

The New San Joaquin County Administration Building

Revitalizing Stockton & San Joaquin County

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The Crosby Group received an Outstanding Project Award for the San Joaquin County Administration Building project in the 2010 NCSEA Annual Excellence in Structural Engineering awards program (Category – New Buildings \$30M to \$100M)

The new San Joaquin County Administration building is located in the heart of downtown Stockton, California. Standing six-stories tall with 250,000 square feet of occupied space, the building represents an effort to revitalize Stockton and San Joaquin County. The striking glass structure at the North-West corner evokes the rugged crest of Yosemite Valley's Half Dome and creates a new landmark for the city of Stockton. With a goal of LEED Gold, the building also represents the County's commitment to a sustainable future. Completed in 2009, it now hosts sixteen divisions of the County Government. It was awarded the 2009 Project of the Year by the American Public Works Association.

To promote improved seismic performance of the structure, Buckling Restrained Braces (BRBs) were used for lateral resistance. BRBs exhibit excellent ductility and energy-dissipation capabilities: unlike conventional steel lateral systems, BRBs do not come at the cost of damage (i.e. yielding and buckling) to the frame beams and columns. The BRBs also have the valuable advantage of predictable seismic behavior, which allowed the BRB-to-frame connections to be compact and ductile. The foundation system for the building was designed with large diameter piers located directly under the building columns, with grade beams to tie together the top of the piers. This approach had the benefit of smaller pile caps and reductions in the associated excavations. The basement was constructed with perimeter shotcrete retaining walls over anchored slurry walls.

One of the major structural design challenges was the sixth floor board chamber, which is enclosed in glass to symbolize openness of county government and cantilevers nearly 60 feet from the main building. Since the area has no structural support from below, a truss, nearly a full story deep, was designed to span approximately 75 feet across the diagonal of the cantilevered floor system. Two secondary trusses were then cantilevered out nearly 30 feet to pick up the edges of the main floor system. In addition to this cantilever, the floor was sloped away from the building and then raised up to a platform at the edge of the cantilevered main floor. This platform framing then further cantilevered out nearly 8 feet beyond the main floor, to accommodate the dramatic shape of the glass system. A two-tiered steel structural system was designed to accommodate this complicated framing.

Another significant challenge was the support of the glass atrium framing below and above the Board Chamber. Structural steel was strategically located and designed to support the loads from the atrium glass assembly. The glass system, designed and manufactured by Novum Systems, was self-standing but laterally braced to the main building below the sixth floor. Above the Board Chambers, it was completely supported and braced by the main structure.

The project was delivered to the county via the Design-Build method, with Hensel Phelps Construction Company serving as builder, Fentress



Figure 1: © Tom Bonner 2009.

Architects serving as prime designer and Crosby Group as Engineer of Record. The County program required that the project be designed and constructed within a very aggressive schedule of about 24 months. The Design-Build team focused on interconnecting the design, permit, and construction schedules to streamline the overall process. The structural design began in May 2007 and within only three weeks nearly 80% of the gravity steel was sized and provided to the fabricator for procurement. This effort expedited the construction schedule and also ensured stable steel pricing. The Design-Build delivery method created an environment within which the client, the design team, the general contractor and the steel fabricator were able to work interactively and efficiently towards a common goal.

Even with this aggressive schedule, Building Information Modeling (BIM) was used to document this project. The ETABS analysis model was used by Puma Steel, the steel fabricator, to develop their 3-D fabrication model. The ETABS model also formed the basis of the structural REVIT model for eventual inclusion in the overall building BIM model. Due to the complicated geometry at the cantilevered Board Chambers and the atrium, BIM was used extensively to ensure that the structural steel, the various architectural features, and the atrium glass system would all fit together as intended. A critical conflict, between the main girder truss and the interior space truss for the atrium glass system, was discovered during the design process and was mitigated by modifying the depth of the girder truss appropriately. BIM helped the Design-Build team prevent a show-stopping conflict in the field during construction.

The Design-Build delivery method was crucial to the timely and on-budget completion of the building. The new San Joaquin Administration Building was received to great acclaim by the residents of Stockton and the County. It is now fully occupied and the people of San Joaquin County have an architecturally striking, energy efficient and user-friendly facility that will accommodate potential growth for the foreseeable future. ■

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