Team

Owner:
City of San Diego

Architect:
Quigley Architects FAIA and Tucker Sadler Architects (Joint Venture)

Engineer:
Martin-Libby Engineers, San Diego, CA
Endres Studios SC Engineers, Emeryville, CA
LSW Engineers, Phoenix, AZ

General Contractor:
Turner Construction Company

Concrete Contractor:
Morley Construction Company

Total Project Size:
504,000 sq ft

Floor System:
Cast-in-Place Waffle Slab Flooring System

Framing System:
Moment Frame System

Award:
2013 CRSI Award Winner – Cultural & Entertainment Facilities Category

Photography:
Rob Wellington Quigley Architects FAIA
Gary Krueger

STRUCTURAL FRAMING SYSTEM
The San Diego Central Library is a nine-story building of flexible spaces with diverse and accessible public amenities. Bay view terraces, roof gardens and a public reading room reflect and celebrate San Diego’s natural beauty and temperate climate.

The Library’s spaces are designed to be open and invite patrons to explore or relax with a newly found book. Special features include a flexible Special Events room on the ninth floor, a state-of-the-art auditorium, and a beautiful reading room under a lattice dome creating a unique and extraordinary facility.

Based on this input, the joint venture team of Rob Wellington, Quigley, FAIA and Tucker Sadler Architects implemented the breath-taking design. The final structure you see today is the result of over a decade of design effort. There were no precedents, and the final result is a unique synthesis of environmental and artistic concerns.

UNIQUE STRUCTURAL AND/OR ARCHITECTURAL DESIGN FEATURES
Selection of vertical and lateral load-resisting systems for the main library was dictated in good part by the use of the building. Considering the need for openness and versatility, the heavy live loads and the requirement for perimeter retaining walls below grade, a lateral load-resisting system of special concrete moment resisting frames above grade and shear walls below grade was the logical choice.

Special moment-resisting frame columns continuing below grade retained ductile detailing to the foundation level.

The building was required to be designed for a minimum live load of 150 lbs per square foot at and above the ground level with some limited depressed areas to receive compact shelving designed for 300 lbs per square foot. The waffle slab system lent itself to support of large live loads in possibly changing configurations in the areas without compact shelving and the effect of the exposed waffle slabs from below was architecturally appealing.

Moment frame columns were designed to different sizes and shapes depending on their proposed location in the building and architectural desires. These columns occurred at the perimeter of the ninth floor and were carried downward. Moment frames were added along different lines as the footprint of the floors increased travelling down the building. Gravity columns in the central portion of the building were minimized to 34” square below grade and 30” square above grade to maintain flexibility.

REASONS FOR CHOOSING REINFORCED CONCRETE
An open feeling was desired at the library lobby so a 64-foot-long concrete gravity arch was designed from the ground level to the fourth floor eliminating a column from the center of the lobby. Congestion of reinforcing steel at the two ends where the arch was to be supported by vertical columns proved a challenge. Couplers and headed bars were utilized here and in many other locations where congestion was a problem. Architecturally concrete with a white appearance was preferred and used and structural concrete elements were designed with a 28-day strength of 6,000 lbs per square inch.