ABC Innovative Projects

George P. Coleman Bridge						
Location	Route 17 (George Washington Memorial Highway) across the York River between Yorktown and Gloucester Point southeast of Richmond					
State	Virginia					
Owner	State					
Year ABC Built	1996					
State ID #	0991946-000000000019824					
NBI #	000000000019824					
Coordinates	***Latitude:*** 37.238333			***Longitude:*** -76.510000		
Contact Person	Kendal "Ken" Walus, P.E. State Structure and Bridge Engineer Virginia Department of Transportation Phone: 804-786-4575 Email: kendal.walus@vdot.virginia.gov					
Mobility Impact Time	***ABC:*** 9 days			***Conventional:***		
Impact Category	*Tier 1*	*Tier 2*	***Tier 3***	*Tier 4*	*Tier 5*	
			X			
Primary Driver(s)	Eliminated the need for costly, temporary, floating bridge; also: • reduced traffic impacts – a major goal was limiting bridge closure to avoid disrupting traffic • reduced onsite construction time – truss sections were constructed offsite and barged to site to quickly erect • improved work-zone safety • improved site constructability • improved material quality and product durability • minimized environmental impacts • reduced life-cycle cost					
Description	• 3,750-ft-long and 77.33-ft-wide 21-span double-swing steel deck truss bridge (2 @ 65 ft – 4 @ 90 ft – 280 ft – 350 ft – 389 ft – 500 ft – 389 ft – 350 ft – 280 ft – 8 @ 90 ft) • Urban location • Average Daily Traffic count: 32,125 (2008) • Traffic management alternative, if constructed conventionally: extended use of 75-mile detour and temporary floating bridge ***Existing Bridge:*** The existing bridge was named after George Preston Coleman, a native Virginian and former mayor of Williamsburg, who was Virginia's highway commissioner from 1913 to 1922. The two-lane bridge was 31 ft wide with two 12-ft-wide traffic lanes and two 1-ft-wide shoulders. Built in 1952, the bridge superstructure was deteriorated and narrow, requiring replacement. ***Replacement Superstructure:*** The replacement bridge has two 12-ft-wide traffic lanes in each direction, a10-ft-wide shoulder on the outside of each direction and a 2-ft-wide shoulder on the median side of					

each direction. The deck truss portion of the bridge consists of two identical halves, each with a 500-ft-long swing section, a 560-ft-long anchor section, and a 210-ft-long suspended section.

Construction Methods:
In 1995, the largest double-swing bridge in the US was dismantled and replaced in record time. Using lightweight concrete for the deck allowed Virginia DOT designers to widen the new bridge but use the existing foundation for the pivot piers for the swing spans. While approach spans were widened, deck truss sections were prefabricated nearby and then barged to the construction site. Six old sections were removed and six new ones were placed in only nine days.

While the bridge remained open, the contractor widened the concrete piers and roadway approaches using conventional construction concurrently with the construction of the superstructure on falsework 35 miles downstream at the Norfolk International Terminals. The deck truss superstructure was prefabricated in six individual sections that formed two identical halves. Each half consisted of swing, anchor, and suspended sections. After the deck truss sections were fabricated, the lightweight concrete deck and traffic railing were cast, and light poles and traffic signs were installed. The 4,500 psi lightweight concrete was used to reduce the size of the deck truss members and to allow the piers to be widened without additional pile foundations.

At the offsite staging area, three sets of barges were filled with water and floated underneath the three individual sections of the southern half. The superstructure sections were secured into position on the barges, and the water was pumped out of the barges to raise both the barges and the superstructure sections.

On April 3, tugboats pushed the 1,250-ton suspended section on barges up the Chesapeake Bay to the bridge site on the York River; the trip took 10 hours. The anchor section and the swing section were floated to the site a few days before the bridge was closed.

With all three of the southern half on site, the bridge was closed at 5:30 am on Saturday, May 4. By noon the existing swing section was removed. The suspended section was separated by evening. It and the existing anchor section were removed the following day with high tide, completing the removal of the southern half in 30 hours.

The contractor installed the anchor section first, then the suspended section, then the swing section, completing the installation of the southern half by 8:30 pm on Monday, May 6. Delayed by bad weather, the three existing sections of the northern half were removed by late afternoon on Thursday, May 9. By evening on Friday, May 10, two of the three northern sections were installed, with the remaining swing section in place by Saturday, May 11. A total of 7.5 days was required to install the six sections.

Finishing touches were done on Sunday. The cast-in-place closure joints at the ends of the spans and median barriers were cast, and pavement markings were applied. No overlay was applied. The bridge was opened Monday, May 13, at 8:24 am, only nine days after the bridge was closed.

The contract specified a maximum of two 12-day detours for removing the old truss section, moving in new sections and opening the bridge to traffic, with an early completion bonus if the bridge was re-opened early. The bridge was re-opened in one 9-day closure, and the contractor earned a $1.4 million bonus.

***Stakeholder Feedback*:**

	Overall good coordination between the consultant designer and the contractor regarding the float-in of the trusses. A lesson learned was that tidal influences need to be more closely considered during a float-in.
High Performance Materials	• Lightweight concrete decks on truss spans
Photos	  

Project Planning	*Decision-Making Tools*	*Site Procurement*	***Procurement***	***Contracting***
	•	•	• Design-bid-build	• Full lane closure • Incentive / disincentive clause • Lump Sum bonus • Formalized partnering

Geotechnical Solutions	***Foundations & Walls***	*Rapid Embankment*
	• CIP substructure under traffic	•

Structural Solutions	***Prefabricated Bridge Elements & Systems***			***Construction***
	Elements	***Systems***	***Miscellaneous***	• Float in
	•	• Truss span with deck	• CIP reinforced concrete closure joints • LWC deck	

Costs	The low bid was $72.7 million for the entire project including roadwork. There were seven bidders. The cost per square foot of bridge was $209. Conventional construction would have required a temporary floating bridge. By using prefabrication the temporary bridge was avoided, with a construction cost savings of $15 million.

Funding	*Federal only*	*State only*	***Federal and State***	*Other*
			X	

Incentive Program ($)	*Highways for LIFE*	*IBRD*	*SHRP2*	*Other*

Contract Plans	**Complete Set:**	Not available.	**ABC *:**	
Specifications	**Complete Set:**	Not available.	**ABC *:**	

Bid Tabs	Partial Bid Tabs (link to pdf) [Note: Bid tabs show 2nd and 3rd bidders; 2nd bidder used to compute square foot cost of bridge included under "Costs."]

Schedule	**Engineer's:**	Not available.	**Actual:**	
Other Related Information	"*The Coleman Bridge c 1997*," VDOT Public Affairs, DVD, 38 minutes (link to DVD)			

	May 2002 AASHTO TIG / FHWA *Prefabricated Bridges: "Get In, Get Out, Stay Out"* (link to pdf) Summary Video of Construction [http://www.fhwa.dot.gov/bridge/prefab/videos.cfm]
Photo Credits	Virginia Department of Transportation

* Specific to the ABC used in the project.