University of North Carolina Genome Science Laboratory Building

Chappel Hill, NC

Team

Owner:
University of North Carolina

Architect of Record:
Skidmore, Owings & Merrill LLP (SOM), Chicago, IL

Structural Engineer of Record:
Skidmore, Owings & Merrill LLP (SOM), Chicago, IL

Mechanical Engineer of Record:
AEI Affiliated Engineers, Inc.

Construction Manager:
Bovis Lend Lease/Clancy & Theys (joint partnership)

Reinforcing Bar Fabricator:
Central Reinforcing Corp.

Total Project Cost:
$110 million

Total Project Size:
210,000 sq ft

Award:
2013 CRSI Award Winner – Educational Facility Category

Photography:
Tom Rossiter Photography

STRUCTURAL FRAMING SYSTEM

The new University of North Carolina (UNC) Genome Sciences Building (GSB) is an eight-story, 210,000-sf structure and the centerpiece of the Bell Tower District master plan. Skidmore, Owings & Merrill LLP (SOM) lead the master planning and acted as both the architect of record and structural engineer of record. AEI Affiliated Engineers, Inc. acted as the mechanical engineer of record.

This project establishes a vital link between UNC's historic north campus and its medical school to the south. It is a land reclamation effort, transforming a surface parking lot and back alley service area into a new science quadrangle, park, and Kenan Woods expansion.

UNIQUE STRUCTURAL AND/OR ARCHITECTURAL DESIGN FEATURES

Structural engineering design played a critical role in realizing many of the project objectives. The three "pod" arrangement of the building lent itself to a box-like structure, where cast-in-place concrete walls join the flat plate slabs to form a three-story box above the second floor. In order to maximize circulation options at grade level, SOM placed two large lecture halls underground and raised the labs above the ground floor, leaving more open space and passageways at grade. Maximizing flexibility in the building's underground lecture halls meant keeping them column free. Structurally, this was accomplished via 84" deep haunched concrete girders that span 63' and transfer out the columns coming down from the labs above. To further enhance the GSB's open feel at the ground level, SOM framed the levels above with wide column spacing (up to 55') and long cantilevers (up to 14') over three sides of the building. Thick (18 to 19") cast-in-place reinforced concrete flat plate construction was used to meet the strict vibration requirements associated with sensitive lab equipment. SOM located the building's office spaces on the cantilevers where vibrations are less restrictive.

The monolithic nature of the GSB's wall-floor-roof concrete construction is dramatically exposed at the face of each of the three pods, where the bare concrete frames the building's glazing like a shadow box. SOM enhanced the extant thermal mass of the concrete walls with embedded insulation panels at critical locations. The insulation required two layers of reinforcing on each side, as well as special boundary detailing on all four edges. Other large areas of the walls, slabs, and soffits are also architecturally exposed, allowing for a great material reduction in other finishes. In order to achieve the GSB's desired appearance, SOM carefully designed the concrete mix with color admixtures and special aggregates. A white slag made from recycled content was used as a partial cement replacement to benefit the concrete's color. The resultant warmth of the visible concrete juxtaposes the building's sleek glass and wood finishes. SOM achieved a high gloss finish on the floors via multi-step polishing; special framework panels helped achieve a similar finish on the walls. 7-foot wide by 4'-4" deep concrete haunches raise the roof slab up to cantilever 27' beyond the supporting walls, creating the dramatic curved roof overhang at the interior corner of the building.

REASONS FOR CHOOSING REINFORCED CONCRETE

- Self-consolidating concrete for tight pours, Grade #75 reinforcing steel (rebar) for critical columns.

CRSI Concrete Reinforcing Steel Institute
www.crsi.org