RIDGE

1 TO 87 REGINA ROAD CROYDON LONDON SE 25 4TW

STRUCTURAL ENGINEERING VISUAL INSPECTION OF TOWER BLOCK

August 2021

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CROYDON SE25 4TW

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VERSION CONTROL

VERSION	DATE	DESCRIPTION	CREATED BY	REVIEWED BY
1.0	9 August 2021		RMN	RMN

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1. INTRODUCTION AND BRIEF

Following instructions from Saheed Ullah, Head of Capital Delivery for Homes and Schools Place Department, Ridge structural engineers carried out a visual inspection of the tower block at 1 to 87 Regina Road, Croydon SE25 4TW. The scope for the inspection was to be limited to a visual inspection of the exterior, interior common areas and a sample number of voided flats. In addition, we carried out a review of record drawings for the building provided by LB Croydon, and specialist reports on its method of construction. Our findings were to be summarised in a brief report with recommendations for any further action that we considered to be appropriate.

The survey was conducted by Richard Newman, a Chartered Engineer and Partner with Ridge, who was accompanied by Chris Fadoju, a Chartered Building Surveyor and also a Partner with Ridge.

The inspection was made on Monday 2nd August 2021.

2. GENERAL DESCRIPTION

The building is an 11storey high tower block, understood to have been constructed using a precast reinforced concrete large panel system (LPS) and constructed by Wates. It is thought to date from the mid-1960s.

The building has subsequently been overclad, so the original cladding material could not be seen (refer Fig 1). The building contains four flats per level, symmetrically disbursed about a central stair and lift core. A projecting tower containing a waste chute has been added subsequent to the original date of construction to the north-western elevation (refer Fig 2).

There is what appears to be a lift motor room and possibly a tank room on the flat roof of the block. An additional staircase exists on the south-eastern side of the building serving the 9th, 10th and 11th floors only.

Fig 1 View of Southeast elevation of 1 to 87 Regina Road

From the record drawings it appears that the waste chute and over-cladding were installed c1998-99. From the same drawings it was possible to identify that the waste-chute tower was formed using hot-rolled steelwork and tied to the original tower for stability. The records show the cladding system comprised brackets fixed to the concrete structure supporting a system of vertical rails to which aluminium cladding panels have been fixed. This had been applied from first floor level up to roof. The ground floor level has been clad in render and insulation. The render had an exposed aggregate finish and was inset from the line of the aluminium cladding above (refer Fig 3).

Fig 2 View of Northeast elevation showing waste chute Added after original construction

Fig 3 Showing render finish to ground floor to over-cladding and aluminium panels used for remainder of block

3. SURVEY

The building was subjected to a visual inspection both externally and internally. The internal inspection was restricted to examination of the common areas (ie the main staircase, secondary staircase serving the 9th ,10th and 11th floors and lift lobby at each level) and a sample of voided units (Flats 87, 23 and 7). External examination was from the perimeter of the building at ground level.

Since the building had been overclad, the primary structure was hidden from view. Nevertheless, it was possible to see the brickwork enclosing the space below ground floor level, which remained exposed. This appeared to be in satisfactory condition (refer Fig 3).

Internally the walls in the common areas had a plastered finish. There were one or two areas where the plaster had been damaged, but this was due to impact from door handles rather than because of any underlying structural issues. This had generated a diagonal crack parallel with the door handle in one wall believed to be of blockwork construction rather than LPS (refer Fig 4).

Fig 4 Diagonal crack in wall propagated through impact from door handle

Within the flats that were examined, the internal partition walls were constructed in blockwork, (refer Fig 5) but the main structural walls all appeared to be of reinforced concrete large panels. This included the walls between the bedroom and bathroom and lounge and hall lobby.

Fig 5 Showing blockwork partition within flat

There were a few locations where the joints between the large precast concrete panels (both vertical and horizontal) were reflected in the plaster finish on these walls. However there was little evidence of any significant structural issues (refer Fig 6). There was no evidence internally of gaps appearing between wall and floor units, the floors did not appear to have suffered from long-term creep deflection, no longitudinal joints between adjacent units were visible, and there was no evidence of general cracking, exposed reinforcement or spalling concrete.

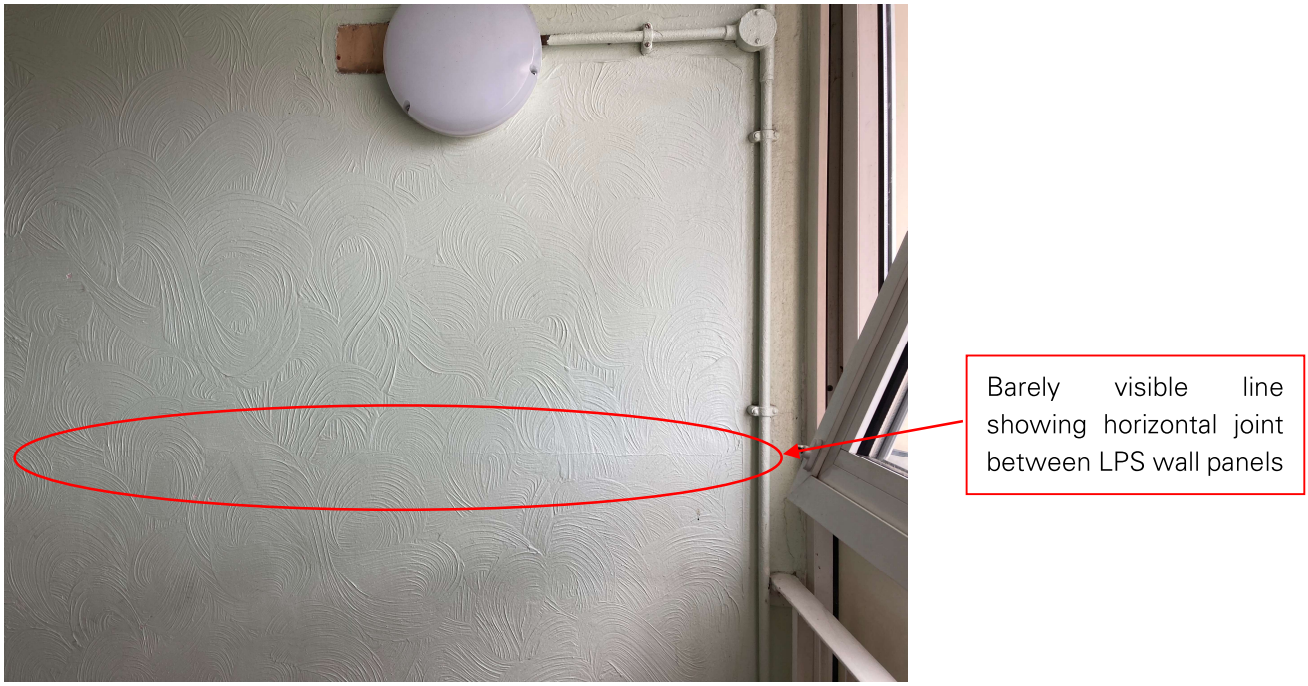

Fig 6 Horizontal joint between wall units just visible in plaster

4. RECORD REVIEW

The record drawings provided did not reveal any useful information concerning the construction of the original building. However it is understood that the building was constructed using the Wates LPS system. Reference to BRE publications indicates that the Wates system was generally not widely used compared with other LPS systems. It apparently comprises precast floors supported on solid precast internal walls, with precast sandwich panels forming the outer envelope. The inner leaf of the sandwich panels supports the floors at the loadbearing peripheral walls of the building.

A common problem with LPS systems is the detailing and workmanship at the panel joints. At least three Wates blocks have been subject to opening up by the BRE to examine these joints. Typical of the issues encountered on Wates blocks were:

1. The in-situ concrete surrounding the levelling bolt was in place and complete but was friable in nature.
2. No bedding mortar had been used at one location, resulting in the upper panel bearing unevenly on high spots at the top of the lower panel.
3. Vertical cracking between panels occurred frequently at the higher levels in the building but less often with reducing height. No cracks were present below fourth-floor level.
4. A strengthening bar exposed was not properly embedded in the concrete and was considered to be ineffective.
5. Chloride contents in all samples were in the low.
6. Inadequate concrete cover to the reinforcement leading to carbonation and spalling of the concrete cover.
7. Water penetration at some joints
8. Chloride contents in the panels were in the low category but where repairs had been made, chloride contents in the repair materials were often high.
9. Poor-quality concrete in the cladding panels due to an excessive amount of sand in the mix resulting in a poorly graded porous concrete, with excessive shrinkage leading to cracking in the panels.

5. CONCLUSIONS

From the observations made on site, there was little visible evidence of any structural distress in the building. However it must be borne in mind that the external structure of the building was hidden behind the cladding material, and so the condition of the external wall panels could not be observed. In addition, experience gained by the BRE in examining other LPS structures in general and the Wates system in particular has highlighted potential detailing and workmanship issues that may exist.

Most blocks of this age and form of construction will have been subjected to structural engineering appraisal following the Ronan point collapse. However many of these appraisals were undertaken in the form of desktop studies, and the conclusions regarding such matters as quality of workmanship, adequacy of detailing, robustness and resistance to disproportionate collapse will not necessarily have been examined by physical examination. In order to evaluate whether any of the risks highlighted in the previous section are present in the building, it is recommended that some limited scope opening up is carried out to enable examination by a Chartered engineer. Whilst this only enables a limited assessment to be made, it will provide an indication of the likelihood of the construction being of an acceptable standard or otherwise, in which case furthermore detailed examination might be necessary.

6. RECOMMENDATIONS

Taking the foregoing points into account, it is recommended that some sample areas are opened up in the voided units to allow visual examination of the joint details by a Chartered Engineer. This will enable an assessment to be made of whether the construction detailing and workmanship is likely to be of a satisfactory standard, sufficient to provide the degree of robustness required to resist disproportionate collapse. Whilst such a limited scope investigation will only allow a very small sample to be considered, it will provide an indicator as to the standard of construction employed on the remainder of the building, and hence enable an informed decision to be made on whether furthermore detailed investigation might ultimately be necessary.

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