Five years ago, traveling the stretch of I-85 north of Henderson, North Carolina to and from Virginia, was less than ideal. The original concrete pavement, constructed in the early 1960s, was clearly showing its age. Original design standards called for thirty feet joint spacing and did not include steel dowels to provide load transfer across the joints. Over the years, increased truck traffic caused joint faulting and pavement cracks requiring the North Carolina Department of Transportation (NCDOT) crews to remove and patch sections of the roadway.

In late 2013, a project site visit and a one-day workshop were coordinated with NCDOT engineering staff as part of the “Concrete Overlay Technical Assistance Program” offered by the Federal Highway Administration (FHWA) and the National Concrete Pavement Technology Center (CP Tech Center). A report was prepared with recommendations based upon site observations and discussions with engineers experienced with concrete overlays from across the country. One of the key cost-saving recommendations was to leave the existing asphalt repairs in place, prior to placement of the asphalt wedge and drainage layers. This change in scope saved millions of dollars.

By March 2015, a $137-million “rehabilitation” project was bid by the NCDOT calling for a new unbonded concrete pavement overlay, built to current interstate standards, as well as improvements to vertical clearances under several bridges along the corridor. McCarthy Improvement Company, the paving subcontractor, batched the concrete on-site for the 661,877 square yard project—making it one of the largest unbonded concrete overlay projects in the southeast. The 10-inch unbonded concrete overlay was placed on top of an asphalt interlayer. Dowel baskets were placed at 15-foot intervals to help transfer loads between the slabs and protect against future faulting.

Beginning in late 2015, construction was phased by first constructing the southbound shoulder widening to permit head-to-head traffic flow, separated by a temporary barrier wall, as the northbound lanes underwent closure and construction. Upon completion of the northbound lanes, the southbound traffic was then diverted via a crossover to the new lanes, permitting southbound lane closure and construction. This process was repeated for different sections along the entire length of the twenty-mile project.

The project was initially expected to conclude by late 2020. However, two years into its construction, the NCDOT granted additional funds to the prime contractor, S.T. Wooten, to accelerate the construction and open all lanes earlier by incorporating off-season paving. McCarthy Improvement’s Project Manager Kevin Crusa said, “Due to good weather in 2017, we were able to pave 321,148 square yards, thus the entire 20 miles of southbound lanes.” The accelerated schedule enabled four more of the projects eight phases to be completed in 2017. The remaining two phases will be completed by November 2018, just in time for the holiday season!
Over the last decade, truck traffic has increased steadily. This section of I-85 currently carries nearly 40,000 vehicles per day (VPD), 23% consisting of trucks (9,200 VPD). According to *Freight Management and Operations*, freight truck traffic is expected to increase by another 40% in the next 30 years ... bringing I-85's average truck traffic to over 12,800 trucks per day. Unlike 4,000 pound cars that do little damage to roadways, trucks can weigh up to 80,000 pounds, and can quickly stress road surfaces, especially asphalt.

“Concrete pavements are designed to carry the increased truck loads. It’s not uncommon to see concrete pavements last up to 30 years before requiring preservation treatments. In comparison, interstates constructed of asphalt typically last only 8-10 years before needing a surface makeover,” said Greg Dean, Executive Director of the Carolinas Concrete Paving Association (CCPA).

If this 20-mile interstate had been re-built or overlaid with asphalt, future milling and resurfacing contracts would have been required. Not only resulting in higher repair costs over the life-cycle, but the additional work zones with lane restrictions would also create traffic back-ups that can result in increased accidents.

Rigid concrete pavements do not deform under the intense loading of tractor-trailer trucks, and last much longer than asphalt before requiring preservation treatments. Once the section of I-85 leading into Virginia is complete, travelers and truckers will enjoy twenty more miles of new interstate, maintaining North Carolina’s nickname “The Good Roads State” for many years to come!

Diamond grinding enhances smoothness and provides uniform texture.

Head-to-head traffic in southbound travel lanes enables full-width (24') paving.

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Head-to-head traffic in southbound travel lanes enables full-width (24') paving.

Bid Date: March 17, 2015
Number of Bidders: 7
Project Low Bid Cost: $137,353,711.23
% Below Engineer’s Est.: 9.2%
PCCP Units (Costs): 661,877 SY ($30.4M)
Asphalt Units (Costs): 687,900 tons ($41.4M)

Unbounded Concrete Overlay on Concrete Pavements

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