

ABC Innovative Projects

Inyan Kara Creek Bridge					
Location	on County Road 268 over Inyan Kara Creek in Crook County in northeastern Wyoming				
State	Wyoming				
Owner	Crook County				
Year ABC Built	2009				
State ID #	0C18005				
NBI #	MFC				
Coordinates	Latitude: 44.390422		Longitude: -104.681103		
Contact Person	Keith R. Fulton, P.E. State Bridge Engineer Wyoming Department of Transportation Phone: 307-777-4427 Email: keith.fulton@dot.state.wy.us				
Mobility Impact Time	ABC: 5-week closure		Conventional: 6-7 week closure		
Impact Category	<i>Tier 1</i>	<i>Tier 2</i>	<i>Tier 3</i>	Tier 4	<i>Tier 5</i>
				X	
Primary Driver(s)	<ul style="list-style-type: none"> improved material quality and product durability – cast-in-place concrete was not readily available in this remote location improved site constructability 				
Description	<ul style="list-style-type: none"> 85-ft long and 29.33-ft wide single-span prestressed deck bulb tee girder bridge Rural location Average Daily Traffic count: 60 (2004) Traffic management alternative, if constructed conventionally: extended use of ____-mile detour <p>Existing Bridge: The existing single-span timber stringer bridge was 31-ft long and 20-ft wide with timber substructure. It had two 9.5-ft-wide traffic lanes. Built in 1960, the bridge was deteriorated and required replacement.</p> <p>Replacement Bridge: The replacement bridge has two 11-ft-wide traffic lanes and two 2-ft-wide shoulders. The cross-section consists of four 3.92-ft-deep adjacent prestressed concrete deck bulb tee girders spaced at 7.33 ft with attached precast abutment backwall and 6-inch-long steel weld ties at 5-ft spacing along deck edges. The edge beams were precast with curbs and embedded anchor bolts to connect the steel traffic railing. The 2.83-ft wide and 2.75-ft deep precast abutment caps were 29.38 ft long. The precast wingwalls were each 8.5 ft long, 8 ft deep, and 1 ft thick. Steel plates were embedded in the abutment caps to connect to steel H-piles and wingwalls; similarly steel plates were embedded in the sides of the wingwalls to connect to the abutment caps.</p> <p>Construction Methods: Preliminary work at the site began June 16. On July 21 the bridge was closed and traffic detoured. The existing bridge was removed. Abutment piles were driven. Precast abutment caps were set on the piling and connection plates welded. Superstructure bearing plates were installed on the abutment caps. The precast girders complete with</p>				

	<p>abutment backwalls and curbs were erected, and deck ties between girders were welded. Precast wingwalls were erected and welded to the abutments. Backer rods between girders were placed and closure joints were filled with non-shrink grout. The bridge rail was installed and connected to the anchorage reinforcement that extended from the precast curbs. No deck overlay was applied. The roadway was graded with crushed base, and the bridge was opened to traffic.</p> <p>Once the work commenced with either the bridge or the roadway disturbed, the contract allowed a 40-calendar-day window to return the road to normal unrestricted traffic flow. The contract included liquidated damages in the amount of \$1,000 per calendar day in excess of the 40-calendar-day window or after August 7, 2009, whichever came first, until the roadway was permanently opened to unrestricted traffic flow. The bridge was open in five weeks.</p>			
High Performance Materials	<ul style="list-style-type: none"> • 			
Photos				
Additional photos				
Project Planning	<i>Decision-Making Tools</i>	<i>Site Procurement</i>	Project Delivery	Contracting
	•	•	• Design-bid-build	• Full lane closure
Geotechnical Solutions	<i>Foundations & Walls</i>		<i>Rapid Embankment</i>	
	•		•	
Structural Solutions	Prefabricated Bridge Elements & Systems			<i>Construction</i>
	Elements	<i>Systems</i>	Miscellaneous	•
	<ul style="list-style-type: none"> • Adjacent deck bulb-tee beams • Precast abutment caps • Precast backwalls • Precast wingwalls 	•	• Grouted keys	
Costs	<p>The engineer's estimate for the project was \$ 547,000. The low bid was \$500,500 (\$46,500 = 8.5% lower than engineer's estimate). There were three bidders. The cost per square foot of bridge was \$141 compared to \$133 for conventional construction in this region in 2009.</p>			
Funding	Federal only	<i>State only</i>	<i>Federal and State</i>	<i>Other</i>
	X			
Incentive Program (\$)	<i>Highways for LIFE</i>	<i>IBRD</i>	<i>SHRP2</i>	<i>Other</i>
Contract Plans	Complete Set:	Project Plans (link to pdf)		ABC *:
Specifications	Complete Set:	Project Specifications (link to pdf) 2003 Standard Specifications [http://www.dot.state.wy.us/wydot/engineering_technical_programs/ma		ABC *:

		nuals_publications/standard_specifications]		
Bid Tabs	Bid Tabs (link to pdf)			
Schedule	Engineer's:		Actual:	Construction Schedule (link to docx)
Other Related Information	Wyoming Bridge Program Website [http://www.dot.state.wy.us/wydot/engineering_technical_programs/bridge]			
Photo Credits	Wyoming Department of Transportation			

* Specific to the ABC used in the project.