



Wolf Creek Bridge

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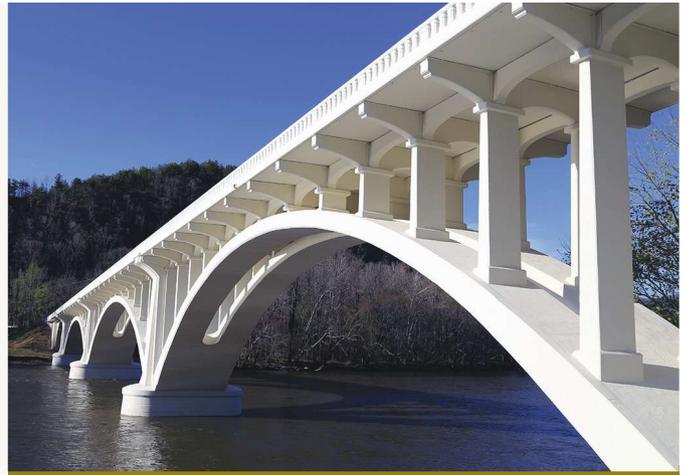
The French Broad River traverses through the scenic mountains of eastern Tennessee, intersecting SR-9 (U.S. 25/70) in Cocke County near the town of Del Rio. To bridge the river, the Tennessee Department of Highways and Public Works designed and contracted the construction of the structure in 1926. This historic structure, referred to as the “Wolf Creek Bridge” by locals, is an exceptional asset in the Tennessee Department of Transportation’s (TDOT’s) inventory. It is the second oldest open-spandrel concrete arch bridge in the state, as well as one of the longest.

Time for Major Overhaul

Although maintained by TDOT through multiple small scale repair projects over the recent decades, it was determined that a major rehabilitation was needed to preserve the structure. Some of the options that were examined included in-place rehabilitation and constructing a new bridge to eliminate the sharp curves in the roadway approaches on each end. The in-place rehabilitation method was chosen due to

- the bridge’s eligibility for the National Register of Historic Places,
- its complex architectural details, and
- the opportunity to expedite construction by avoiding permitting and right-of-way obstacles for a new structure.

TDOT oversaw the design of the rehabilitation, and AECOM managed the construction engineering and inspection on TDOT’s behalf. The contractor was awarded the \$8.7-million rehabilitation contract in 2011. Working as a team, TDOT, AECOM, and the contractor completed one of the most-unique rehabilitation projects in TDOT’s history. The completed bridge



The rehabilitated Wolf Creek Bridge. Photo: Brian Hall.

preserves the appearance of the original structure, and will be around for many generations to enjoy in the future.

Many Tennessee Firsts

Spanning over 629 ft with two closed arch spans and three open-spandrel arch spans, the bridge was closed for approximately 2 years in order to complete the rehabilitation. The center cross section of the arches was preserved as well as the pier bases protruding from the river surface, but most of the remaining structure was demolished. The structure was rebuilt from the pier bases up, utilizing precast and cast-in-place concrete components, as well as many other unique materials.

The project included

- construction of a haul road in the river,
- demolition of the existing structure (except the arches and piers),
- hydro-demolition of portions of the concrete arches,
- repair of the arches,
- reconstruction using precast and cast-in-place bridge components,
- epoxy injection repair, and
- grading, paving, and guardrail installation.

The use of shrinkage-compensating concrete, self-consolidating concrete, a polymer-modified concrete overlay on precast concrete deck panels, and vertical and horizontal hydro-demolition were all firsts for bridge rehabilitation in Tennessee.

The river posed its own challenges during the construction phase, as the south bank experienced significant soil loss due to excessive rain and high flows, and it was encroaching on the embankment supporting Norfolk Southern’s railway tracks—potentially undermining their stability if left unchecked. The selected solution could immediately reinforce the railroad embankment and could be utilized in the permanent bank-stabilization construction. It involved the first use of a bioengineered (vegetated) soil-stabilization retaining wall on a TDOT project, and was constructed this fall. 

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