


ABC Innovative Projects

Linn Cove Viaduct					
Location	Blue Ridge Parkway, Milepost 304.6, crossing Grandfather Mountain in Avery County				
State	North Carolina				
Owner	National Park Service				
Year ABC Built	1983				
State ID #	0000005140182P				
NBI #	5140-182P				
Coordinates	Latitude:	36.094944	Longitude:	-81.812528	
Contact Person	Hratch Pakhchanian Bridge Engineer, Branch Leader FHWA Eastern Federal Lands Highway Division (EFLHD) Phone: 703-404-6246 Email: hratch.pakhchanian@dot.gov				
Mobility Impact Time	ABC:	Not applicable; on new alignment		Conventional:	
Impact Category	<i>Tier 1</i>	<i>Tier 2</i>	<i>Tier 3</i>	<i>Tier 4</i>	<i>Tier 5</i>
Primary Driver(s)	<ul style="list-style-type: none"> • minimized environmental impacts – Precasting each segment of the bridge allowed construction workers to assemble the bridge with little impact to the most environmentally sensitive section of Grandfather Mountain. This bridge also proved that a design could be environmentally sensitive in addition to being utilitarian and economical. • reduced onsite construction time • improved work-zone safety • improved site constructability • improved material quality and product durability • reduced life-cycle cost 				
Description	<ul style="list-style-type: none"> • 1,243-ft-long and 37.5-ft-wide 8-span precast concrete segmental bridge (98.5 ft – 163.0 ft – 4 @ 180 ft – 163 ft – 98.5 ft); curved alignment • Rural location • Average Daily Traffic count: 2,000 (2007) • Traffic management alternative, if constructed conventionally: not applicable – new alignment <p>New Bridge: The bridge has two 17-ft-wide traffic lanes and no shoulders. The cross-section consists of a 9-ft-deep single-cell segmental box with 18-ft-wide bottom flange. The precast post-tensioned segmental columns were based in cast-in-place pile footings founded on micropiles. The cast-in-place abutments were founded on micropiles.</p> <p>The bridge contains 153 superstructure segments, each weighing 50 tons, along with 40 substructure segments weighing up to 45 tons. The road is at an elevation of 4,100 feet and was designed as an S-shape to wind around the scenic mountains.</p> <p>Construction Methods: To avoid placement of heavy equipment in a sensitive environment, the bridge was built</p>				

	<p>in one direction from the south abutment to the north almost entirely from the top down. The only exceptions to the top down method were construction of the initial span on falsework and construction of a temporary timber bridge that enabled the micropile foundation drilling machine to prepare several of the foundation sites ahead of the superstructure erection.</p> <p>The construction proceeded in cantilever directly from one pier to the next. Each span was cantilevered half-way, and then supported by a mast and two stays for each segment. Post-tensioning tendons were threaded through and stressed from the inside of the box. Segments were placed by a movable swivel crane located at the end of the cantilever.</p> <p>Precast was chosen over cast-in-place segments because the region has a reduced construction season. By choosing precast, production of the segments could continue during winter. Additionally, the precast segments were made under plant controlled conditions, leading to high quality concrete.</p>			
High Performance Materials	<ul style="list-style-type: none"> • 			
Photos				
Project Planning	Decision-Making Tools	<i>Site Procurement</i>	Procurement	<i>Contracting</i>
	<ul style="list-style-type: none"> • FHWA Process 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Design-Bid-Build 	<ul style="list-style-type: none"> •
Geotechnical Solutions	Foundations & Walls		<i>Rapid Embankment</i>	
	<ul style="list-style-type: none"> • Micropiles 		<ul style="list-style-type: none"> • 	
Structural Solutions	Prefabricated Bridge Elements & Systems			Construction
	Elements	<i>Systems</i>	Miscellaneous	<ul style="list-style-type: none"> • High-capacity crane
	<ul style="list-style-type: none"> • Precast segmental beam elements • Precast columns 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • PT ducts, grouted 	
Costs	The low bid was \$7.9 million.			
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:		ABC *: Bridge Plan Sheets (link to pdf)	
Specifications	Complete Set:	Not available.	ABC *:	
Bid Tabs	Not available.			
Schedule	Engineer's:	Not available.	Actual:	
Other Related	Construction Presentation [http://www.fhwa.dot.gov/bridge/prefab/videos.cfm]			

Information	
Photo Credits	U.S. Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division

* Specific to the ABC used in the project.