



South Carolina DOT Reconstructs and Widens Interstate 20 in Richland County with Concrete



1 Paving underway



2 Paving complete near Spears Creek



3 High-strength PCC utilized

The residents of northeast Richland County now have a smooth, easy ride that is expected to be maintenance free for decades to come.

Interstate 20 in Richland County, South Carolina, east of Columbia between I-77 and Spears Creek Church Road, was constructed with plain jointed concrete pavement in 1965. When this 12-mile stretch of road was first built, the east side of Columbia was rural and undeveloped. Over the next 50 years, pine forests and farmland were turned into a highly developed residential and commercial area. Traffic on the formerly rural section of highway ballooned to over 60,000 vehicles per day.

The original 9-inch thick concrete was built on a sand-clay base and had a 20-foot joint spacing without dowels. Despite a design that is considered obsolete for interstate traffic by current standards, the pavement performed exceptionally well. The highway required only a single patch, grind, and reseal project in mid 1990s. But by 2012, congestion made widening the highway a priority.

The simple addition of a third lane in each direction was considered, but the geometry of the existing pavement was outdated and significant changes were needed to bring the road to current standards.

The South Carolina Department of Transportation (SCDOT) chose to remove and reconstruct the existing pavement while simultaneously adding a new lane. Concrete was selected for the project due to its long-life and minimal disruption to traffic for repairs over the next 40 years.

Zachry Construction Corporation was selected the general contractor. The project was expected to last 36 months, but changes to the staging plan allowed the paving to be substantially completed nearly one year ahead of schedule. Pavement removal and replacement was conducted under regular traffic conditions. Two lanes in each direction were maintained during daytime hours. Figure 1 shows how traffic was configured during construction. Medians split traffic and crossovers allowed for entering and exiting traffic.

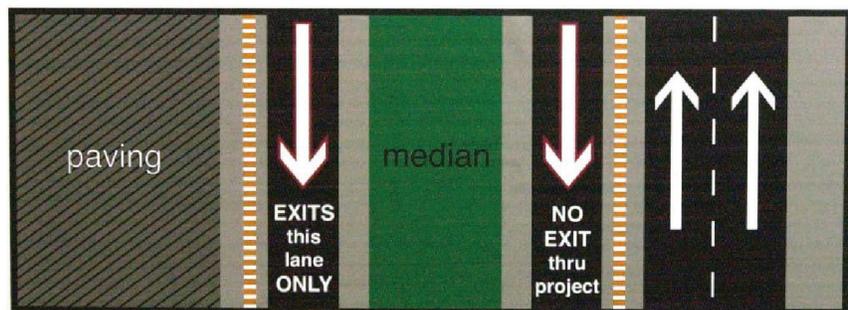


Figure 1 — Traffic staging during construction

Continued on back



4

Diamond-ground surface



5

Project completion 29 months after start

The total low bid for completing the project was \$64,378,721. Concrete paving consisted of 304,737 square yards of 12-inch thick mainline paving at \$30 per square yard, and 110,699 square yards of full-depth concrete shoulders at \$22 per square yard. In addition, 67,333 square yards of fast-track concrete paving was done at night and off-peak times around the two interchanges for \$32 per square yard.

Another significant element of the project was the widening of two overpass bridges at Alpine Road to accommodate additional lanes. The existing concrete pavement was removed and taken to a nearby location to be crushed, screened, and sold as graded aggregate base, as permitted by SCDOT specifications. The removed concrete and steel was recycled and very little waste was created. The sand-clay subbase was graded and re-compacted.

An 8-inch course of graded aggregate base was constructed for the new lanes. Once prepared, the subbase was overlaid with 2-inches of dense graded asphalt surface to provide an improved, non-erodible base. The original pavement design called for tied concrete shoulders. However, Zachry proposed SCDOT use asphalt shoulders to facilitate construction staging. The concrete compressive strength required for acceptance increased from 4,000 psi to 5,200 psi to adjust for the edge support loss. Finally, the new surface was diamond-ground to provide the smoothest, quietest surface possible. The cost of the grinding was \$2.04 per square yard.

The project was substantially completed on February 11, 2015, approximately 28 months after it began.

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