



BRONX LIBRARY CENTER

Next Generation Library Built in Steel

“This is not your mom’s library,” says Daniel Heuberger of the new facility in the Bronx that his firm, Dattner Architects, designed. The five-story, 78,000-square-foot Bronx Library Center—three times larger than the old Fordham Library that it replaces—represents a revolution in the way libraries are perceived and utilized. This becomes clear the moment you enter the bustling first-floor lobby, which, in keeping with the library’s open-plan layout on every floor, spills directly into the teen area, where a stereo with directional speakers plays rap music for youngsters using computers, reading books, or simply lounging around “shooting the bull.” It also happens to be the first fully green public building in New York City, having been awarded a LEED® Silver rating by the United States Green Building Council (USGBC). The designers achieved green distinction by incorporating a variety of features into the building, including a sophisticated glass curtain wall that carefully controls the amount of natural light entering the space, implementing energy-saving mechanical systems, and choosing materials with high post-consumer content, from the carpeting all the way down to the steel structural system that frames the iconic swooping roof. No more musty stack odors for the Bronx Library Center.

Regarding the structural system, the designers studied both steel and reinforced concrete for the building before deciding upon steel. “The project could have been built in concrete,” admits Heuberger, “but the library wanted to be able to easily adapt the building in the future and steel is a much more flexible material when it comes to things like inserting a new staircase and reorganizing circulation.” The steel structural system also made it easier to achieve certain features of the library’s design. “The building had this special roof that wanted to be steel, and these long cantilevers along the street facade that indi-

cated that steel would be the way to go,” says structural engineer Lou Occhicone of Severud Associates. Structural steel, which is produced using more than 97 percent recycled content and gets the USGBC’s maximum credit, also contributed to the project’s LEED® rating.

The engineers specified 50 ksi structural steel throughout the project. Designating standard wide flange shapes for nearly all of the building’s structural members helped streamline the budget and contributed to an overall construction cost of \$400 per square foot. The primary gravity load bearing columns are W14x109s to W14x120s, the girders are W35x230s, and the standard beams are W18x35s. The structure was put together with basic bolted moment connections, which sufficiently managed the lateral forces. In all, the building used approximately 540 tons of structural steel, which was fabricated by Helmark Steel at its Wilmington, Delaware, plant.

The only unusual structural steel shapes in the library were used in the cantilevers and roof framing; both instances highlight the material’s flexibility and ability to achieve design goals. The architects pulled the street face’s columns 16 feet back from the edge of the building to create an unobstructed glass wall that takes advantage of the maximum amount of natural light. They also tapered the ceiling at the cantilever to catch daylight and diffuse it into the reading areas of the library. Making this work required framing the cantilever with beams that taper from 30 inches to 18. These beams are moment connected back to the columns. The designers also placed 6x4 hollow structural sections at intervals along the slab edge to stabilize floor deflection and allow for a full-height glass wall without horizontal joints.

The architects developed the swooping form of the roof not as a design flourish alone, but in order to fit the building within the site’s zon-

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OPPOSITE The library’s steel-framed swooping roofline is visible for miles around.



ABOVE The curtain wall's low-e glass carefully modulates daylight within the library.



TOP The structure's primary load bearing columns await erection.

MIDDLE Falcon Steel bolted all primary connections in the moment frame.

BOTTOM The roof's framing members were structurally roll curved to achieve their swooping form.



ABOVE The roofline creates a soaring space within the fourth floor reading room.



The designers achieved green status by incorporating a variety of features... from the carpeting all the way down to the structural steel system.

ing envelope, which required a 30-foot setback after the fourth story. An iconic form, recognizable from afar, the roof also serves a practical function on the interior. Clerestory windows run along the west wall of the fifth-floor mezzanine, letting the afternoon sunlight into the building, where it plays on the sloped ceiling, diffusing its luminescence all the way down into the fourth-floor reading room. In order to achieve this shape, a process known as structural roll curving was used to bend the W18x60 steel sections that frame the roof.

Falcon Steel, Helmark's erection wing, set all the steel, picking the members into place with one tower crane as they were delivered to the site on trucks. "The erection went very fast," recalls Larry Best of F.J.

Sciame. "We started putting steel up on August 31st and completed the building by November 10th." And while the steel went up fast, it was chosen because it will last for years to come. "All of the materials in this building had to be extremely durable," says Heuberger, "because no one is going to come back and repair it until it's in dire need." Fortunately, the library seems to have worked its way into the community's heart, inspiring those who use the space to care for it rather than try to destroy it. According to Heuberger, this is one of the benefits of designing an inviting building rather than a concrete bunker. "If you build a fortress people are going to attack it," he says, "but if you make an open building people are going to adopt it as their own." ■

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Owner **The New York Public Library** *New York, NY*
 Architect **Dattner Architects** *New York, NY*
 Structural Engineer **Severud Associates** *New York, NY*
 General Contractor **F.J. Sciame Construction Co., Inc.** *New York, NY*
 Structural Steel Fabricators **Helmark Steel, Inc.** *Wilmington, DE*
 Structural Steel Erectors **Falcon Steel Co., Inc.** *Wilmington, DE*
 Miscellaneous Steel Fabricator and Erector **Post Road Iron Works, Inc.** *Greenwich, CT*
 Ornamental Metal Fabricator and Erector **Airflex Industrial, Inc.** *Farmingdale, NY*
 Curtain Wall Fabricator and Erector **Neversink Construction Corp.** *White Lake, NY*

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ABOVE The steel structure provided an expansive, column-free open plan layout.