

Magic Box Roof

The roof of the Magic Box covers an area of three stadiums. The main stadium has a seating capacity of approximately 15,000 spectators, while the smaller stadiums 2 and 3, seat 3,000 and 4,000 people, respectively. Its large dimensions of 170.40 x 163.20m², convert it into a significant architectural element, particularly because of its three mobile roofs.

The roof structure is divided into two completely independent areas: one which covers the main stadium and the other; stadiums 2 and 3. The two roofs are separated by an area of 7.20m which houses facilities and an access area. This area is covered by its own roof at a lower level, whose design does not fall within the scope of the present project.

On plan, the maximum roof dimensions of the main stadium, between supporting axes, are 158.40m (alignments A to W) by 100.80m (alignments 10 to 24). These dimensions slightly increase due to the lateral cantilevers of the architectural design.

In the centre of this roof, there is a large opening 72.00m by 86.40m (alignments G to O and 11 to 23). The free clearance of the opening slightly decreases due to the presence of cantilevers on the inside.

Stadiums 2 and 3 are covered by one single roof structure of 158.40m (alignments A to W) by 57.60m (alignments 1 to 9). These dimensional values also slightly increase because of the lateral cantilevers. This fixed roof has two large openings, with dimensions of 43.20 x 28.80m² for each of the stadiums.

The proposed structural solution therefore consists of a hierarchical structure containing linear, truss-type elements composed of commercial hot-rolled profiles (mainly HEB) at every 7.20m. The versatility of this proposal perfectly suits the different structural configurations present in both the fixed and mobile roofs of the three stadiums. Load-bearing columns are placed along the outer perimeter at every 14.40m.



Spain /2009 Project data

Structural type:
Trusses for maximum spans of 100.00m
Location:
Manzanares Park Sports facilities, Madrid
Inauguration:
2009
Proprietor:
Empresa Municipal del Suelo (EMS)
Architect:
Dominique Perrault
Construction:
Dragados
Structural and Mechanical Design:
FHECOR Consulting Engineers and SBP
Scope of Works:
Construction Project