Steel Frame construction delivers stylish new Melbourne Tower

According to its proponents, the new Urban Workshop at 50 Lonsdale Street, Melbourne, designed by John Wardle Architects in association with HASSELL and NH Architecture, has "unparalleled modern features that will set new standards in office accommodation." Built for the Industry Superannuation Property Trust, the majority of the building's occupants will be within 12 metres of a window, no matter where they are in the 54,000 square metres of floor space on the 34 above ground levels. There are 5 basement levels.

The building, project costs for which were $200 million, does look very different. It is very light and transparent, very open, indicating that there is actually a lot that is quite different under the skin as well.

Considerable innovations in the state-of-the-art management and control of building services are just one, albeit important, aspect of the project. The building has achieved a 4.5 star (out of 5) Australian Building Greenhouse Rating (ABGR), as a result of detailed design covering all energy aspects of the building. The Building Management System flexibly responds to occupant demands, as well as optimising energy use and logging usage patterns.

The system manages lighting, power, transport, safety, security and air handling, which for example, can utilise outside air when outdoor ambient conditions permit, thus avoiding the need to cool air. Heat recovery from light fittings in ceiling voids can also be used to supplement heating in winter.

The innovative structural design of the steel and glass structure is fundamental to achieving the light, airy and transparent look. It is a steel-framed, composite construction with innovative composite columns and metal deck, prop free construction. Floor construction employs lightweight composite steel beams (up to 13 metre span), with a cantilever that supports floor to ceiling windows and provides a column free façade effect.

Its 1,900 square metre floor plate is unique for a 34 storey building in Melbourne. The slender lift core is offset and has three core outriggers at the top of the building to assist in providing structural stiffness. Flying beam structures are employed for podium floors.

Peter Chancellor of Connell Mott MacDonald, the design engineers on the project said that: "We produced designs for two versions – in post tension concrete and in steel. Both were costed by Rider Hunt and were pretty close. Because of similar floor-to-floors heights of 3.95 metres for the concrete and steel alternatives and the same vertical interval for accommodating services, there was no significant variation in costs for services."

Multiplex, the builder on the project, then made the call for the steel version, and the detailed design was done. In making the decision to use steel Multiplex said that steel presented less risk to the building program and a significant reduction in labour costs.

Chancellor went on to say that: "There was a tight program for this job, and Multiplex felt there was a lower risk with the steel option as more of the components could be fabricated off site." "Another benefit was the jump-start method of construction for which steel is very suitable. The lower podium floors are quite complex post tensioned concrete structures so it was advantageous to be able to remove these from the critical path for the project. The tall steel jump start columns protruded above the podium levels, and meant that by building on top of those jump start columns, work could proceed on the upper levels, while the complex and time consuming podium floors were attended to. Steel construction is ideal for this approach," Chancellor concluded.

The project grid was 9 metres x 12 metres, with a central spine beam. Because the floor plate was not rectangular, it needed a bay of varying span secondary beams having one support on the central concrete core. The beams were generally OneSteel 700WB and 610 and

530UB sections with tubular steel perimeter columns and square steel internal composite columns, involving innovative splice details. The floor slabs were 120mm with designated areas strengthened for compactus loading.

The floor plate sizes at 9 metres x 12 metres, were also quite economical in steel. Other reasons for going with steel included:

- simplicity and ease of construction
- speed of erection
- emphasis on repetition engineering
- considerable off site construction opportunities, leading to reduction in site trades and labour
- lower structure weight compared to concrete construction meant that the column and footing sizes could be reduced

In all, steel presented less risk to the overall program and the contract time saving was estimated at two months. The building is due for completion later this year.

Project team
Developer: ISPT
Architect: John Wardle Architects in association with HASSELL and NH Architecture
Structural Engineer: Connell Mott MacDonald
Builder: Multiplex Constructions
Steelwork Contractor: GFC Industries
Steel Detailer: Straightline Drafting
Quantity Surveyor: Rider Hunt
Fire Engineering: Norman Disney Young and Victoria University of Technology