

Pasadena City Hall (Seismic Renovation)

Pasadena, CA



Team

Owner:

City of Pasadena

Architect:

Architectural Resources Group Inc.
San Francisco, CA

Engineer:

Forell/Elsesser Engineers Inc.
San Francisco, CA

General Contractor:

Clark Construction Group, Costa Mesa, CA

Concrete Contractor:

Morley Construction Co., Santa Monica, CA

Construction Management:

DMJMH+N Management, Orange, CA

Total Project Cost:

\$117.5 million

Total Project Size:

190,000 sq ft

Award:

2008 CRSI Design Award Winner—
Public Buildings Category

STRUCTURAL FRAMING SYSTEM

Restoring and rehabilitating the historic Pasadena City Hall, built in 1927, required significant structural analysis. The building needed to be brought up to current seismic requirements without compromising its historic architecture. To achieve this, designers specified a number of structural enhancements made of reinforced concrete. These comprised encasing the lower structure, replacing the existing foundation and installing friction pendulum-base isolators.

The building originally was designed to be light and open, providing few significant solid full-height components to use as shear walls. This required the foundation support to be transferred to isolators which allows the building to move independently from the surrounding earth during a seismic event.

UNIQUE DESIGN FEATURES

Most of the structural work took place in the building's basement, out of sight of visitors. Epoxy-coated reinforcing bar anchors connect the new cast-in-place walls, beams and encasements to the existing building, using both dowel and through-bar configurations.

After removing the existing floor slab and exposing the existing foundations, a new network of reinforced cast-in-place grade beams was installed. Isolators were placed on the grade beams, centered between the existing spread footings that support the building's columns. Then a second set of beams combining both conventional reinforcing bar and post-tensioned steel tendons was cast on top of the isolators.

The new structure encased the existing column system and transferred the load to the grade beam. Then the column connections to the existing foundation were demolished, transferring load through the new isolators and into the new grade beam foundations. Without any remaining connection to the foundation except through the isolators, the building was free to move independently as needed.

The only visible remnant of the extensive retrofit was the covered "moat" around the building's perimeter that provides space for the structure to move during an earthquake. This ensures that minimal damage will occur even during a major seismic event.

REASONS FOR CHOOSING REINFORCED CONCRETE

Concurrent with the seismic upgrade was a complete restoration of the building's exterior in a phased schedule of repair. The exterior plaster and cast-stone façade details were repaired and restored, with some previously altered interior spaces changed to reflect the original appearance. The overall renovation work allowed the project to achieve LEED Gold certification from the U.S. Green Building Council.

Isolators and reinforced-concrete framing increased strength and security while maintaining the aesthetics.

CRSI Concrete Reinforcing
Steel Institute

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