

Big wheel a balancing feat for lead contractor



Southern Star Observation Wheel

Deft work is well underway on what is destined to dazzle visitors to Waterfront City in Melbourne's redeveloped Docklands area with the Southern Star Observation Wheel set to rival the famous London Eye.

Working with the project's main contractor Hansen Yuncken, leading contractor Alfasi Steel Constructions has confronted a myriad of challenges in fabricating parts and erecting the mega-sized wheel because of the large components to be lifted into position.

Careful planning is necessary to counter the weight imbalances as sections weighing up to 26 tonnes are bolted on to create the structure which will weigh a total of 1500 tonnes on completion.

To achieve this, Alfasi is balancing contributions from a number of suppliers and subcontractors to ensure a total project solution encompassing steel detailing, fabrication, erection, electrics and commissioning.

Japanese company, Sanoyas Hishino Meisho Corporation (SHM) designed the wheel and are supplying a number of critical components under contract to Hansen Yuncken, including the hub, controls and motors as well as the cabins.

Whereas the London Eye is similar to a bicycle wheel with spokes, the Southern Star Observation Wheel comprises a unique star-like structure. The wheel will also feature a multi-million dollar spectacular LED lighting system.

Alfasi also devised the erection methodology and are conducting tests as well as installing the drive/braking system, electrical works package and 21 mechanically rotating cabins.

It is the first time a project of this complexity has ever been attempted by Alfasi and the team relishes the challenges involved.

"We spent four months in concept development sessions to meticulously plan out exactly how we were going to undertake every single step of the project," Alfasi project manager, **Peter Jones** said.

"All fabrication is to tight tolerances as the wheel must be round and in one plane perpendicular to the hub axis. Each component is carefully surveyed before final bolt torquing."

Alfasi prepared a very detailed erection program showing all crane lifts, temporary bracing, erection platforms and rotation winches.

According to Mr Jones, it was critical that the alignment at the top of the towers be within specified tolerances on the giant support columns.

"Despite the considerable scale of the structure, we really do have to work within tolerances of mere millimetres."

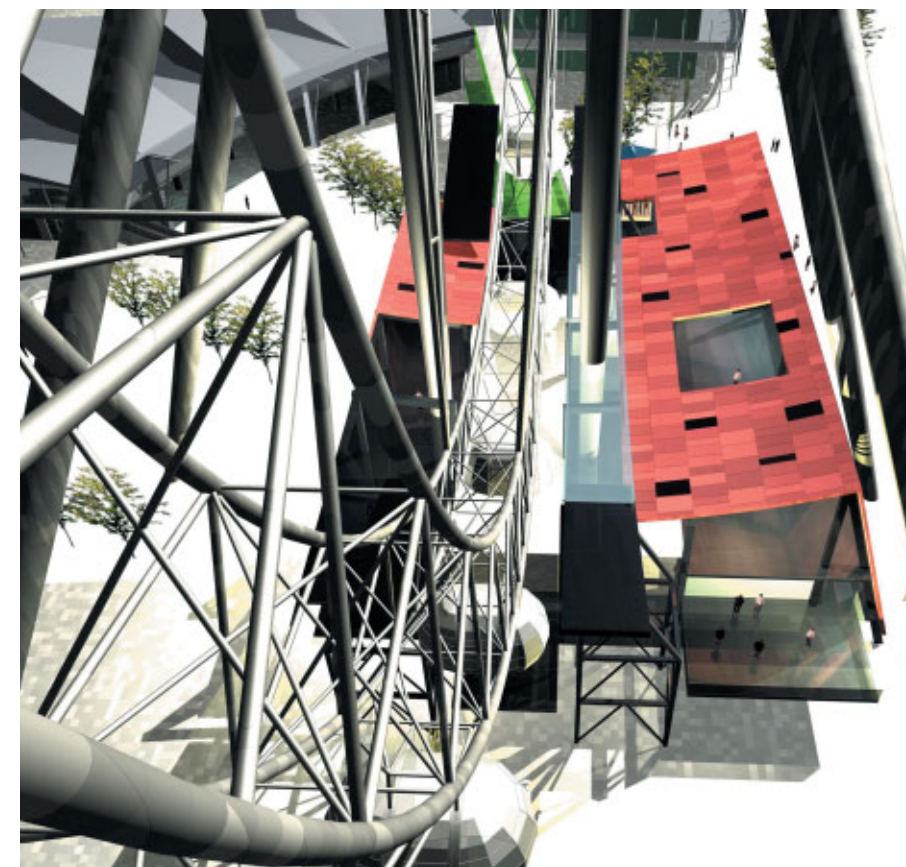
"A difference of just three millimetres between the elevations of the two towers would throw the wheel out by twenty at ground level. So despite the considerable scale of the structure, we really do have to work within tolerances of mere millimetres," he said.

Thermal expansion and strong coastal wind factors also complicate the erection process.

"The thermal and wind movements will be taken up in the drive motor region atop level two," Hansen Yuncken project manager, **Justin Murray** said.

With the hub securely in place, the spokes of the 110-metre diameter wheel will progressively be attached followed by the 21 passenger cabins.

Each of the 21 air conditioned cabins will provide seating for 20 people, measure 5.7 metres in length and 3.7 metres in diameter and fit inside two special slew rings which keep the cabin upright as it moves around the circle. They are being constructed from a



combination of stainless steel frames, glass and fibre reinforced plastic.

In their lead role, Alfasi managed the fabrication of the six main support columns and capitals undertaken by Haywoods Steel Fabrication & Construction in Tasmania. The main support columns are tapered from 1.6 to 2.5 metres in diameter and were fabricated in half sections, transported to site and welded to form the full columns.

All other steel for the project is being fabricated by Alfasi at its Dandenong facility with the steel tube being supplied by Orrcon.

"We manufactured various circular hollow sections specifically for this project. The tube has been manufactured at our Wollongong and Salisbury plants to exacting Australian standards," Orrcon's Manager Vic/Tas, **Steve Dawes** said.

As this issue goes to press, the columns have been erected and the central hub, weighing 75 tonnes, has been installed. The inner ring around the hub has been fitted and the seven spokes were fixed into position during October 2007. Each 22 tonne spoke has eight holding positions to the hub ring and is fixed in a horizontal position 60 metres above the ground. There are seven spokes in total, each symbolising a different State and Territory in Australia.

The base of the wheel will house three storeys of retail, commercial, office space and

function facilities as well as queuing and loading areas.

The Southern Star Observation Wheel is due for completion in late 2008.

Project Team

Property Owner: ING Real Estate Development

Head Contractor: Hansen Yuncken

Observation Wheel Specialist: Sanoyas Hishino Meisho Corporation

Building Architect: HASSELL

Building Structural Engineer: Winward Structures

Leading Contractor: Alfasi Steel Constructions