

Stadium Australia



photo courtesy of Peter Hyatt

The Steel Solutions

As the major venue of Olympic competition, Stadium Australia had to underline the commitment of the organisers of the 'Green Games'. This included the materials used in construction, as well as the ecology of the building's operation.

The stadium's design has minimised the use of PVC. All building materials have been subjected to Life Cycle Assessments to determine their environmental impacts.

The use of steel not only fitted the parameters of the stadium's construction, but also complies with a number of plans for its future. One plan is to fully enclose the arena with a retractable roof system. The structure is designed so that additional trusses can be erected below the main arches to support a retractable roof, with minimal ground disturbance during construction.

The top pipe of each arch is made from steel plate, rolled into pipe by Transfield, then fabricated into the finished arch sections by National Engineering.

The rest of the steel pipe used in the arches was either fabricated or rolled and cut to exact length to minimise wastage, in keeping with BHP's commitment to uphold the Sydney Olympic Games Organisers' environmental commitment.

BHP Manager Olympics Projects and BHP Building Products provided technical support to the architects and structural engineers.

BHP Manager Olympic Projects, Jack Katon, ordered steel at tender time to eliminate any possibility of construction delays.



photo courtesy of Peter Hyatt

Steel played a major role in the construction of Stadium Australia which was designed not simply to be the showcase of the Olympic Games, but as a new national icon to rank alongside Sydney's Harbour Bridge and Opera House.



Facts and Features

■ No other venue for the Sydney Olympic Games drew as much attention during construction and operation as Stadium Australia. Covering a total site area of 16 hectares, the 110,000 seat (Olympic mode) stadium includes some 32,000 tonnes of steel including 12,000 tonnes of structural steel.

The 30,000 square metre roof provides shelter for 60,000 spectators. It is supported by twin main arches each covering 295.6 metres, with each centre span covering 70 metres. The height of the roof from the arena is 43 metres to the front edge at the highest point, and 58 eight metres to the back edge at the highest point.

The 1200mm diameter top pipe on the arches is constructed from 28mm thick, 350 grade welded BHP steel plate. Although originally priced to come from Japan, BHP undertook to construct the steel piping locally to keep with the "built-in and built-from Australia" feel to the project.

The concrete stands cradling the seating are reinforced by welded beams. A unique approach has been taken to the stadium's seating, which is not supported over vertical walls. This provides a more open, aesthetically pleasing external facade.

The stepped seating of the temporary end stands used for the Olympics was 'folded' out of 6mm steel plate rather than concrete. Made from 1,200 tonnes of steel plate, this meant that the stands could be recycled post Olympic and Paralympic Games.



photo courtesy of Peter Hyatt

Figures

■ The Stadium in Olympic mode seated 110,000, with a reduction to 80,000 following removal of the two temporary end stands after the Games. Built along 'Green' guidelines, the massive stadium roof allows for storm water to be used to irrigate the playing area, as well as having application in a number of other internal water usage areas. The passive ventilation system, which draws air out from the grandstand through thermal stacks, is a key design feature which minimises the need for air conditioning.

Project Details

- Client** Olympic Co-ordination Authority
- Architect** Bligh Lobb Sports Architecture, a BVN joint venture p (02) 9252 1222
- Structural Engineer** Sinclair Knight Merz / Modus Consulting Engineers p 02 9928 2100
- Principal Steel Fabricator** National Engineering p 02 6382 1499 Transfield 02 9273 8600
- Principal Construction Contractor** Multiplex Constructions p 02 9256 5000
- Cost** \$690 million

Featured Steel Products

- Arches** Top pipe - 28mm thick, 350 grade BHP steel plate (50mm wall thickness over the last 50 metres at each end). In finished form the pipe has a diameter of 1200mm.
- Upper and Mid Stands** 300PLUS® Welded Beams and 350 grade fabricated steel girders
 - 6,000 square metres of Lysaght BONDEK® made from ZINC HI-TEN® structural decking.
- Special Stramit purlins** made from Z450 GALVSPAN® steel
- Temporary End Stands** 6mm steel plate.

© Copyright Bligh Voller Nield

