


ABC Innovative Projects

I-10 Bridge over Escambia Bay (Replacement Spans)					
Location	Interstate 10 over Escambia Bay in Escambia County in northwestern Florida				
State	Florida				
Owner	State				
Year ABC Built	2007				
State ID #	480213 (EB) / 480214 (WB)				
NBI #	480213 (EB) / 480214 (WB)				
Coordinates	Latitude:	30.517778	Longitude:	-87.145556	
Contact Person	Robert V. Robertson, Jr., P.E. State Structures Design Engineer Florida Department of Transportation Phone: 850-414-4267 Email: Robert.Robertson2@dot.state.fl.us				
Mobility Impact Time	ABC:	Twin bridges completed in 2 years and 8 months		Conventional:	Additional year
Impact Category	<i>Tier 1</i>	<i>Tier 2</i>	<i>Tier 3</i>	<i>Tier 4</i>	Tier 5
					X
Primary Driver(s)	<ul style="list-style-type: none"> reduced onsite construction time – I-10 is the only east-west interstate in the southern region of the US reduced traffic impacts – the existing I-10 eastbound bridge could only carry one lane of interstate traffic, creating significant delay and interstate traffic backups improved work-zone safety improved site constructability – eliminated time-consuming cast-in-place construction on the water; also allowed the contractor to use two precasters improved material quality and product durability 				
Description	<ul style="list-style-type: none"> 2.6-mile-long and 59-ft-wide 102-span twin bridges, each with pretensioned bulb-tee girder spans (60-ft to 138-ft-long span range typical) at piers and pile bents, and with a 616-ft-long 3-span spliced post-tensioned haunched girder unit (200 ft – 250 ft – 166 ft) Rural location Average Daily Traffic count: 21,750 each direction (2011) Traffic management alternative, if constructed conventionally: extended use of 130-mile detour <p>Existing Bridge: The existing bridge consisted of twin structures, each with two 12-ft-wide traffic lanes and 6-ft-wide shoulders. Built in 1968, the bridge was typically only 12 ft above mean tide level. It was heavily damaged during Hurricane Ivan in 2004. The bridge was temporarily repaired to maintain a total of two lanes of traffic pending construction of the replacement bridge.</p> <p>Replacement Bridge: The replacement bridge is aligned to the south of the existing bridge and is curved near the beginning and end of each approach. It was built higher than the original bridge to better resist storm surges. Its height above mean tide level ranges from 25 ft for typical spans to 65 ft over the navigation channel. The bridge has a total of six 12-ft traffic</p>				

	<p>lanes (three eastbound and three westbound) and 10-ft inside and outside shoulders. The cross-section of all but the main span unit consists of five 6.5-ft-deep bulb-tee girders spaced at 12.5 ft, with an 8.5-inch-thick cast-in-place 5,500-psi reinforced concrete deck. Precast trestle pile caps were used for low-level piers, and precast waterline footings were used for high-level piers.</p> <p>Construction Methods: To make efficient use of the high-capacity cranes on barges, the precast piles, pile caps, footings, and girders were approximately the same weight, with a maximum of 80 tons each. Most of the substructures consisted of a precast pile cap supported directly on five piles. These piles were 3-ft-square with a 22.5-inch-diameter void except for the 4-ft-long solid section at the bottom tip. The pile cap-to-pile connection was made by inserting a reinforcement cage into the top 10 ft of the pile in the length above the pile plug and into the pile cap pocket, and filling the pile void and cap pocket with concrete.</p> <p>The other typical substructure type was piers with waterline footings. These footings became larger as they approached the navigation channel. For most of these piers, two precast footings each rested on three piles. The footings had pockets to accept the pile reinforcement cages, and had reinforcement extending from the top surface for connection to the cast-in-place pier columns. Movable cofferdams were used to install the precast footings below sea level. The cap pocket were filled with concrete.</p> <p>The contract included A+B bidding and a \$10 million bonus for early completion, as well as a \$133,000 per day disincentive. Lane rental days were included to minimize inconvenience to the traveling public. Also included was a 5-year warranty for deck expansion joints, coatings, bearings, lighting and electrical systems, and drainage systems. FHWA designated the project as a Type 2 Categorical Exclusion.</p> <p>The joint venture received the \$10 million bonus when the new eastbound bridge opened 11 days early in December 2006. The width of the eastbound bridge allowed it to temporarily carry four 12-ft-wide traffic lanes, two in each direction, separated by a median barrier. Less than a year later the new westbound bridge was opened to traffic.</p>			
High Performance Materials	<ul style="list-style-type: none"> • 			
Photos Additional photos				
Project Planning	<i>Decision-Making Tools</i> <ul style="list-style-type: none"> • 	Site Procurement <ul style="list-style-type: none"> • Early environmental clearance & permitting 	Procurement <ul style="list-style-type: none"> • Design-build 	Contracting <ul style="list-style-type: none"> • A+B bidding • Warranties • Lane rental • Incentive / disincentive clauses
Geotechnical Solutions	<i>Foundations & Walls</i> <ul style="list-style-type: none"> • 		<i>Rapid Embankment</i> <ul style="list-style-type: none"> • 	
Structural	Prefabricated Bridge Elements & Systems			Construction

Solutions	Elements	Systems	Miscellaneous	• High-capacity cranes on barges
	<ul style="list-style-type: none"> • Precast pile caps • Precast footings 	•	<ul style="list-style-type: none"> • CIP pockets in precast substructure 	
Costs	<p>The low bid was \$243 million. There were three shortlisted bidders.</p> <p>ABC techniques saved an estimated \$48.5 million (\$133,000 x 365 days) in delay-related user costs.</p>			
Funding	<i>Federal only</i>	<i>State only</i>	Federal and State	<i>Other</i>
			X	
Incentive Program (\$)	<i>Highways for LIFE</i>	<i>IBRD</i>	<i>SHRP2</i>	<i>Other</i>
Contract Plans	Complete Set:		ABC *: Plan Details (link to pdf)	
Specifications	Complete Set:	Not available.	ABC *:	
Bid Tabs	Not available.			
Schedule	Engineer's:	Not available.	Actual:	
Other Related Information	FHWA Connections Manual for PBES Details 3.1.1.4A, 4.1.4A, 4.1.6A "Innovative Solutions for Rapid Construction: Replacement of the I-10 Bridges across Escambia Bay," Summer 2008 ASPIRE (link to pdf) FHWA Florida Division Presentation (link to pdf)			
Photo Credits	Florida Department of Transportation			

* Specific to the ABC used in the project.