

SX1 - Southern Cross Development Eastern Tower

"There was no previous relationship with the site team but some relationship with Multiplex. The Multiplex site team was relatively unfamiliar with high rise structural steel construction so the key was in the professional shop detailing, and GVP facilitated this. The big advantage in building in steel is floor turnaround time. With steel you can move the screens the next day whereas with concrete screens cannot move until the back-propping is complete and the concrete has had sufficient time to cure."

Durham Shaw, Multiplex
Constructions Design Manager

"The other great advantage was the reduction in the number of workers on site. On this project the erection team was 15 whereas if the building had been a concrete frame the number of form workers would have been approximately 80."

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"....We recognised that pre-planning is paramount in achieving and delivering the project on time and on budget. It is through getting the project team working closely together at the initial planning phase that determines the success of the building system adopted....then the advantages of opting for a structural steel building system can be realised."

Lou Piovesan,
Director at Bonacci Group

ASI Head Office

Level 13, 99 Mount Street,
North Sydney, NSW 2060
PO Box 6366
North Sydney NSW 2059
Telephone: 02 9929 6666
Facsimile: 02 9955 5406
www.beyond2.com.au



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Multiplex Construction is the 'design and construct' builder for this \$300 million development. It is estimated that 40,000 cubic metres of concrete and 6,500 tonnes of steel will be used on the project. The SX1 (or East tower) will deliver 76,700 square metres over forty floors.

Architecture

Woods Bagot, the architects on the project, has designed a dramatically angled glazed façade, to take advantage of the city views. Gordana Ticak, Woods Bagot's Project Director said that: "On the eastern façade we utilized the slim profile of the slab (Stramit Condeck® with 125PFC edge beam) and floor structure to extend glazing from the floor to the underside of the slab above thus maximising the views and natural light penetration. The steel structure and the beams cantilever enabled creation of large podium floors, giving a dramatic affect of space without any apparent support."

The long spans were a massive selling feature for SX Developments and enabled work station layouts at a 1,500 millimetre grids rather than 800 or 900 millimetres. This significantly improved building efficiency. The structural solution for the tower floor plate accommodated spans of up to 16 metres radiating from the central core.

Builder

Multiplex Constructions required the structure to be simple, easy to construct, repetitive and minimise the on-site trades. Durham Shaw, Multiplex Constructions' Design Manager on the site, said that the two main drivers for steel were the price of formwork and the competitive quotes from the steel fabricators. Durham said that GVP, engaged as the steel fabricator and erector, conducted the operation in a highly professional manner. "There was no previous relationship with the site team but some relationship with Multiplex. The big advantage in building in steel is floor turnaround time. With steel you can move the screens the next day whereas with concrete screens cannot move until the back-propping is complete and the concrete has had sufficient time to cure."

"The other great advantage was the reduction in the number of workers on site. On this project the erection team was 15 whereas if the building had been a concrete frame the number of form workers would have been approximately 80," Durham said.

Steel detailing

Steel detailer Ricky Hains of PlanIT Design Group said they created a 3D model for the project using ProSteel 3D detailing software.

"Multiplex's use of a web based project management programme Aconex facilitated the exchange of documentation and helped coordination between the various sub-contractors including those working on the façade glazing and the steel structure," said Ricky.

Structural steel design

Bonacci Group (structural engineers on the project) Director Stuart Rossiter, proposed an unpropped steel frame, acting compositely with metal deck formwork as the most cost-effective solution for the tower, and this was then verified by Multiplex Constructions. Columns were spaced around the building's perimeter, at 9 metre centres, to suit the architectural ceiling and façade grid and there are no column transfers.

Lou Piovesan, Director at Bonacci Group described the design of the columns, slab, and beams of the structural system.

Columns

"Full structural steel columns were adopted in lieu of composite acting or erection column encased in concrete. This enables the structural column to be relatively small in size. GVP Fabricators the steel fabricators and erectors for the project sourced 460 Grade hot rolled sections from Germany through Smorgon Steel Metals Distribution who supplied 1,155 tonnes of imported hot rolled sections and 5,345 tonnes of Australian hot rolled and welded sections.

Slabs

Continuous metal deck formwork spanning 3,000 millimetres between secondary beams was used to support the 120 millimetres thick floor slab, with continuous reinforcing fabric top. In areas where greater acoustic requirement was required (i.e. plant rooms), a thicker slab with secondary beams at closer centres was adopted.

Beams

The building floor framing system has composite steel secondary beams spanning up to 15 metres.

Fire Engineering Design

A thorough fire engineering design was investigated by Lincolne Scott Fire, all working through the building surveyor, Philip Chun and Associates. The fire engineering solution adopted to comply with the requirements of the Building Code of Australia (BCA) was to fire protect all steel columns to the underside of primary beams, as well as primary beams with a surface area to mass ratio of greater than 20 square metres per tonne.

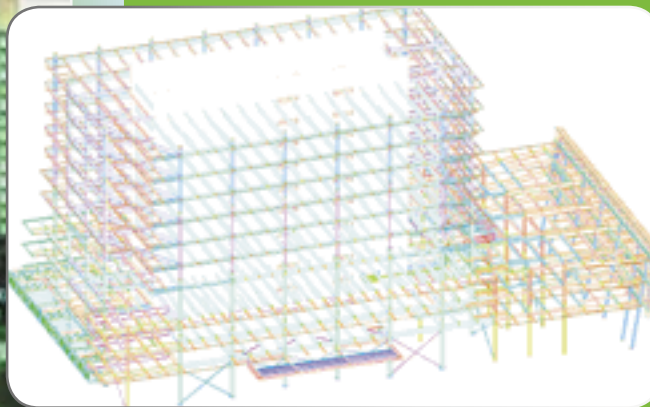
The fire engineering study reduced the protection from two to one hour through larger exits, an economically acceptable outcome, as most of the structural steel was unprotected.

Conclusion

Lou concluded his comments on this project by saying: "....We recognised that pre-planning is paramount in achieving and delivering the project on time and on budget. It is through getting the project team working closely together at the initial planning phase that determines the success of the building system adopted.... then the advantages of opting for a structural steel building system can be realised."

SX1 - Southern Cross Development

Eastern Tower



Project Team

Developer: SX developments

Building Contractor:
Multiplex Constructions

Architect: Woods Bagot

Structural Engineers:
Bonacci Group

Steel Contractor:
GVP Fabricators

Steel detailing: PlanIT
Design Group

Steel supplier: Smorgon Steel
Metals Distribution

STRUCTURAL STEEL delivered:

- Earlier Occupation
- Reduced Risks
- Larger Column-Free Space
- Competitive Cost



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