South Australia ASI Steel Design Awards

WINNER St. Peter's College Sports Centre

The design of St. Peter's College Sports Centre uses the structural versatility of steel in the most elegant manner. A large footprint building has been skilfully conceived and executed to blend into the ambience of the grounds of the school and its buildings, without the bulky impact of most sports or activity halls.

St. Peter's College in Adelaide is one of the oldest and prestigious private boys' boarding schools in South Australia.

Entry to the sports complex is through a long mall separating a two-court basketball/multi-purpose sports hall from the swimming hall with its swimming, diving and learners' pools. At the end of the entry mall stairs lead to a mezzanine where a well equipped gymnasium is located over the pool. On the other side at this level are change and shower facilities and an administration area.



Down the length of the mall three masts penetrate the roof and provide support by a tensioned suspension system to the main steel rafters supporting the roof. This design called for long spans of lighter steel beams, at considerable cost saving to the project.

By adopting a lightweight masted structure for the large steel deck roof the structure has realised the architectural expression for the building. This expression reflects its gymnastic and physical development function.



The design called for long spans of lighter steel beams

The tied structural system employed for the roof has provided a very graceful structure with spacious column free areas and shallow construction depth. There are just three ball bearing points of support to the masts and the external tie downs to the slender steel beams spanning 40 metres. These ball bearing points enabled the wing-like roof to be "floated" over the whole building.

The slender construction is emphasised by the exposure of the roof framing and omission of a ceiling in the swimming and sports areas. It is this, together with the glazed walls, which has lightened the impact of the building in its park like setting.

By using the unique properties of steel the architects, DesignInc, have realised their intent for clean lines and minimal structure. The architects said that by utilising the unique properties of steel the cable-supported roof design shows

The tied structural system has provided a very graceful structure with spacious column free areas.



the way the strength of steel can lead to elegant solutions that are both cost effective and simple to build.

With glazing to the perimeter, the roof appears to float above the walls amplifying the sense of space, light and transparency within the sports halls. Particular care has been given to the integration of the support to the perimeter concrete walls.

Cable supports to the roof are arranged to balance and resist upwards and downwards loads, reducing the effective beam span to less than half of the mall width. By balancing the self-weight of the roof from one side against the other, permanent out of balance loads have been minimised. A simple in plane truss system distributes the lateral loads into the precast wall panels, restricting the requirements for braced walls to the mall area. With each member of the roof performing multiple roles the final roof design is particularly efficient, coming in at under 23kg/m².

The three masts that support the roof sit within the central circulation spine of the building. Four small restraint cables brace the column against eccentric loads, also acting to simplify the erection and stressing procedures. Connections from cable to roof steel have been detailed to minimise penetration of the steel sheeting, while the detailing of connections within the halls have been carefully selected for both appearance and cost efficiency.

The judges considered the pool area to be the benchmark for this project where considerable design effort went into the steel finishes to combat condensation

۲

4

œ

۲



The strength of steel can lead to elegant solutions that are both cost effective and simple to build.

in the corrosive pool environment. The roof purlins, rolled from galvanised and prepainted steel, are both attractive and durable. To prevent moisture collecting in the bottom flange, the bottom lips of the purlin sections were turned down.

The primary steel members inside were factory painted with a zinc phosphate primer with architectural top coat while inorganic zinc primers were used in the less trafficked external areas.

The simple detailing was easy to fabricate and build, maximising cost efficiency. Special consideration was given to the required building tolerances and the need for durability, especially in the pool hall. The roof penetrations for the ties were cleanly detailed and placed above the roof, thus avoiding a fussy detail inside the facility.

The architects said that: "the sense of lightness, both internally and externally, could only have been achieved through the use of fine steel structure complemented with steel sheet decking, mini orb soffits, perforated corrugated iron ceiling to the mall and large steel sun shades."

Architects: DesignInc Project Architects: Geoff Nairn and Tim Ross Structural Engineers:Arup Melbourne Building Contractor: Bovis Lend Lease Steel Fabricators: Samaras Group Steel Detailers: Samaras Group Steel Distributors: OneSteel Distribution

۲