

Melbourne Rectangular Stadium

Client: Victoria State Government
Contractor: Grocon Constructors Pty Ltd
Location: Melbourne, Australia
Products: Alshor Plus / Megashor

Case Study

RMD Australia puts its Olympic stadium experience to the test in Melbourne, using a combination of Alshor Plus and Megashor to support the construction of the impressive Melbourne Rectangular Stadium

With a whole range of top class sports teams in need of a world-class venue to play football, rugby league and rugby union, in May 2007, the Victorian State Government commissioned the design of the 31,000 capacity, AUD\$267.5 million venue currently known as the Melbourne Rectangular Stadium (MRS).

Located in the Olympic Park Precinct, on Olympic Boulevard in Melbourne, Victoria, the new stadium will be home to football teams, Melbourne Victory and Melbourne Storm.

As a key centrepiece for the development of the Melbourne Olympic Park, the MRS is set to combine cutting-edge design and architecture with practical facilities and seating that will offer an uninterrupted view for all sports matches and events. Made achievable thanks to its Bio-frame design, which incorporates a lightweight steel structure based on the inherent efficiencies of the world famous Buckminster Fuller geodesic dome, the roof will substantially cover the seating area, without the need for pillars, walls or other support structures.

Commenting on the MRS and RMD's involvement in its construction, Peter Muirhead Victorian/Tasmanian Regional Manager for RMD Australia, said: "It is great to be involved with a world-class project of this kind, the bio-frame roof design itself is unique, and will give the MRS a very strong identity.

"From a design perspective, although we are dealing with supporting 50% less steel than a more traditional cantilever steel roof structure, thanks to the geodesic dome design, the strength and precision of the shoring solution is crucial. Having previously worked with contractor Grocon Constructors Pty Ltd on the Melbourne Cricket Ground Redevelopment in 2003 and 2004, the team at our Melbourne branch began looking at solutions to support the roof structure at the tender stage, using our heavy duty Megashor shoring system.

"Working together with experts at Grocon Constructors through early to mid 2007, we were able to develop a range of safe, practical and cost effective shoring solutions for the numerous challenges of the project. With the use of our Alshor Plus product, we were also able to demonstrate the lightweight but inherent strength of aluminium shoring, mirroring the benefits of the geodesic dome design itself.

"By focusing on these core deliverables, we were able to demonstrate how our equipment and design could meet the clients need for a versatile, labour saving solution. Our first challenge was to support the reinforced concrete beams ranging up to 950mm deep by 1,800mm wide in the podium slab areas.

"In turn these beams carried additional loads from precast hollowcore slabs used to form a base for the main facilities and seating areas. In order to support the installation of these slabs, we designed and supplied our lightweight Alshor Plus aluminium shoring, which was used to support our aluminium Albeam and Alform primary and secondary beams.

"Thanks to the high leg capacity of Alshor Plus, which is able to withstand pressures of up to 120kN/m², our design was able to cater for the high loads, whilst providing the advantage of fast erection and safe dismantling of the falsework. As a modular system, with various leg heights, easy to use jacks and a simple one strike quick release mechanism, Alshor Plus was ideal for this application and having already used it on propping heights of around 4.5m, the client was familiar with the versatility of the product.

"It was for this reason they then decided to use it as a high level support system to provide falsework to an area of beams and slabs at level three of the stadium, approximately 18 metres high. The advantage of doing this meant that the system could be installed complete with bracing frames up to this height and once level three was completed, instead of having to take down the entire 18 metre high structure, the client was able to simply remove some of the leg pieces to take the system down to the next required level.



"In practical terms, this meant the construction phase could be reversed, installing the slabs from the 'top down' using the same system. This ultimately allowed levels two and one to be completed in just a fraction of the time, reducing equipment hire costs and labour - both important parts of the overall developments budget. Putting level three together first, also gave the roof installation team swifter and safer access to the upper level to undertake critical early preparation work for the roof installation to be completed."

Following an analysis of the Alshor Plus system by the project management team, it was identified that the combination of the high leg load capacity and general 2.4m frame size of Alshor Plus, would equate to less components, quicker erection and dismantling times, greater versatility, and reduced labour costs, when compared to traditional scaffold/support systems.

Thanks to this analysis and the performance of Alshor Plus for the slab installation process, engineers from RMD Australia were then asked to design solutions for the utilisation of Alshor Plus on various high-load shoring applications. These numerous tasks were located at various points throughout the construction of the substructure, concourse slabs and grandstands.

Having thousands of metres of Alshor Plus on-site at the peak of the project, the availability, cost effective use and familiarisation of the workforce with Alshor Plus, led to its further use for various soffit support applications, whilst the installation of the unique roof structure which commenced during late 2008 took place. Once sections of the roof were installed, Alshor Plus was seen as the best solution to provide support and combined access for fitting roof panels.

With Alshor Plus playing an important leading role in the overall construction of the MRS, it was the use of RMD's heavy duty 1000kN/leg shoring system, Megashor that enabled the safe support and installation of the roof structure itself. With Megashor Towers formed by connecting together four Megashor legs, braced with steel Superslim Soldiers, a safe and robust solution was developed to support the roof installation. Craned into position under each groin, which forms the junction of each shell profile on the bio-frame roof, the loads of the steel roof structure were able to be held into position safely using the Megashor towers.

Phil added: "As part of the safe siteing of the roof components, the Megashor Towers were engineered to incorporate special "headstock" arrangements, designed and supplied by the client. These specials enabled the precise connection of the individual steel components to the node points on the roof.

"With the roof construction already underway it is estimated that there will eventually be twenty Megashor Towers, one positioned under each groin when the roof is fully in place. The highest of these four legged Megashor Towers will be approximately 24 metres from its base to the underside of the roof."

Phil concludes: "Hiring Megashor has allowed the client a greater degree of flexibility in their considerations for supporting the roof compared with the alternative of structural steel fabrication and purchase. It also means that components to make up each Megashor Tower can be supplied to programme for assembly as required, so do not have to be stored on-site

"In conclusion, it is great to see that a project of this scale and global profile has been able to recognise and benefit from the use of two of our leading falsework products Alshor Plus and Megashor."

