


ABC Innovative Projects

Kickapoo Bridge					
Location	Kickapoo Road over Bogue Chitto Creek in the City of Clinton in Hinds County				
State	Mississippi				
Owner	City of Clinton				
Year ABC Built	2010				
State ID #	SA2500000000197				
NBI #	SA2500000000197				
Coordinates	Latitude: 32.40028		Longitude: -90.31250		
Contact Person	Nick J. Altobelli, P.E. Director of Structures Mississippi Department of Transportation Phone: 601-359-7200 Email: naltobelli@mdot.ms.gov				
Mobility Impact Time	ABC: 54 days		Conventional: 6 months		
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"> • reduced traffic impacts – route serves public school buses and other local needs • reduced onsite construction time • improved work-zone safety • improved site constructability – restricted to existing right-of-way due to environmentally sensitive location • improved material quality and product durability • minimized environmental impacts – bottomland hardwood forest and emergent wetlands adjacent to stream channel and in surrounding floodplain • reduced life-cycle cost 				
Description	<ul style="list-style-type: none"> • 124-ft-long and 34.5-ft-wide four-span precast adjacent slab beam bridge (31-ft-long spans) • Rural location • Average Daily Traffic count: 940 (2008) • Traffic management alternative, if constructed conventionally: extended use of 3-mile detour <p>Existing Bridge: The existing five-span concrete bridge was 116 ft long and 24 ft wide with wooden pile foundation. It had two 10-ft-wide traffic lanes and two 2-ft-wide shoulders. Built in 1964, the bridge was deteriorated and required replacement due to low bridge ratings and load limit restrictions.</p> <p>Replacement Bridge: The replacement bridge has two 12-ft-wide traffic lanes and two 4-ft-wide shoulders. The cross-section consists of eight 1.5-ft-deep simple-span adjacent slab beams, with four 4.5-ft-wide interior beams and four 3.5-ft-wide exterior beams. The abutments and intermediate supports consist of precast caps founded on 1.5-ft-square piles composed of HP 14x73 steel piles encased in concrete. Additional prefabricated elements include precast barrier rails and precast abutment wingwalls.</p>				

	<p>Construction Methods:</p> <p>This bridge is one of four bridges in the construction project. The precast slab beams, caps, and wingwalls were fabricated at a precast plant and trucked to the bridge site. The 35-ft-long caps are 2.25 ft wide and vary in depth from 1.4 ft at edges to 1.7 ft at midspan, to follow the roadway crown. Each cap was fabricated with four partial-depth pockets for pile embedment with 4-inch-diameter grout holes to the top surface.</p> <p>Traffic was detoured and the bridge was demolished. Four piles per support location were driven, with the two outside piles battered. A strut was attached mid-height between piles at intermediate supports. The precast caps were erected over the piles. The precast wingwalls were attached to abutment caps with bolted connections. Cap pockets and grout holes were filled with non-shrink commercial-type or epoxy-type grout.</p> <p>The slab beams were erected on ¼-inch-thick elastomeric bearing pads. Bolts were inserted vertically into beam ends and extended into 2-inch-diameter x 8-inch-deep holes in the caps. Webs of adjacent beams were bolted together transversely near the beam ends and at mid-span along the length of the span. At intermediate bents, ½-inch-thick expansion material (closed-cell polyethylene pre-molded joint filler) was placed the full depth and width at beam ends. Beam ends were bolted together longitudinally at intermediate supports with 1.6-ft-long 1-inch-diameter bolts. The precast concrete barrier rails were erected and transversely connected to the web of the outside beam with galvanized screw anchor and bolt connections. Shear keys between beams and between outside beams and rail elements were grouted with a 1:2:3 mix grout having a 3/8-inch maximum aggregate size. An overlay was not placed on the deck.</p> <p>Notice to proceed for the project was given February 1, 2010 and all four bridges were required to be replaced by September 1, 2010. The contract specified a maximum closure of 55 calendar days for the Kickapoo Bridge. Disincentives of \$2,000 per calendar day of closure beyond 55 calendar days were specified for this bridge. In addition, liquidated damages of \$700 per calendar day were specified for the project as a whole if the contractor had failed to complete the work by the project completion date. The bridge was opened in 54 days, one day early; no disincentives were assessed.</p>			
<p>High Performance Materials</p>	<ul style="list-style-type: none"> • 			
<p>Photos</p> <p>Additional photos</p>				
<p>Project Planning</p>	<p><i>Decision-Making Tools</i></p> <ul style="list-style-type: none"> • 	<p><i>Site Procurement</i></p> <ul style="list-style-type: none"> • 	<p>Project Delivery</p> <ul style="list-style-type: none"> • Design-bid-build 	<p>Contracting</p> <ul style="list-style-type: none"> • Full lane closure • Incentive/disincentive clauses
<p>Geotechnical Solutions</p>	<p><i>Foundations & Walls</i></p> <ul style="list-style-type: none"> • 		<p><i>Rapid Embankment</i></p> <ul style="list-style-type: none"> • 	
<p>Structural</p>	<p>Prefabricated Bridge Elements & Systems</p>			<p><i>Construction</i></p>

Solutions	Elements	Systems	Miscellaneous	•
	<ul style="list-style-type: none"> • Adjacent slab beams • Precast pile caps • Precast abutment caps • Precast wingwalls 	•	<ul style="list-style-type: none"> • Grouted keys • CIP pockets in precast substructure • Prefab parapets 	
Costs	<p>The engineer's estimate for the project (all four bridges) was \$1.50 million. The low bid was \$1.54 million. There were 5 bidders. The construction cost per square foot of bridge was approximately \$145 for this project compared to an average of \$228 for MDOT bridge replacements by conventional construction in this region in 2010. (<i>Note: These 2010 averages are based upon total bids for bridge replacement projects which each included roadway work and other items incidental to bridge replacement work and often included the construction and removal of temporary detour bridges.</i>)</p> <p>ARRA funds in the amount of \$1.722 million were received for this project, which consisted of four bridges including Kickapoo.</p>			
Funding	<i>Federal only</i>	<i>State only</i>	<i>Federal and State</i>	Other
				ARRA
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:	Proposal (link to pdf) Addendum (link to pdf) Categorical Exclusion (link to pdf)		ABC *:
Bid Tabs	Award (link to pdf)			
Schedule	Engineer's:	Not available.		Actual:
Other Related Information				
Photo Credits	Mississippi Department of Transportation			

* Specific to the ABC used in the project.