

IStructE Award for Arts, Leisure, Entertainment or Sports Structures 2006

Winner

Lingotto Speed Skating Oval
Structural Designer: Buro Happold





"...a structure of outstanding elegance and efficiency..."

"...the building demonstrates how the skills of the structural engineer can provide a major multi-purpose facility of lasting benefit to the community..."

The structure is one of outstanding elegance and efficiency, used for skating in winter and as an exhibition centre in summer. Temperature variations and the needs of speed skating caused substantial challenges in structural engineering.

The 100m long, 12m wide concrete pad for the ice oval contains conventional and fibre reinforcement and was designed for a movement of 80mm. It was cast in a single pour without joints, to meet extremely tight surface tolerances and durability requirements.

The long roof also has to accommodate significant thermal movements. Independent bays comprise tapering primary trusses and arch-profile infill trusses. The supports accommodate movements in the primary trusses. To keep the interior cool in winter and stable in summer, the façade is highly-insulated, supported by vertically-spanning trusses.

The resulting building demonstrates how the skills of the structural engineer can provide a major multi-purpose facility of lasting benefit to the community.

Sponsor of Award:

Griffiths & Armour

Project Credits

Client:
City of Turin

Architect:
HOK SVE
Studio Zoppini Associati

Location:
Turin, Italy

Commendation

Allianz Arena

Structural Designer: ArupSport



"...the structural engineers responded well to the time constraints and the need for a flexible construction sequence – this is demonstrated by the choice of roof type..."

"...a very impressive football stadium, suiting its role as host to the opening ceremony for the 2006 World Cup..."

Project Credits

Client:
FC Bayern Munich

Steelwork Sub-contractor:
Dillinger Huette GTS

Architect:
Herzog de Meuron

Contractor:
Alpine Bau GmbH

Location:
Munich, Germany

This very impressive football stadium is already familiar as it hosted the opening ceremony for the 2006 World Cup.

A reinforced concrete frame supports the terraces, floors and roof, the column spacing providing the desired open spaces in the concourses. The steel roof cantilevers over the seating. The choice of roof type was strongly influenced by time constraints and the wish for a flexible construction sequence. Special features include cascade stairways to assist the flow of fans to and from the upper levels; prefabricated columns of high quality in appearance; and a façade that can be illuminated by individual club colours.

Commendation

Khalifa Stadium

Structural Designer: Arup



"...a magnificent stadium showing Qatar to be a leading location for sporting events..."

"..the desert environment generates extremes in loading, yet the design of the stadium accounts beautifully for this..."

Project Credits

Client:
International House General Trading LLC
Khalifa Sports City Development Committee

Architect:
Cox
PTW in association with GHD Qatar

Contractor:
Eversendai

Location:
Doha, Qatar

The roof is supported by a cable net, secured on one side by compression arches and on the other by the main catenary. A separate lighting arch crosses the stadium. Form-finding was used to determine the most efficient geometry and prestress field. The roof was pulled into shape by stressing the catenary at two abutments simultaneously.

The desert environment generates extremes in loading from its temperature range, winds and sandstorms. Using a wind tunnel, many combinations of severe upward and downward loading were considered. The result is a magnificent stadium showing Qatar to be a leading location for sporting events.

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