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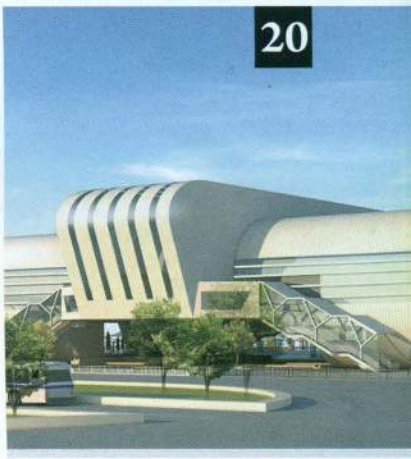
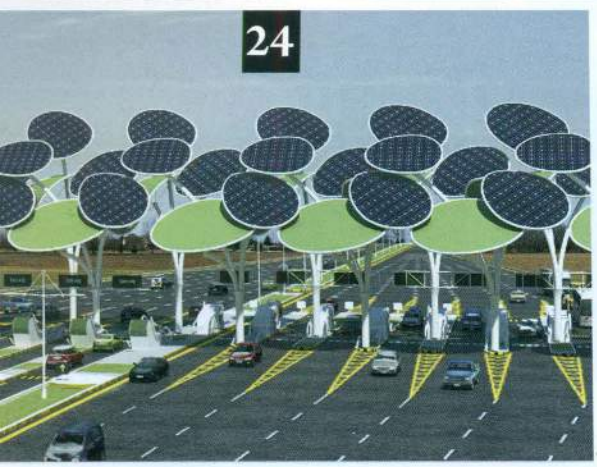
STEEL STRUCTURES & METAL BUILDINGS

BUILD WITH STEEL

STEEL IMPACTS EFFICIENTLY IN TRANSPORT...

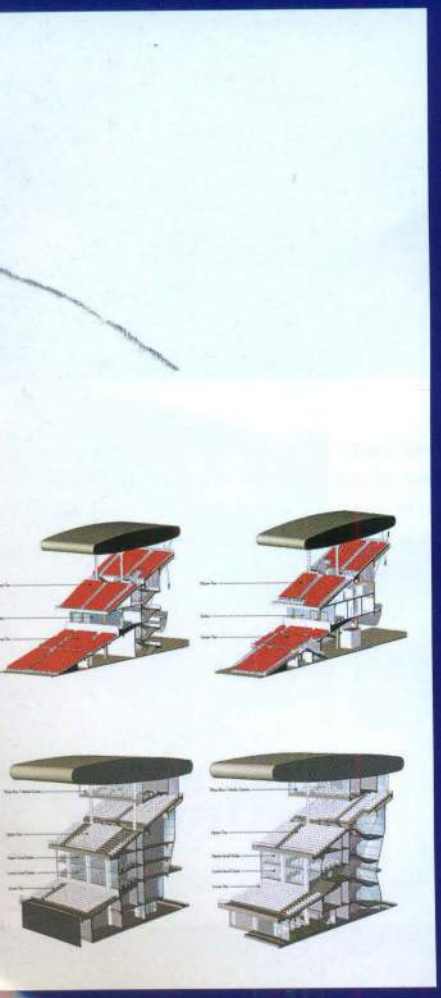
contents





EDEN GARDENS STADIUM, KOLKATA

functional and architecturally significant design of new stadium



Client Brief

In 2011 India hosted the Cricket World Cup. But prior to this, many of the existing cricket stadiums lacked facilities and required renovations, repairs, and upgrades, and Eden Gardens was one of such stadiums. Famous for its large and vociferous crowd, it is said that a cricketer's cricketing education is incomplete until he plays in front of a capacity crowd at Eden Gardens.

It is India's biggest cricket stadium, a premier venue in the world of cricket and home to the IPL's Kolkata Knight Riders. The client, Cricket Association of Bengal, identified a need for extensive reconstruction to meet the changing needs of the game, and prepare for the 2011 World Cup where it was to host four matches.

The goal of the client was to re-establish Eden Garden's status as an elite competitive facility. The prime objective was master planning entire campus and re-development of entire facility in phased manner to meet the changing nature of the game and offer a world class facility. Following were some of the major points/brief given that was to be addressed – improve spectator experience, improve player experience and facilities, improvement for administration/office bearers, unification of aesthetics, and modernization. Based on this brief, the project team developed the design. In addition to being an iconic structure that was to host the Cricket World Cup in 2011, the stadium also had to meet the pragmatic needs of the regular season and special events as well. The redevelopment additionally had to ensure that Eden Gardens retained its legendary atmosphere.

Initial Thought Process

The initial thought process included extensive research, meeting with stakeholders, benchmarking studies, etc. in order to establish standards and objectives. The team also carried out a detailed study of existing facility in order to identify various issues related to the design and overall functioning of the stadium. Later, a discovery session including all the stakeholders was conducted to establish an overall vision for the master-plan.

Steel Usage

Steel was used to create a new eye-catching façade and long span roof. The long span roof structure is having curved length of 130m, radial width of 35m and depth varies from 2m to 4m. The cantilever projection towards ground is 19m which provides an obstruction-less view of the ground to the spectators. This helps re-establish the stadium as a world-class venue and inspires a sense of pride in athletes, staff and the city beyond.

Architectural Features

Due to addition and expansion in phased manner and sections, the stadium premises lacked uniformity/aesthetic homogeneity as a whole. In order to create a uniform character, the long span roof was introduced which acts as a binding element. This along with the iconic façade gives a unique identity and re-establishes the stadium as a premier venue in the world of cricket. The design of the new stadium is both functionally and architecturally significant.

The stadium's unique feature includes its two-way curvilinear roof and the tubular sections that are not merely an aesthetic feature, but, also structurally supports the lateral movement of the roof. Care was taken for the vertical supports for the roof so as to minimize the obstruction for spectators. Also, it was further streamlined for the wind movement.

The tubular sections are arranged in a diagonal fashion to help spread structural loads, whereas architecturally they generate a three-dimensional dynamic pattern. This arrangement fulfils another function aside from supporting the structure above. It acts as a beacon in the night sky. These back lit tubular members increase the dramatic effect by adding depth and contrast to the façade creating an iconic statement.

Structural Geometrics

Modular systems where used in the roof and façade in form of truss and other elements. This helped create an efficient structural system and allowed for ease of construction. The roof is curved in plan. The top cord and bottom cord of roof section are also curved. The crescents at front and rear side of roof, called as bull-nose, enhance aesthetic significance of the structure and also very efficiently handle the wind forces. The structural geometry follows the form of skin to have maximum depth and optimum consumption of steel. The roof structure is designed using conventional hot rolled angle and channel sections.

Due to curvatures of a skin, it is essential to cover the top with specialized standing seam metal sheets which are formed at site with required dimensions and curvature in two planes - as per the geometrical requirement of the roof. Any lap in the roofing sheet along the span of the roof is not provided - making each sheet approximately 35 m. long. The bottom of the roof structure is covered with aluminum false ceiling.

The software used for designing and detailing included - AutoCAD, Revit, 3D Max, Sketchup and other structural software. Due to the approaching World Cup, the challenge was to create a world-class facility on a fast track schedule and tight budget that would create a sense of pride for the players. The team dealt with various issues and the overall experience of the project was rewarding, as was the experience of watching Eden Gardens host the World Cup 2011 matches. The project started in 2009 and was completed in 2011.

The Team

Stantec was responsible for the master-plan, vision and concept design along with landscape design, while VMS handled the design integration and project monitoring and control, structural design, plumbing design, site infrastructure and procurement management. Antech Consultants was concerned with electrical work, while Studio I worked on lighting design. Associate heating, ventilating, and air conditioning (HVAC) design work was carried out by Mihir N. Patel. ■

"The nature of the game of cricket has changed significantly since the establishment of Eden Gardens in 1864. At that time, Eden Gardens was a model stadium, combining low-cost construction with some cutting-edge attempts to add luxury suites and other revenue-generating design features to a stadium. Today, however, escalating player salaries have dictated that greater sources of revenue be dedicated to operational expenses. The existing stadium is inadequate, given the revenue needs of cricket teams. A modern stadium must create revenue streams from many sources (more seats close to the field, better luxury boxes, enhanced concessions, naming and advertising rights) to make the owner more competitive. The aim of the project was to design a state-of-the-art cricket stadium, unlike any other in the world, to be the home of CAB and Kolkata Knight Riders. When all phases are developed the new stadium is eventually expected to become an icon in the same way as the old one"

JAYESH HARIYANI
Director (Planning)
Stantec Consulting Pvt. Ltd.