



2011 – Buffalo Creek Bridge

Description

Meta Fields

Abc Construction Equipment : Conventional

Miscellaneous Prefabricated : Grouted key closure joints

Prefabricated Bridge Elements : Adjacent T beams (double tee); Steel sheet piling; Other abutment element: precast planks

Contracting : Full lane closure

Project Delivery : Design-bid-build

Longitude : -100

Latitude : 45.9358711

Nbi # : 53048010

State Id # : 53-048-010

Construction Equipment : Conventional

Total Bridge Length Ft : 60

Max Span Length Ft : 60

Beam Material : Concrete

Spans : One-span

Location : Rural

Owner : Perkins County

State : SD

Year Abc Built : 2011

Contract Plans : 1

Incentive Program : (Federal and Local)

Funding Source : Other

Costs : The engineer's estimate for the project was \$ 413,000. The low bid was \$459,000. There were four bidders. The cost per square foot of bridge was \$136 compared to \$141 for conventional construction in this region in 2011.

Contacts : Kevin Goeden, P.E. Chief Bridge Engineer South Dakota Department of Transportation
kevin.goeden@state.sd.us 605-773-3285

Stakeholder Feedback : This bridge is an example of the prefabricated bridges commonly used on the South Dakota local road system. It is an example of the use of PBES that could have been done in an accelerated manner. However, there were no requirements at this location for accelerated construction. The use of PBES was driven more due to the remote location and lack of ready-mix

concrete availability.

Construction Method : The pretensioned double tee beams were fabricated at a precast plant and shipped to the bridge site. The two exterior beams were cast with Type T101 rail post connection steel. The eight beams weigh approximately 16 tons each. The bridge was closed and traffic detoured. Excavation was completed and H-piles were driven at each abutment location. The sheet pile backwalls and wingwalls were erected and tie-back cables were anchored to steel piling driven in undisturbed soil behind the abutments. Steel pile caps were erected onto the H-piles and the bearing dowel bars were welded to the bottom flange. The double tee beams were erected onto elastomeric bearing pads. A dowel pin was placed through the beam end and steel cap top flange and welded. The beams were also welded together at 5-ft spacing longitudinally. The 3-inch x 27-inch precast concrete planks were bolted to the ends of the beams. The shear keys between beams and the dowel bars were filled with non-shrink grout. The 7-inch x 4-inch x 5-inch blockouts at the ends of the beams were filled with grout. Railing was installed. No overlay was applied. The bridge was opened to traffic. No incentives/disincentives or other contracting strategies to achieve rapid construction were used on this project. The schedule was driven by the contractor's availability and work load.

Replacement Or New Bridge : The replacement bridge has a 28-ft-wide roadway width. The cross-section consists of eight 3.83-ft-wide 30-inch-deep pretensioned double tee beams. The vertical abutments are founded on tied-back H-piles with 10-gauge galvanized steel sheet piling backwalls, and precast concrete planks at the ends of the beams.

Existing Bridge Description : The existing single-span bridge was deteriorated and required replacement.

Traffic Management : Traffic management alternative: Onsite short detour

Average Daily Traffic At Time Of Construction : 60

Dimensions : 60-ft-long and 30.67-ft-wide single-span adjacent T beam (prestressed double tee) bridge

Primary Drivers : reduced traffic impacts; reduced onsite construction time; improved site constructability; minimized environmental impacts

Impact Category : Tier 6 (longer but reduced by months/years)

Mobility Impact Time : ABC: NA; Conventional: This type construction is typical for local SD roads

Project Location :

Border Line Road over Buffalo Creek approximately 24 miles west of the town of White Butte in Perkins County