

## MERIT AWARD

\$10M OR GREATER,  
BUT LESS THAN \$25M

# New Haven Athletic Center NEW HAVEN, CT



**T**he challenge presented by the New Haven Athletic Center was to provide a clear-span arena of 60,000 sq. ft that maximized the availability of clear height within a structure for athletic events, while minimizing the apparent exterior height of the facility for the community it serves.

To achieve these conflicting goals, the structural team developed a shallow triangular truss system comprised of 16"-diameter HSS for top and bottom chord members with 7"-diameter web members capable of spanning the 160' width of the arena. The complexity of the project lay in achieving the simplicity of the geometry and the dimensional requirements of the roof truss system.

To achieve the architects' desire for a uniform and visually elegant structural system, the tri-dimensional trusses were designed to be shipped as 40 units and joined in the field with full-penetration splice welds, thereby minimizing the number of bolted connections. The criteria for the welds in the field were to maintain the same tolerances as those in the factory. The uniformity in the truss appearance was achieved through careful modeling and analysis of the truss loading, and then detailing of the web thicknesses to achieve the required strengths. The resistance of the welded joints was modeled to represent a tri-dimensional elliptical shape, substantially increasing the complexity of the technical analysis. Moreover, one

### JUROR COMMENTS:

*Brilliant integrated solution with architecture and services. The technical analysis of the joints resulted in clean, clear details.*

#### PROJECT OWNER

City of New Haven, Board of Education

#### ARCHITECT AND STRUCTURAL ENGINEER

The S/L/A/M Collaborative, Glastonbury, CT

#### GENERAL CONTRACTOR

Giordano Construction, Branford, CT

#### ERECTOR

Kenerect, LLC (NEA member), Newington, CT

#### ENGINEERING SOFTWARE

STAAD, RAM Structural System

#### DETAILING SOFTWARE

SDS/2



single joint could be comprised of the concentric junction of up to six tubular members.

Because of limited staging area (most of the truss staging occurred within the arena itself) and the need to minimize erection time, the trusses were shipped pre-assembled as 15' wide by 12.5' high, in lengths up to 80'. They were coated with a factory-applied finish, thereby requiring only touch-up painting at the splice welds and a final coat of paint at the site. Because of their size and weight (each truss weighed between 36,000 lb. and 48,000 lb.) specialized equipment was required for the transportation of the individual pieces from the fabrication plant. The trusses were shipped upside down on an independent hydro-pneumatic suspension system that allowed adjustments in the transport height of

the individual trusses. The pieces were then rotated 180 degrees when delivered at the site.

The resulting truss system, which totals 750 tons and is supported by an additional 680 tons of structural steel, is expressed in its triangular form on the exterior of the building through the clerestory glazing system. The flat plane of the main roof appears lifted up over the building form, achieving the architects' desire to reduce the apparent height of the building.

The steel fabricator worked in collaboration with the construction manager, the erector and the design team for four months prior to fabrication of the trusses, planning the delivery of this challenging project. As can be seen in the photographs, the elegance of the exposed structure is the major visual feature of the arena's interior. ★