CBD school build light on Perth

Central Institute of Technology, Northbridge WA

When it came time to relocate several key faculties of Perth's Central Institute of Technology from Mount Lawley Campus to a more central, but sensitive inner city location, a steel-intensive solution came to the fore.

The overall Central TAFE redevelopment aims to create an inner city precinct for more than 26,000 students and consolidate training in resource development, creative industries, community services, engineering and science.

Due for completion this month, Stage Two is the centrepiece of the new inner city training precinct worth $59.5 million which will also link other college buildings in the area.

While the new construction will bring students closer to public transport with easier access to the Perth Cultural Centre, State Library, Northbridge cafes, restaurants, shops and nightlife, its location directly over a major road tunnel and near a high pressure gas line meant dampening construction activity and dealing with imposed structural load limits on the site.

Airey Taylor consulting engineers' principal, **John Taylor** said that the technical challenges were mainly due to the complexity of the architectural design, but the systems chosen proved beneficial to the construction of the steel elements. The building contains a steel framed roof, fascias, walls and external support columns and glazing, and ornamental pipe structures.

"The 3000 square metres of wall and fascia panels required the use of lightweight 'C' sections which resulted in significant cost savings. The welded light gauge steel panels were also quick and easy to install as the base for the Alucobond® cladding," Mr Taylor said.

The welded panels were bolted between columns and helped to brace the perimeter of the building.

"Of particular note was the use of 500mm diameter pipe columns and ornamental pipe beams which raised challenges for the design of the support system for the second floor and the Aberdeen Street 12-metre glass façade," he said.

"Design of the support for the glazed façade to Aberdeen Street involved a three-dimensional analysis with 150 by 100 RHS mullions up to 12 metres high supported laterally by a 500 diameter pipe rail which is in turn supported by the mullions and laterally propped by two large exposed architecturally sculpted pipe struts back to the main building."

He said that the main roof framing utilises typical steel rafters, purlins and columns with an upper highlight roof accommodating a skylight on the northern side. The roof over the Aberdeen Street entry cantilevers eight metres over the glazing wall and comprises cantilevered main and fascia trusses to control deflection. Erection of this section of the building required two temporary support towers until it was fully stabilised.

Director of Complete Steel Projects, **Dom Carbone** said the tight inner-city locale also limited site movements significantly and dictated the planning and method for erection.

The ASI member company provided all services related to the structural steel for the project, a concept-to-completion approach which encompassed the design, fabrication, paint and erection.

He said that as the building is a unique 'one-off design' a major challenge for the project was to ensure structural steel components could replicate the architects' and client's vision for the building. The complexity of the design meant the company had to fabricate and erect the building in many distinct packages to match the steel erection with the overall construction schedule.

"The job totalled 234 tonnes of steel and the detailing was very involved taking us about 12 months to complete," said Mr Carbone.

"Rather than a standard square box, the steelwork needed to marry with the concrete structure in many different ways and angles, the highlight being the decorative aspects of the piping incorporated into the structure.

"Putting together the components of this job took a long time as there was a lot of steelwork fixed to multiple levels of the building and the logistics of working in such a tight environment at the inner city location required a lot of forward planning.

"For instance, restricted space onsite meant that steelwork delivered could not be over 12 metres in length.

"Limited site access and laydown areas when delivering steel meant our planning and logistics needed to be precise, closely following the construction schedule set by Cooper and Oxley."

These restrictions meant that steelwork was delivered in small specific packages and erected immediately often straight from the truck bed with road closures in place.

Mr Carbone said that another limiting factor was the compromised placement of the tower crane adding another level of complexity to the erection process. A special permit to use the tower was necessary as the building is built over the Graham Farmer Freeway Tunnel and undertaking associated engineering for the permit was a lengthy process.

"Planning on these multi-storey projects with limited access and work space is paramount," he said.

Project Team

Architects: Lyons Architects and T&Z Architects

Builder: Cooper & Oxley

Structural Engineers: Airey Taylor Consulting and Meinhardt (Vic)

Steel Fabricator: Complete Steel Projects

Steel Detailer: X-S Drafting (Victoria)

ASI Steel Manufacturers: BlueScope Steel, OneSteel and Orrcon

ASI Steel Distributors: Southern Steel (WA) and BlueScope Lysaght (roof purlins and wall girts).

Protective Coatings: Complete Steel Projects