

6 new floors in pre-fabricated steel frames were added to this 25 storey precast concrete building, without over-loading the existing building and the work was completed in just 12 weeks

RENOVATION OF ARAGON TOWER, EAST LONDON



Renovation of existing 1960s concrete tower blocks is an important social concern, especially if the renovation work can be combined with roof-top extensions to create valuable new space without impacting on the rest of the building

In 2003, Developer Berkeley Homes purchased from Lewisham Council a run-down 25 storey residential tower block called Aragon Tower in Deptford, east London, which was built in 1962 and was at 78m high, the tallest residential building in London. To add value to the existing 144 flats, the developer chose to add 6 new floors to create 14 new high quality apartments and penthouse all with magnificent views of the nearby river Thames.

Aragon Tower was an ambitious project which included over-cladding of the existing façade as well as the roof-top extension in structural steelwork, steel decking, parapets and in-situ concrete for the suspended floors. In 2004, when work started on site, the client wished to accelerate the construction

programme by achieving a high level of pre-fabrication

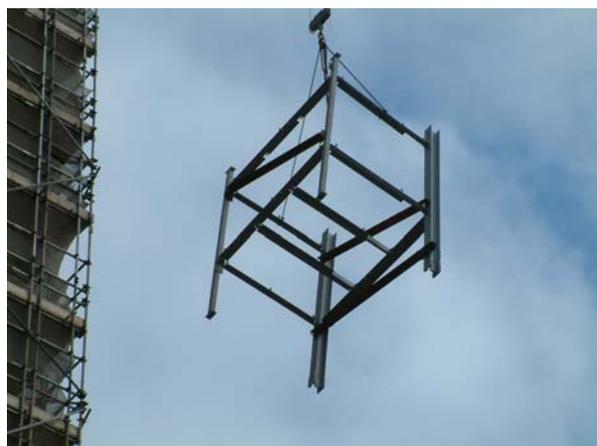
The optimised design for the project kept the number of pieces of steel components to a minimum and this was further enhanced through a rationalised modular and pre-assembly of storey-high frames, which enabled single lifts of multiple components to a height of over 90 m.

The lifting of pre-assembled frames, comprising Universal Columns and Beams, also included trapezoidal composite decking to speed up the installation process and to act as a working platform. The decking was attached to the steel frames with shear studs and reinforcement provided structure continuity.

The whole of the structural work was completed in 12 weeks, despite the need to avoid disturbance to the nearby properties. The total value of the renovation project was £3 million of which the structural work was valued at £520,000.

Application Benefits:

- 6 new floors added to a 25 storey concrete building
- New steel floors are sufficiently lightweight that they do not add excessive load
- Steel frames are pre-assembled and lifted into place
- Fast speed of construction
- Excellent fire resistance and acoustic insulation of the composite floors



Installation of pre-fabricated steel frame

Project Team:

Client: Berkeley Homes

Architects:

Structural engineer: JSA

Main Contractor:

Steelwork contractor: Bourne Steel



New steelwork at roof level

Construction Details:

The pre-fabricated steel frames were assembled at ground level and lifted some 80m onto RC plinths formed on top of the 25th floor level of the existing building, having first demolished the former roof and side walls. A total of 6 new floors was created in this way plus the re-built former 25th floor. The final building height was close to 95m. Set back terraces were provided at the 25th floor and upper levels.

The new structure of approximately 14m x 10m on plan comprised a grillage of 203mm deep Universal Column sections spanning 5.9m as beams. These sections were chosen to minimise the floor depth to a total of 450mm. The new columns were 152 UC sections, which were braced together by 150mm diameter Circular Hollow Sections.

The steel decking was pre-fixed to the beams so that the concrete slab could be placed on it to provide a stiff, fire resistant and acoustically excellent floor. A fire resistance of 90 minutes was specified for this roof-top extension which was satisfied by use of intumescent coatings to the steelwork.

Importantly, the self weight of the new structure had to be kept to a minimum and the 6 new floors added less than 15% additional weight, which was within the capabilities of the existing structure and foundations.

New steel and concrete stairs were also pre-assembled and lifted into place in order to provide easy access during the renovation work. The stairs and lifts were also continued down to ground level to provide independent access to the upper floors. The installation and concreting work by Bourne Steel took only 12 weeks.

In the following phase, the existing building and its roof-top extension was over-clad using large metallic panels in a metallic pewter powder-coating finished to a marine specification. The total area of over-cladding was some 6000m².

This project illustrates clearly the benefits of pre-fabrication in renovation work to speed up the construction process and to minimise the disturbance of the work in terms of noise, vibration, vehicle movements and waste on site.