



Hall of Science

Innovative Project is Steel Showcase and Learning Center

by Nancy Hanks

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The \$50 million 55,000 sq.-ft. center expands on the museum's original building, built for the 1964 World's Fair, with an exposed steel frame that illustrates concepts of structural design.

The New York Hall of Science's Hall of Light expansion in Queens is more than a new addition.

It's actually exposed-steel "structure as exhibit", said James Dempsey, the project executive for Bovis Lend Lease of New York.

The Hall of Light – which Dempsey describes as a "demonstration to kids of how truss and beam structures work" – consists of exposed structural steel rolled members, pipes, rods, tubes, and structural strand cable that are both design and structural elements of the building.

"The use of steel as both a key structural element as well as aesthetic feature is a visible component of the quality of design in the Hall of Science project," said David Burney, commissioner of the New York City Department of Design and Construction, which oversaw the project.

In collaboration with the design and construction agency, the city's Department of Cultural Affairs hired Polshek

Partnership Architects of New York to design the building and Leslie E. Robertson Associates of New York as structural engineer. The Polshek design for the \$50 million, 55,000 sq.-ft. structure provides a long, low, horizontal transparent counterpoint to the museum's original building designed by Harrison and Abramovitz for the 1964 World's Fair and used as a nuclear fallout shelter.

The challenge for construction manager Bovis Lend Lease of New York and its steel fabricator, ADF Steel of Canada, was to devise a form for the exposed structure that which would reflect the 'structure as exhibit' concept of the Hall of Science, and meet budget constraints for the public project. The construction phase ran from October 2001 to last November.

Dempsey said the building uses 600 tons of steel, including 400 ASCE standard exposed steel, with a polished finish covered by intumescent fire-resistant paint instead of fireproofing.

The structure for the walls of the >>

Hall uses tapered built-up members with pipes welded to the web of the tee. The wall columns cantilever up from the floor, leaving the taper's maximum size at the floor and minimum at the roof.

According to the design team, each pair of wall columns supporting a king-post truss form a 'bent'. A structural strand catenary cable runs from one end of the hall to the other. This provides added stability by linking the kingposts, as well as structural redundancy.

"We were really excited by the Hall of Science concept of needing to physically experience real science in real time in order to learn from it," said Guy Maxwell of Polshek. "The design improved the museum experience."

Maxwell said that the building's Great Hall has 90 ft. of dead-end sequence.

"We turned it into a loop sequence," he said. "The structure of the addition itself is very light, and one of the accomplishments of the job was to bring more light into the whole space. You can also see the mechanical underpinnings throughout."

The hall's open nature displays an extensive network of mechanical ducts, which run under the first floor. The resulting structure has shallow girders and filler beams complementing the light-weight concrete-on-metal deck.

Bovis prepared a detailed plan for the erection of the cantilever elements, including preloading of the cantilever for the weight of the glass.

"A good job is 90 percent vanilla ice cream and 10 percent complex, and that's what this job was," Dempsey said. <<

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Key Players

Owner-Developer: New York Hall of Science; N.Y.C. Dept. of Cultural Affairs and Dept. of Design and Construction

Architect: Polshek Partnership, New York

Construction Manager: Bovis Lend Lease, New York

Structural Engineer: Leslie E. Robertson Associates, New York

Steel Fabricator-Erector: ADF Steel, Canada

Geotechnical Engineer: Langan Engineering, Elmwood Park, N.J.

Mechanical Engineer: Flack + Kurtz, New York