



Building extended 'inside the box'

Gilbert Building Redevelopment, Adelaide SA

A steel-based approach is proving a winner for a major redevelopment at the Women's and Children's Hospital (WCH) in Adelaide within a work site effectively boxed in on all four sides and whilst the original floor underneath keep operating.

The \$24 million new building project is adding three new floors on top of the WCH's Gilbert Building for facilities to improve care of sick children, manage life threatening and chronic diseases and equip the hospital's researchers with the best possible facilities.

The Gilbert Building is also the South Australian home of the Starlight Foundation which has traditionally been the recipient of the ASI's Golf Day fundraising efforts in that State.

The project has been made possible with \$15 million Federal Government funding, \$4.4 million from the State Government of South Australia, \$2.6 million from the Women's and Children's Hospital Foundation, and \$2 million from the Little Heroes Foundation. Construction began in March this year and is expected to be completed on time this November.

Kellogg Brown & Root (KBR) Principal Structural Engineer Infrastructure and Minerals, **Dr Gregg Klopp** said the main significance of the project is in providing three new floor levels (two newly constructed) without interrupting the performance of the hospital on a site that has very limited space for expansion.

Project preparation included an upgrade of lift access from the Hospital's Good Friday and Gilbert buildings, and the replacement of the cooling towers on the top of the Gilbert Building. The project also involves re-locating some offices and departments.

"The building was initially designed to have an additional level constructed on top and the design of this extra level when the original building was constructed was a reinforced concrete floor," he said.

"But it was necessary to change to a steelwork solution to reduce the weight of the structure in order to accommodate two extra levels, especially with respect to seismic loads."





The original building was designed to the original Australian Earthquake Code AS2121 and the new extension required that the whole building be assessed against the current code AS1170.4.

"The critical load case for the extension was the ability of the existing lateral load resisting elements, lift shaft and stair shaft, to resist the seismic loads," Dr Klopp said.

"If the steel structure could not have been used then only one floor could have been added which would not have provided the floor area required for the Children's Cancer Centre."

He said the existing structure set the column spacing and building grid so that steel was the only material considered. The existing lift

and stair shafts had cast in coupler bars that did not match current reinforcement and meant drilling in new bars.

"Steelwork allowed the design to be of un-propped construction which meant nothing required propping through the existing (unoccupied) level six slab through to the occupied levels of the building below which would have disrupted the operation of the hospital."

Project Manager with managing contractor Hansen Yuncken, **David Focareta** concurred that structural steel was indeed the preferred option due to restraints on the site reducing storage and working space.

"We relocated the tower crane frame from the loading bay to within an empty lift shaft due to restricted working space provided," he said.

"As the crane was supported mid span within the lift shaft from steel grillages, the size and therefore lifting capacity of the crane was restricted.

"Closures and spotters were used to assist with the erection of the steelwork as the project is being undertaken over operating areas such as a loading bay, children's play area, corridors and parental ward.

"The main lessons we take away from the job are that the length of steel members for delivery are best determined during the design phase.

"We spliced the full length columns before the roof structure to allow shop drafting to be completed and to prevent any hold ups to the

roof structure. This enabled the two new floors to be shop drawn, fabricated and erected as the roof structure was being shop drawn.

"Program time is reduced with structural steel compared to a concrete frame."

The project's steel fabricator, Manuele Engineers agreed that detailed planning has ensured it delivered only the required items to site as they were required due to the restrictive site conditions.

"A good level of pre-fabrication offsite definitely helped to alleviate disruption on the 'boxed-in' building site," **Vince Manuele** said.

Mr Manuele added that the job was accomplished using the standard OneSteel 300 grade structural steel for general and truss fabrication, 265 tonnes all told.



Project Team:

Architecture: Cheesman Architects

Structural Engineering: Kellogg Brown & Root

Managing Contractor: Hansen Yuncken

Steel Fabricator: Manuele Engineers

Steel Detailer: USDSA

ASI Steel Manufacturers: OneSteel, BlueScope Lysaght (purlins)

ASI Steel Distributors: OneSteel Steel and Tube, BlueScope Lysaght (purlins)