TECHNICAL EXCELLENCE

category nominations





WINNER: TECHNICAL EXCELLENCE

THE ROYAL BAFOKENG SPORTS PALACE UPGRADE

It is perhaps the simplest to the untrained mind by its apparent neat appearance. But the project displays some amazing technology, in design, and execution with lots of firsts when compared with other stadia. And it is an all South African team.

project team

Developer / Owner
Royal Bafokeng Administration

Architect
BSP Architects

Structural Engineer
M2 Consulting Engineering (incorporated into Vela VKE Consulting Engineers)

Quantity Surveyor
CP De Leeuw Quantity Surveyors

Project Manager
CP De Leeuw Quantity Surveyors

Main Contractor
Liviero / Wramatshe JV

Steelwork Contractor
Midmar Engineering (Pty) Ltd

The steelwork for this project is full of complexities, but the end-result is an elegant structure that architect, engineer and contractor can be proud of. From the design, through fabrication to erection – this project is a testimony to why it is the winner in the technical excellence category.

In this upgrade the western side stands have been increased in capacity necessitating the removal of the existing tubular steelwork to make way for the new stand extensions and roof covering. The capacity of the ground has been increased from 39 000 to 45 000.

One of the complexities of the project are the nodes above the under-slung steel sheeting. Each node is the meeting point for the columns (below and above the node) and the roof rafters (in front of and behind the columns) as well as the meeting point for the horizontal bracing and or tie members.

Now, take into account that football ground stadiums in their very nature result in roof structures that are elliptical in plan shape. This means that the angles of bracings connecting into the nodes will vary in every bay. Add to this that the roof has a 'high point' in the centre and slopes down to the outer ends. In their very nature each of the 32 such nodes (called knuckles for the project) is different from any other knuckle.

Even the usually 'simple' items like the purlins are complex. Other than its opposite hand partner, every purlin is once again its own little masterpiece. Every length and every end bevel for each purlin is thus different.

The design for the columns below the knuckles called for tapering 'conical' developments in profile. The columns above the knuckles were not a straight continuation of the column below, but they bifurcate into 2 columns that meet above the middle of the space between the lower columns from which the tension cables to the front of the cantilever rafters are suspended. The steel columns are filled with reinforced concrete used both structurally and as a counterweight.

To add yet another challenge, careful planning and development of a suitable safe erection method system and corresponding statement were essential to the successful erection of such a complex project with as much site welding as this project required.

All the main steel items were erected using one or more of the 4 tower cranes strategically placed to ensure the steel could be erected without mobile crane access to the playing areas. A special trolley was devised to enable the front of the rafter to roll into position during the final locating of the rafter and attaching of the tensioning cables to the front of the cantilevered rafters.

JUDGES COMMENT

The judging team has taken the liberty through the rules of the competition to be able to recognise more than one stadium since they could not ignore this 'little refurb job' near Rustenburg.

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Once again, fabrication and erection workmanship we can all be proud of is on display for all to see, even at eye level such as brilliant welding and attention to detail – for example how the internal shear studs are laid out in identical patterns on each column.

Every aspect of this special project left our judges in no doubt, that this project team has spoken fluent steel in every aspect of the job to truly deserve a category award for technical excellence.