

Adelaide Convention Centre Extension

July 2002

This case study was written at the time when InfraBuild (formerly Liberty OneSteel) was part of OneSteel. In that context, in some instances within this case study reference may be made to OneSteel.

INFORMATION TECHNOLOGY

Adelaide's Convention Centre Extension

An Architectural and Engineering Showpiece.

Project Team

PROJECT DIRECTOR:

Major Projects Group DAIS

PROJECT MANAGER:

Savant Pty Ltd

MANAGING CONTRACTOR:

Boulderstone Hornibrook Pty Ltd

PRIMARY CONSULTANT:

Woods Bagot Pty Ltd

DESIGN SPECIALIST:

Skidmore Owings Merrill

STRUCTURAL, CIVIL**AND TRAFFIC ENGINEERING:**

Connell Mott MacDonald Pty Ltd

COST MANAGER:

Rider Hunt Adelaide Pty Ltd

BUILDING SERVICES:

Bestec Pty Ltd

ACOUSTICS AND VIBRATION:

Basset Consulting Engineers Pty Ltd

COLLABORATION CONSULTANT:

JMJ Associates

The Adelaide Convention Centre extension is one of the most ambitious redevelopments of a convention centre facility ever undertaken in Australia, with the roof alone comprising some 1450 tonnes of steel.



After more than two years and \$85 million, the upgrade of Adelaide's Convention Centre is due to be completed in September this year, creating an internationally competitive convention and exhibition hall, and one of the most visually spectacular buildings in the city.

The new Convention Centre is in the heart of Adelaide's Central Business District overlooking the River Torrens. When completed, the redevelopment will be more than 7,000 sqm of column free floor space, more than doubling the convention centre's capacity and further enhancing Adelaide's reputation as one of the top ten convention destinations in the world.

But to achieve this showpiece for the city and what is one of the biggest construction projects undertaken in Adelaide in recent times, the project team has had to overcome hurdles both in the operation and construction of the project.

One difficulty faced early on was the site location, with the convention centre floor elevated over nine railway lines. For the project team, working around the busy inner city rail network has made design and construction of the new Convention Centre much more challenging. However with the extensive project just three months from completion, there's been only minimal disruption to inner city trains. The project team has worked closely with the city's rail authority, TransAdelaide, to ensure that at any one time, only two lines are closed due to construction and that the closures occur generally in off peak commuter times.

The initial constraints placed on the project by the rail network were largely overcome by pre-fabricating elements of the main convention centre floor, and by using long span steel elements to precast concrete headstock beams – techniques which according to David Johnson, a Principal of engineering firm Connell Mott MacDonald, saved on the project budget.

The design of the floor comprised 800WB122 stock beams at 1.5 metre centres and were delivered direct to the site from the paint shop without fabrication.

“That led to significant savings in shop drawing, fabrication costs and delivery time. The beams were placed on top of a pre-cast headstock beam supported by precast columns on a piled foundation.”

To achieve the substantial floor capacity of 20kPa for T44 semi vehicles and to accommodate extensive construction mobile crane loads of up to 170 tonnes during construction, the concrete floor was poured on a composite metal deck encasing the headstock beams.

The beams were designed to act compositely with the slab and achieved continuity over the headstock support beams, by using additional shear studs, top reinforcement and compressive steel stress blocks to the bottom flanges.

The steel plaza floor beams were supplied locally by Samaras Steel Fabricators and comprised some 770 tonnes of steel and 38,000 shear studs.

Also considered by Connell Mott MacDonald was the control of the vibrations emanating from the railway lines below. The Adelaide Convention Centre will have a variety of uses at any one time, including conventions and exhibitions, so it was vital that the functions of the centre could be carried out simultaneously and without interruption from the working rail network nearby.

High shear rubber elastomeric bearings were incorporated at the column heads in lieu of spring bearings. According to Mr Johnson, this eliminated the substantial cost of isolating the railway lines at ground level.

Even though the plaza floor lies above a busy inner city railway station, it was fire engineered so that no additional fire treatment was required. The possibility of a train fire and the resulting fire load had to be considered given the proximity of the railway lines to the Convention Centre extension. The steel beams were provided without additional fire protection by fire engineering the steel.

Almost every aspect of the Adelaide Convention Centre extension was

OneSteel contributed more than 2,200 tonnes hot rolled and welded sections for the Adelaide Convention Centre Extension.



approached from a team point of view and those involved in the design and construction have praised the working environment in which this massive redevelopment has taken shape. A unique collaborative relationship between the project team partners has assisted in meeting challenges that have occurred.

According to Gary Dare, Construction Manager with Managing Contractor Boulderstone Hornibrook, it's the first time such an approach has been adopted for a major project in South Australia

"The collaborative relationship is based on open and honest communication between all parties, where the team adopts a "best for project" approach in search of exceptional performance."

The innovative working environment and unique approach has assisted all

involved with the redevelopment of the convention centre. Sub contractor Alfasi Steel Construction was brought into the project in the early design phase, and according to John Grasset, Senior Project Engineer, that allowed fabrication and erection of the 63 metre roof trusses to commence well in advance of the design being completed.

A design feature of the Convention Centre is the dramatic clear span structural steel roof, which dominates the Adelaide skyline, while a sweeping wall of glass captures the River Torrens as a focal point.

The main roof trusses, with a depth of approximately eight metres, were manufactured in Alfasi's Victoria factory and transported by road to Adelaide. Cruciforms and splices were added to the web and chord members making the trusses easier to handle and, in turn, assisted with fabrication, transportation,

painting and erection. Despite being relatively slender, the cantilevered trusses were required to support 18 metre high and 100 metre long curved curtain wall glazing. The resulting effect is a light and spacious atmosphere for pre-function gatherings with a spectacular view of the River Torrens.

The Adelaide Convention Centre extension is one of the most ambitious redevelopments of a convention centre facility ever undertaken in Australia, with the roof alone comprising some 1450 tonnes of steel. The Convention Centre will be officially opened in October 2001, significantly contributing to the South Australian economy and creating an architectural icon of which the city can be proud.