Richmond(RSRB) Seismic Retrofit (Link to San Francisco), complicated bridge in California

Richmond - San Rafael Bridge (RSRB) Seismic Retrofit

Length : 4.5 miles

Tonnage : 20,000 tons

Cost : $500 millionDetailing Environment : AutoCAD

Duration : October 2000 to October 2002

Richmond - San Rafael Bridge is also a vital link to the San Francisco. It is one of the largest and most complicated bridges in the state of California. This 4-1/2 miles long bridge, spanning two shipping channels, was completed in 1956 and is comprised of four distinct sections: the East Approach Structure, the Main structure, the West Approach Structure and the concrete Trestle section. Since the bridge is located in very close proximity of the San Andreas and Hayward faults, it was necessary to upgrade it to modern seismic standards which will prevent it from collapsing during a major seismic event.

Structural steel detailing of the retrofit work was carried out in association with A. A. International for the joint venture of Contractors, Tutor Saliba, Koch Skanska and Tidewater. The work includes detailing of:Steel Towers
- New dual, eccentrically braced frames at the taller, two-legged towers of the existing bridge
- New dual, special moment resisting frames at the shorter, two-legged towers of the existing bridge
- New two eccentrically braced frames in transverse direction and four in longitudinal direction at the four-legged anchor towers
- New dual eccentrically braced frames in transverse direction and moment resisting in longitudinal direction at the main cantilever towers
- New transfer beams or steel collars at the tops of all eccentrically braced and moment resisting frames to transfer the lateral loads from the existing truss shoes, bolted to the tops of the existing columns, to the new ductile frames. It also include the connection between the truss bearing shoes and the tops of all steel towers Superstructure
- Selected upper and lower chord members, truss verticals, and member connections by adding additional cover plates, by replacing existing lacings and by adding high strength bolts
- New sway bracing at locations were it was omitted and strengthening of in-place portal and sway frames in the cantilever truss spans
- New rod braces to connect the upper deck to the truss bottom chords
- Floor beam end connections at each truss vertical
- Deck expansion joint and Isolation bearings