■ Ian Thorpe Aquatic Centre
Ultimo - Sydney - NSW

The Ian Thorpe Aquatic Centre, a $30 million project which commenced earlier last year is an example of the structural and design benefits of steel in construction. For Harry Seidler and Associates this is a unique project "because it is designed in a city context, not an open park. This required a three storey building covering the majority of the site to fit in all of the Council's requirements."

This iconic Sydney landmark centre incorporates 3 pool areas.

- Main Pool
  - 50m long x 20m wide
  - 1,500,000 litres
- Leisure Pool
  - 18m long x 12m wide
  - 100,000 litres
- Program Pool
  - 16m long x 7.5m wide
  - 120,000 litres

Large trusses externally allow a clear span of 52 metres with continuous glazing under each truss to maximise the amount of natural daylight into the complex. Over the 50 metre pool, the internal space is at its maximum height where the roof curves, then reduces to a more intermediate height over the leisure pools. The floor also steps down from the 50 metre pool to a lower level which takes into account the entry, café, sauna, steam room, leisure and program pool. This allows vistas from inside the complex to the city skyline.

At mid level, the gym/fitness centre can operate as a separate facility, located at a level below the leisure pool complex. It is visually connected to the main pool hall via a two storey high void which allows patrons to relate to both facilities from any one level. At this level all the back-of-house plant and equipment is also located.

At the level below the fitness centre (lowest level), parking facilities are provided for 99 cars which is accessed from Pyrmont Street.

The contract with FRH Group for the structural steelwork totaled in excess of $2.5 million.

Drafting /workshop drawings

The workshop drawings were prepared by steel fabricator and erector TDA Snow engineering using their in-house draftspersons. A drafting company was also contracted to provide all the pipe developments from a 3D model.

Planning

Each of the six trusses was fabricated in three sections and assembled on site and the joints site welded. One end of each of the splice joints had an internal spigot of varying lengths which served as:

- an assembly aid and locator during the erection procedure. The varying lengths of the spigots allowed for each of the three joints to interlock one at a time thus simplifying the assembly process;

- A backing strip for the full strength site butt welds.

Terry Snow of TDA Snow Engineering said, "Due to the shape of the trusses, and the spigoted splice joints, the protruding cast-in holding down bolts would interfere during the erection process. The decision was made to erect and assemble the three sections of the trusses above and then lower the assembled structure vertically down onto the holding down bolts. To achieve this we decided to manufacture temporary support towers at each of the splice locations," which would serve as:

- a temporary support for the truss until site welding was complete;

- a jacking platform to hold the trusses above the holding down bolts during assembly;

- an access and work platform for the erection crew, welders and touch-up painters.

Fabrication

The steelwork was fabricated in two workshops at Heatherbrae, New South Wales with all steel supplied by OneSteel Pipe and Tube. The rolling of the tubular sections involved both cold rolling (Rollco-Sydney) and induction bending (Inducta- Melbourne).

Jigs were used to manufacture the three sections for each complete truss. The trusses were pre-assembled to ensure that the three parts would assemble on site and the overall dimensions of the truss complied in three dimensions. Interference of the bracing members during assembly was eliminated by small cut outs which were later replaced on site.

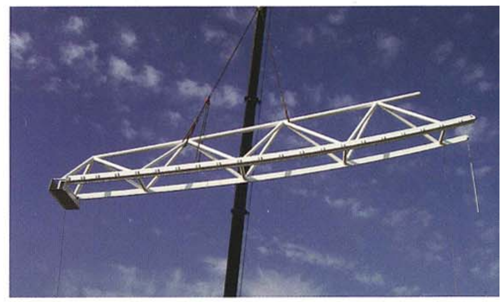
All welding was carried out by qualified welders using pre-determined welding procedures with MIG welders and 1.2 millimetre solid wire. The truss sections were rotated in the workshop to achieve where possible a flat welding position. Ultra-sonic and magnetic particle testing were then carried out as specified.

Transportation

The truss sections were up to 6 metres wide and 27 metres long which required three escorts and restricted travel times during transportation into Sydney.

Erection

The program required the trusses to be erected in three stages. The four temporary towers were assembled on site and installed at their support locations. On top of the towers, adjustable "U" supports were fitted that would saddle on the cross member of the truss and hold it in correct position and level for both erection and site butt welding purposes.



As the truss sections were transported to site on their side, they had to be righted before erection. This was carried out in mid air using the site tower crane and a series of chain blocks to steady the lift to the vertical position. As each of the truss sections weighed up to 10.1 tonnes, the weight and reach was out of the range for the tower crane on the lower sections of the trusses. A 250 tonne mobile crane was used to install these lower sections. The sections were installed from the lower section first, followed by the mid and top sections.

The rigging of the trusses was critical to ensure ease and accuracy of installation. This was achieved by rigging up with a three point attachment method with each of the three connections having a 5 tonne chain block attached. This allowed infinitely fine adjustment in three dimensions by manipulating the chain blocks from a boom lift interlocking the spigots and pulling the sections together. This method proved crucial during the installation.

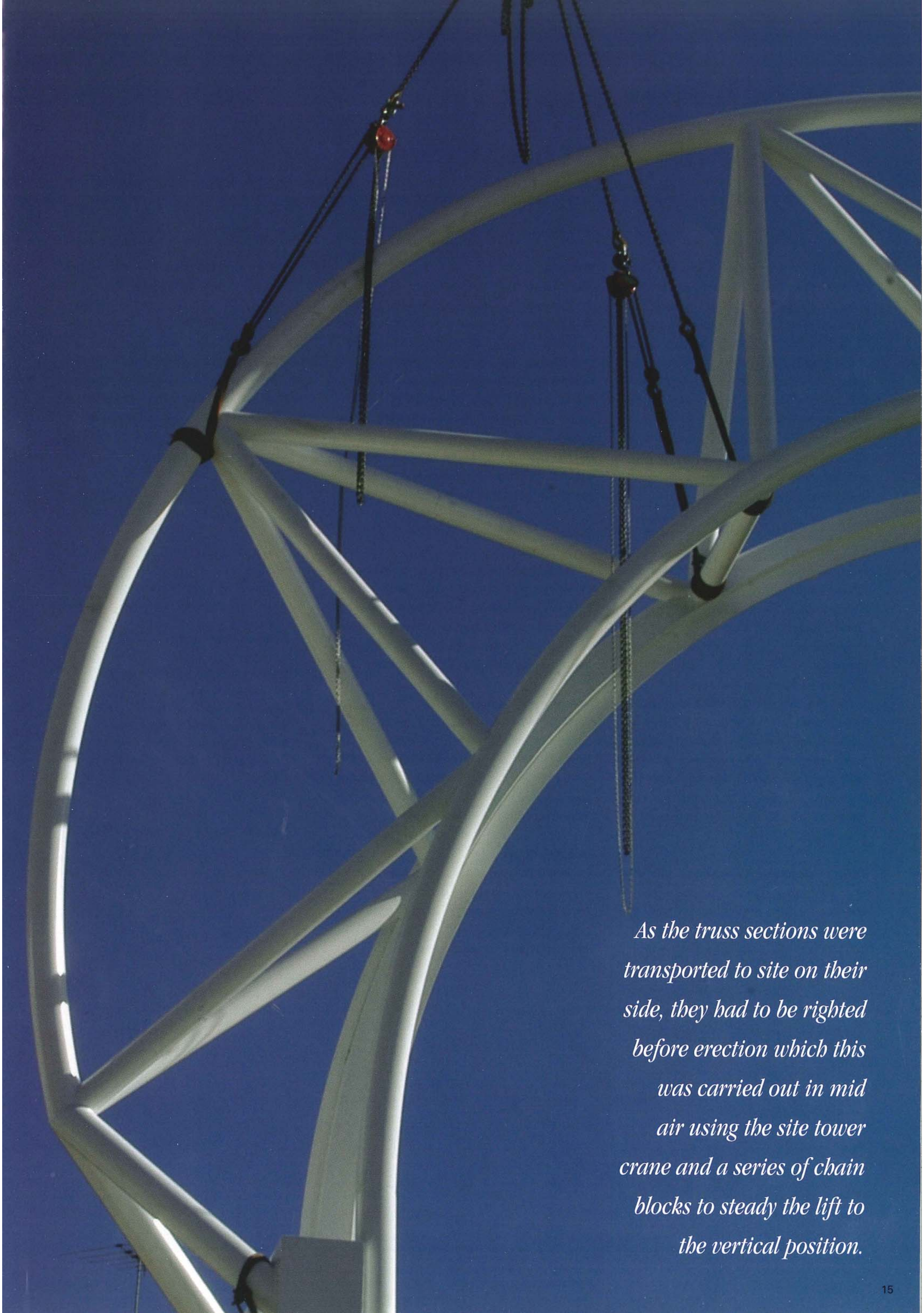
When all three sections were assembled the complete truss was then lowered onto the cast in holding down bolts using 50 tonne jacks and then secured.

After surveying the assembled truss for position and height accuracy, the site butt welds were performed. At the completion of welding, ultrasonic testing and touch-up painting was finalised. The completed "U" support saddles were lowered from under the truss and the temporary support tower as a whole was relocated to the next erection point. This procedure was repeated for the remaining trusses. The installation of ventilation hatches and RHS purlins between the trusses completed the process.

A lot of planning and co-ordination went into preparation and installation of the structural steelwork for this project demonstrating the constructional and architectural advantages offered by steel.

Project team

Architect:
Harry Seidler & Associates
Quantity Surveyor:
Rider Hunt, Sydney
Steel Supplier:
OneSteel Pipe and Tube
Structural Engineers:
Birzulis Associates
Steel Fabricator:
TDA Snow Engineering
Electrical/Lifts/Energy Efficiency:
Steensen Varming
Mechanical & Water Treatment/Pool Filtration:
Beca Simons
Hydraulic/Fire Engineer:
Thomson Kane
BCA :
Dix Gardner
Heritage Consultant:
Graham Brooks & Associates
Landscaping:
Oculus
Contracter:
FRH Group
(formely Belmadar Constructions)



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