

Bijou Bridge

Colorado Springs, CO



Colorado Springs needed a new bridge to relieve congestion and provide added access to the downtown area as well as project a new welcoming image for the city. These goals were reached with a design that featured a spliced, post-tensioned, precast concrete superstructure with an innovative prestressing layouts and variable cross-sections to accommodate a unique erection methodology. The project was completed in only 10 months.

The bridge's seven girder lines include four continuous spans that cross Monument Creek and a 155-ft clear span over a rail yard on Bijou Avenue. Vertical depth was severely limited by the need to provide a more gradual vertical curve to increase safety by increasing clearance over the railroad yard.

The precast concrete girders cantilever beyond interior piers to support the free end of the adjacent girder during erection, eliminating the need for temporary supports in the rail yard. To allow this construction, designers used a combination of debonded pre-tensioning, post-tensioning, and internally thickened sections of the webs and bottom slab.

Strongbacks were used at girder splices to eliminate the need for temporary shoring supported in the creek or the rail yard during construction. The bridge was fully post-tensioned between abutments after splices were cast and prior to placing the deck slab.

A continuous 6-ft-thick cast-in-place diaphragm section was designed over the interior piers and the abutments. Four columns of ducts were placed in the webs to provide a continuous reinforcing cage, through the girders, at the interior pier diaphragms. The girders were notched at the abutments to provide a continuous cast-in-place diaphragm and anchorage zone for the longitudinal web tendons.

The longitudinal prestress design used a combination of pre-tensioning and post-tensioning. The pre-tensioning was designed to optimize the prestress force in the positive-moment regions. Up to two-thirds of the pretensioning was debonded in the cantilevered section to minimize top-flange tensile stresses. The top-flange tendons were stressed and grouted prior to being shipped and erected.

The Bijou Bridge's creative design created a signature structure that was finished before the deadline.

Team

Owner:
City of Colorado Springs

Designer:
Summit Engineering Group, Littleton, CO

Builder:
Rockrimmon Constructors Inc.,
Englewood, CO

- Design Criteria:**
- Relieve congestion and provide added access to downtown area.
 - Improve safety by offering more gradual vertical curve to improve sight lines.
 - Project was value-engineered from a steel-plate girder superstructure with a cast-in-place concrete deck to provide better clearance.

Total Project Cost: \$6 million

Epoxy-coated Reinforcing Steel:
Encon Bridge Co. LLC, Denver, CO

Awards:
2008 Precast/Prestressed Concrete Institute (PCI), Design Awards for Best Bridge with Spans Between 75 and 150 Feet.

Photography:
Summit Engineering Group, Littleton, CO