

Monday 05 December 2011

Structural Steel Design Awards 2011

## Award: American Express Community Stadium

29 July 2011 | By [Pamela Buxton](#)

New football venue in Brighton & Hove designed by KSS Group

**Client** Brighton & Hove Albion Football Club

**Architect** KSS Group

**Steelwork contractor** Watson Steel Structures Ltd (Severfield-Rowen PLC)

**Main contractor** Buckingham Group Contracting Ltd

**Structural engineer** SKM (Europe) Ltd

Building a 22,500-seater stadium in an Area of Outstanding Natural Beauty is always going to be challenging. In the case of Brighton & Hove Albion Football Club's new American Express Community Stadium, the planning and development process took 13 years, with the Falmer site chosen out of 15 options around Brighton.

The result, despite the 4,200 tonnes of structural steel and distinctive arched roof, impressed judges with the way it nestles harmoniously in the South Downs landscape.

"It has been done carefully and sits in the landscape very well. It is very neat and done with an eye to how it looks as well as how it functions," says judge David Lazenby.

The form of the stadium was a direct response to the topography of the site, with the curve and tilt of the roof effectively replacing the ground that was excavated to form the pitch and stands. Visual and acoustic impact is reduced by the partial sinking of the stadium into the landscape.

The roof is the main event. The four grandstands are conventional beam-and-column steel frame structures with metal decking and composite slabs. The architect challenged engineer SKM and steelwork contractor Watson to achieve an exceptionally low profile, flat-arched roof to achieve the

appropriate effect on the sensitive site.

Both the 43m-wide east roof and the 55m-wide west roof are supported by 170m-long arched and leaning roof trusses each weighing around 350 tonnes. The smaller north and south roofs have more conventional cantilever roofs. To allow the roofs to continually “flex”, all four sides of the roof are interconnected, incorporating more than 1,000 sliding bolted connections.

Lateral movement of the rafters is restrained by a catenary member in the plane of the roof that transfers the tension back to bracing and foundations. Double-pinned tubular struts prevent the lateral loads being transferred into the terrace. Bearings transfer the thrust at the end of each roof truss to the permanent concrete thrust walls. The total weight of the roof is 101kg/sq m, which is exceptionally low for such a structure, according to the design team.

The project is also noteworthy for its construction method, which was to pre-assemble as much as possible on the ground and minimise temporary works. The roof trusses were first assembled into three 15m-deep x 60m-long sub-sections which were lifted on to 20m-high temporary trestles. Only when the entire roof structure was completed could these trestles be removed, allowing the thrust blocks to take up the load.

The £92 million stadium will be operational in time for the start of the 2011/12 football season next month.

“This is an enormous structure but they’ve cut it into the hillside. It has a very elegant, curved steel roof,” says judge Oliver Tyler.

Postscript:

 In association with The British Constructional Steelwork Association and Tata Steel

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