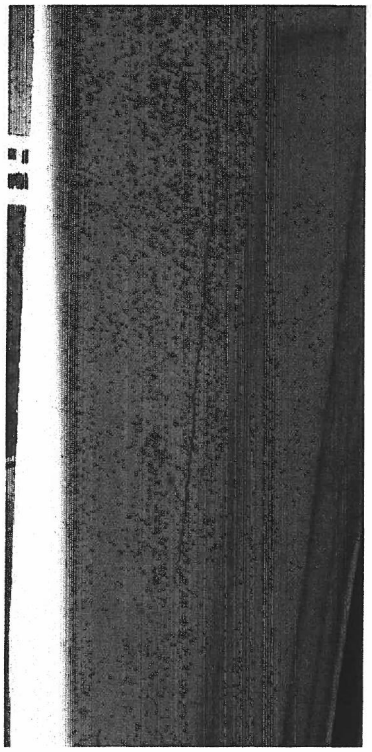
Pic 2 – View of front elevation



Pic 3 – View of side elevation



Pic 4 – View inside the roof space



Pic 5 – Typical crack around window frames

Pic 6 – Internal crack at ceilings