



Suncorp Stadium, Lang Park



WINNER

Suncorp Stadium

Engineers: Arup

The new \$280 million Suncorp Stadium Redevelopment, formerly known as Lang Park, has transformed the comfort of spectators for Rugby League, Rugby Union and Soccer.

The project encompasses a composite steel and concrete grandstand structure on the southern, eastern, and northern sides of the field to create a seamless new stadium. A spectacular 23,000 square metre steel framed roof covers the grandstands and spans up to 180 metres between supports covering some 40,000 seats.

The roof structure provides weather protection for approximately 75% of the seats, and also houses all of the sports lighting, which allowed the original lighting towers to be removed.

The structural design of the roof and grandstand structures utilised a number of innovative features that reduced the weight and cost of the steelwork, and facilitated rapid and safe erection of the roof.

The grandstand buildings consist of a three tiered bowl made up of structural steel frames at 7.6 metre centres that support precast, prestressed voided planks that act integrally with steel beams and precast, prestressed seating plats. The mid and upper tiers of the grandstands cantilever up to eight metres beyond the column and raking strut supports, with the cantilevers formed from fabricated steel box beams.

The judges said that: "The dramatic form of the roof structure exemplifies the physical and sculptural possibilities of steel as a structural material."

The roof is supported by tubular steel trusses approximately 10 metres in depth, intersecting at the corners where they are supported by pairs of inclined struts.

The judges final word was that: "The Suncorp Stadium Redevelopment is a prominent and complex project that demonstrates a number of unique steel design, detailing, fabrication and construction facets."

Innovative thinking was required to reduce costs and enhance safety during the construction. Arup and Partners, in conjunction with architects HOK Sport + Venue + Event and PDT Architects came up with an innovative roof design and method of erection.

The precise location and cross sectional geometry of the main roof trusses were selected to allow the trusses to be assembled on the lower tier of the grandstand and lifted vertically into their final position without impacting on the construction of the middle tier.

A simple yet effective purlin splice detail was developed to allow roof purlins to be installed as simple spans, then spliced using purpose designed lap members to provide continuity. This detail allowed rafters to be spaced at 15.2 metres using off-the-shelf cold rolled purlins working at maximum efficiency. The detail also allowed rapid erection of the roofing using preassembled panels.



The LRJV site team implemented what they called the new 'up and under' roof construction technique for the massive new grandstands. The purlins and soffit linings were assembled in panels on the ground (under), then each section was lifted by crane into position (up).

This innovative approach to assembling the massive roof improved the procurement and safety of construction.

David Ghannoum, Construction Manager for the Multiplex/Watpac joint venture, said: "It made sense to use the site cranes to lift these panels 40 metres up from ground level into position, rather than have roof fixers up there. This method was safer and greatly reduced the erection time."

David Ghannoum added: "We went from 0.42mm to 0.48mm BMT for the roof decking to optimise the roof construction. The thicker base sheet allowed us greater spans and reduced the number of fixings, saving time and cost. The thicker

base also gave us a very strong roof deck. This is important for wind uplift and the safety of site workers during installation."

The contract for the Suncorp Stadium Redevelopment was the largest building contract let to-date by the Queensland Government and required completion of the \$280 million project in less than two years. Innovative structural engineering design was one of the key contributors to the successful delivery of the project within the client's cost and time frames.

Architect: HOK Sport+Venue+Event/PDT Architects

Structural Engineers: Arup

Building Contractor: Multiplex & Watpac

Steel Fabricator: Beenleigh Steel Fabrication & Sun Engineering

Steel Detailer: Online Drafting Services & Cadtech SA

Main Coatings Supplier: International Protective Coatings

Metal Building Product Design Award

In judging the Metal Building Products Award, the panel considered the following criteria: design merit, aesthetics and creativity; ingenuity and innovation in the use of metal building products made of Australian steel, as structural or visual elements; economy of project cost and time in the design solutions; merit in environmental performance and use of energy; design consideration of manufacture, transportation and erection; durability and fitness for purpose of the metal building product elements. Shortlisted projects were:

- **45 Nerang Street**
Architects: Burling Brown & Partners
- **Central Engineering Building Unit, Princess Alexandra Hospital**
Architects: Cox MSJ
- **417 Logan Road, Stones Corner**
Architects: Russell Hall Architects

The winner of the Queensland Metal Building Product Design Award was Russell Hall Architects for 417 Logan Road, Stones Corner.

417 Logan Road, Stones Corner Architects: Russell Hall Architects

The project was a part demolition and addition to existing single storey retail premises. This included the construction of a two storey building in front of the existing single storey structure.

A cantilevered deck and awning with horizontal lines together with relief work give the building a strong presence on its corner location.

Folded steel sheet was chosen as the most effective way to achieve the desired sculptural form. The horizontal handrail which mimics the Art Deco style is made out of 1.2 millimetre folded Zinalume.

For the same reason steel was also chosen to provide the detailing for the soffit of the cantilevered veranda and the cantilevered awning.

It was determined that sheet steel enabled a cost effective method of achieving the three dimensional form. Any other material such as fibre-cement, would have been time consuming and would not be self supporting. The folded steel sections were able to span long distances and make the erection process straightforward.

The judges commented that: The Nerang Steel project was a highly creative and innovative use of steel cladding in a commercial building.

The project meets council requirements to respond to a perceived Art Deco context for this area and the client's needs for a distinctive building within a busy retail environment.

The use of powder coated steel for the steel elements minimised the on-site construction time and produced a durable, easily maintained finish.

Other Project Team Members were:

Engineer: Arup

Building Contractor: Watpac Australia

Steel Fabricator: Alltype Welding

Steel Detailer: Tait Technologies

Metal Building Contractor:

Taringa Steel

