



## Slabstress

The Cube at The Mailbox, Birmingham

**Client**  
Birmingham Development Co.

**Principal Contractor**  
Buildability

**Structural Engineer**  
Buro Happold

**Frame Contractor**  
O'Donnell

**Post-tensioning Designer**  
Matthew Consultants

**Contract Duration**  
Nov 08 to July 09

The Cube is a 24 storey mixed use development. The lower five floors house offices, the next eleven are residential and the top four are a hotel and restaurant. Below all this is a four storey podium with restaurants, shopping and car parking.



In plan, The Cube is a U-shaped building. The illusion of a cube is achieved by bridging the gold-coloured cladding across the open throat of the "U". Looking down into the courtyard so created, reveals an interesting clash of angles as the slab edges jostle for position at each successive level.

Levels 9-24 were post-tensioned. By choosing to use post-tensioning the developers could put an extra storey within the building height. This gave a total area of PT slabs of 28,100m<sup>2</sup>.



Each floor plate was divided into four pours approximately 30 by 24m. Infill strips were used between some pours to provide temporary releases to the restraint to slab shortening that the RC cores would otherwise have offered. The structural grid was typically 8 by 8m but spans were substantially longer at the irregular slab edge at the courtyard. The slab was also asked to cantilever up to 3.5m in some areas of the courtyard. The PT slabs were generally 225 or 250mm thick.



The post-tensioning system selected was unbonded 15mm strands with Freyssinet 1F15 anchorages. The strands were bundled into groups of 2 or 3 typically and laid onto the decking into parabolic profiles with the aid of plastic chairs of differing heights.



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