Legal & Commercial

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Opal Tower investigation reveals structural and design issues

An interim report on Sydney's Opal Tower incident has been released by the NSW Government and indicates that the 'materials used in construction' are unlikely to have contributed to the damage of the structure.

In particular:

> **Materials**
>
> There is also no evidence in the documentation we have reviewed to date to indicate that the materials used in construction were inferior in quality or did not meet the specifications required. We therefore infer that poor quality construction materials are unlikely to have contributed to the damage observed.

Rather, the report indicates that structural design and construction issues were likely the cause:

Design

Preliminary consideration of the bearing capacities of the hob beam at the locations of the connection of the beams with columns C21 and C38 on Level 10 and with columns C16 and C34 on Level 4 indicate factors of safety lower than required by Standards. To date, we are still awaiting further details of design analyses to further consider this factor.

Construction

There are a number of points noted on Level 10 of the building where construction differed from design and / or Standards:

(a) Grouting: design drawings indicate that full grout coverage was expected between the panel and the hob beam. However, during construction only the inner surfaces of approximately 110mm width appear to have been grouted, leading to an eccentric bearing load on the hob beam on Level 10. It should also be noted that approved shop drawings show the grout extending over only the inner portion of the hob beam to panel connection;

(b) Location of reinforcing steel in the vicinity of the connection between the hob beam and columns C21 and C38 on Level 10, in particular, inadequate cover concrete due to encroachment of discontinued (anchored) column bars into the cover zone, and the placement of an electrical conduit within the cover zone in this area;

(c) A dowel bar between the hob beam and the panel was observed to be incomplete, possibly cut during construction;

(d) The original design drawings of the building indicate precast concrete panels that were the same width as the hob beam upon which they rest (180 mm). These were subsequently manufactured to be 200 mm in width. The panels were erected so that they overhang the inside face of the hob beam by approximately 20 mm; and

(e) Inadequate tensile capacity in the horizontal direction in the bottom region of Panel A that rests on the hob beam spanning columns C21 and C38. There is compelling evidence indicating that the wrong size reinforcing bars were placed in this area during manufacture of this particular panel – 20 mm diameter bars were used instead of 28 mm diameter bars (see Figure 8).

At this stage it is not possible to state a definitive cause for the failure of the hob beam on Level 10. However, it is likely that a combination of some of the above design and construction issues led to the observed structural damage on Level 10. There were other construction issues observed, such as incorrectly anchored shear reinforcement in the hob beam, which were considered immaterial to the failure.

In regards to the timing of the observation of damage, it is likely that the damage occurred after progressive build-up of load on the structure as apartments became occupied, culminating with the observed failure at Level 10 on 24 December.

The architectural design where the major damage to the hob beam has been observed on Level 4 is quite different to that of the damaged hob beam on Level 10. Namely, the panels commencing at Level 4 are manufactured in two sections, rather than one, and the width of the hob beam is 320 mm under the inner panel and 180 mm under the outer panel.

The cause of the damage observed on Level 4 is still being assessed and the bearing of the damaged hob beam on its supporting columns is being studied in detail.

Read the full report here.

Media reports can be found here:

- Opal Tower report reveals 'structural design and construction issues'
- Opal Tower residents given all clear to start moving back in this weekend

- NSW Government to crack down on dodgy building certifiers following Opal Tower saga
- Opal Tower woes continue after new cracks found on lower levels
- Opal Tower residents still in the dark following inconclusive interim report

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