



Rapid Set® Latex-Modified Concrete, S.C. Highway 11 (So. Carolina)

# BACK TO SERVICE QUICKLY

## Restoring a Historic Scenic Byway Bridge

With the southernmost peaks of the Blue Ridge Mountains serving as a backdrop, the 118-mile-long Cherokee Foothills National Scenic Byway—also known as S.C. Highway 11—winds its way across the northwest corner of South Carolina to offer travelers a scenic alternative to Interstate 85. Originally used by the Cherokee Indians and English and French fur traders, the two-lane roadway is surrounded by peach orchards, quaint villages and parks. It has been featured in such publications as National Geographic, Rand McNally and Southern Living.

In October 2015, a 240-foot-long, 30-foot-wide bridge that brings S.C. Highway 11 over U.S. Route 25 had reached the end of its service life. In fact, the two-lane riding surface had become deteriorated to the point of possibly needing total replacement.

Under an existing contract with the South Carolina Department of Transportation (SCDOT),

contractor HRI Bridge Co. suggested repairing rather than replacing the structure. The Blacksburg, S.C.-based contractor recommended removing the damaged wearing surface and installing CTS Cement's Rapid Set® Latex-Modified Concrete (LMC) overlay, also known as RSLMC. An evaluation determined that the cost of RSLMC would be half that of total replacement.

### SOUTH CAROLINA'S FIRST FAST-SETTING LMC PROJECT

The DOT agreed to the project as long as the work could be completed during daylight hours—so the bridge could be returned to service by sunset each day for evening traffic. (Provisions to meet the safety requirements for night closures were not in the project budget.) The contractor was able to meet the daytime placement requirement because the Rapid Set LMC mix design is formulated to achieve strengths that accept vehicular traffic within three hours. The mix design includes Rapid Set Cement, a proven, high-performance hydraulic cement that uses water more efficiently than traditional portland cement during the hydration process. The more efficient hydration mechanism of Rapid Set Cement results in prevention of drying shrinkage cracking and extends the bridge's lifecycle two to three times that of traditional cement.

To prepare the bridge deck's surface for the overlay placement, the contractor hydrodemolished the bridge to remove the material that had become delaminated. High-pressure blasts of water removed approximately 1.5 to 2 inches and profiled the surface so it could accept the overlay.

By adding latex to concrete overlays, contractors can achieve very low permeability to prevent harmful contaminants (like road salts) from penetrating into the concrete and causing corrosion of the steel reinforcement. Corrosion of the reinforcement will ultimately destroy the integrity of the bridge superstructure. The latex additive used also increases the adhesive bond to the existing substrate. HRI Bridge Co. partnered with Heartland Concrete, a volumetric mixer service provider based in Petersburg, Va., to batch-mix and pour 50 cubic yards of Rapid Set Cement blended with liquid latex. Approximately 24.5 gallons of latex was used per cubic yard, replacing a large portion of the mix water.

The HRI Bridge crew then finished the material using a roller-paver machine typically used for paving bridges. To properly cure the finished concrete, the crew placed wet burlap over the surface covered by large, plastic sheeting to hold the moisture within the burlap. The wet burlaps stayed in place until the bridge opened to traffic. The hydrodemolition and RSLMC placement was completed in only four days.



The specification called for a compressive strength of 3,000 psi prior to opening to traffic. The Rapid Set Latex-Modified Concrete overlay achieved this strength within three hours of placement, allowing the bridge to open for traffic each evening, meeting the DOT's requirement. SCDOT personnel were so impressed with the final results that the transportation department is considering using Rapid Set LMC for future bridge repairs.