

## Multiplex upholds justice in Parramatta with concrete framing

Built by Multiplex under a fixed 3 year design and construct contract, the Parramatta Justice development includes two new multi-storey buildings, a new low-storey building and refurbishment to some existing buildings. The 6000 m<sup>2</sup> site will house the new Sydney West Trial Courts, NSW Children's Court, Attorney General Department of NSW and Sydney West Area Health Services outpatient services.

Prospective bidders faced two major challenges – fixed price tendering on an extremely complex multi-building project; and the fixed term contract period given the possibility of lost time due to the archaeological heritage of the site. Adopting concrete framing for all three new building structures, Multiplex won and completed this difficult project 6 months ahead of schedule, and under budget. Only building in concrete could reliably provide the necessary speed of construction, economics and price stability required to achieve such a result.

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**1st stage of project:** Refurbishment of existing buildings, completed April 2006

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**2nd stage of project:** NSW Children's Court building, 3-storeys with 6 courts, completed September 2006

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**3rd stage of project:** Justice Administration building, 10 storeys, 21,000 m<sup>2</sup> floor area, completed August 2007

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**4th and final stage of project:** Sydney West Trial Courts building, 7 storeys with 9 trial courts, completed December 2007 (6 months ahead of schedule)

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Project budget \$287 million

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Contract period August 2005 to August 2008



### A concrete framed solution

The 10 storey Justice Administration building is built on a 13.5 m x 8.1 m column grid with an offset service core on its Western side that provides large open floor spaces. Suspended floor plates feature post-tensioned (PT) concrete band beams supporting one way PT floors. Conventional reinforced concrete columns and core complete the structure.

The 7 storey Sydney West Trial Courts building consists of three suspended podium floors with four further office floors. The structure is dominated by the need for separation of the different judicial zones, including 11 lifts safeguarding potential crossover. The resulting complex floor plates were constructed with reinforced concrete band beams and slabs. Load bearing precast facade walls support the structure on the East and West sides.



### Parramatta Justice Precinct Project

Marsden, O'Connell and George Streets, Parramatta, NSW

developer:

NSW Department of Commerce

builder:

Multiplex Constructions NSW Pty Ltd

structural engineer:

Van der Meer Consulting

architect:

Lyons and Bates Smart



*The all concrete Justice Administration building achieved a 5-star Green Star rating*

## Concrete framing provides value

Speed of construction, price stability of building materials and construction system reliability were the major factors influencing the choice of structural framing. Structural steel framing was not considered a competitive option on these three key criteria when compared to the superior economics and predictability of building with concrete.

Structure alternatives considered for the 10 storey Justice Administration building were: a conventional centrally placed concrete core versus an offset core to create an open plan flexible floor space; and PT concrete floor plates versus conventional reinforced concrete floor plates.

The structure of the Sydney West Trial Courts building was dictated by its complex floor plan, which limited the range of possible alternatives. A load bearing precast concrete core option was considered however an insitu jump formed core was considered to be a faster option. With spans varying from 6.0 m up to 13.5 m, a combination of PT and RC band beams were employed with RC slabs.

## Concrete framing delivers speed

The large Justice Administration building floors were constructed in two concrete pours which produced a combined floor to floor cycle speed of 7 days. The Sydney West Trial Courts building achieved 10 day floor to floor cycles for the complex podium levels and 8 day cycles on the typical upper levels.

Utilising load bearing precast concrete for the Eastern and Western facades of the complex Sydney West Trial Courts building assisted in meeting its ambitious construction programme.

## Concrete framing the low risk option

Programme predictability was viewed as vitally important for this challenging project. The project team deemed that concrete framing, being a proven system that all site staff were experienced in, presented the lowest risk option to achieve schedule and budget.

## 5-star Green Star office design (v2) rating for Justice Building

The design brief for the Justice Building specified a 5 star rating under the Green Building Council of Australia Green Star scheme. The use of concrete made the following significant contributions to achieving the 5 star rating:

- The offset concrete services core at the western end of the

building assisted the overall thermal energy efficient design of the building.

- The white precast concrete western facade walls and curtain wall shaded by louvres similarly assisted thermal design.
- Use of concrete with 65% recycled content.

The Justice Administration building also features energy efficient above ceiling passive 'chilled beam' cooling which is easily accommodated within the concrete band beam floor structure. The concrete floors and structure also contributed to an energy efficient thermal design by providing thermal mass which helps regulate temperature swings within the building.



*White precast concrete western facade walls on the Justice Administration building*

## Key features of the design-and-construct solution:

- Versatile concrete band beams with PT proves most effective floor structure for all buildings.
- Jump formed core construction.
- Precast concrete load bearing facade walls on the Justice Administration building.
- Energy efficient design incorporating concrete's thermal mass properties helps achieve a 5 star rating on the Justice Administration building.

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