Sitting at the junction of one north-south freight corridor (I-65) and two east-west corridors (I-40 & I-24), Nashville, Tennessee, is a center for the transportation of goods and services. This ideal location plays an important role in the city and state economies. Although Interstate 65 was originally built using concrete pavement, it since has been resurfaced with asphalt numerous times. Two previous contracts addressed the reconstruction and widening of Interstate 65 north of Briley Parkway. Concrete soundwalls, concrete bridges, and new jointed plain concrete pavement were key improvements to the road in these two projects.

In 2012, the Tennessee Department of Transportation (TDOT) awarded the third project along this corridor to widen and reconstruct with concrete pavement to Rogers Group, Inc. who submitted the low bid just below the engineer’s estimate on the $50.7M contract. ACPA-SE member, APAC-TN-Memphis, was hired to perform the concrete paving work, which began in 2014. Current annual average daily traffic levels exceed 140,000 vehicles, requiring project teams to address the challenges of constructing the concrete pavement under traffic.

TDOT incorporated an evaluation of two-lift concrete pavement on a section of this project. This method utilizes wet-on-wet construction techniques that allow for use of surface aggregates with improved physical characteristics, use of recycled aggregates in the lower lift, or other combinations of materials which might improve pavement performance and economy. According to TDOT Materials and Tests Division Director Brian Egan, PE, the department received assistance from the Federal Highway Administration’s (FHWA) Strategic Highway Research Program 2 (SHRP2) Implementation Assistance Program.

Tennessee agreed to become a lead adopter state in Round 4 under the category R21 for New Composite Pavement Systems. This mechanism provided the funding to evaluate wet-on-wet concrete pavement on an existing project in order to evaluate constructability and compare costs of polish-resistant aggregate in full-depth concrete versus a composite pavement with resistant aggregate only in the top portion of the pavement. APAC-TN and Irving Materials, Inc. (IMI) coordinated to assure timely delivery and placement of concrete mixtures for both the lower and upper lifts. IMI furnished concrete pavement from its nearby central mix plant utilizing dump trucks for delivery of the lower-lift mix and truck mixers for delivery and placement of the upper lift mix.

In the fall of 2014, FHWA’s Mobile Concrete Laboratory visited the jobsite for testing and evaluation of the two-lift concrete paving process, materials, and finished product. In addition to the tests typically performed for concrete pavements, the mobile lab performed the following tests on the concrete: air void analyzer, super air meter, calorimetry, surface resistivity, and coefficient of thermal expansion. Additionally, the mobile laboratory located load transfer dowels and determined concrete pavement thickness using magnetic tomography technology. The FHWA followed the field implementation work with a two-day workshop for TDOT and industry to highlight field observations, best practices, and lessons learned from the two-lift concrete pavement demonstration.

The results of the project are best summarized in a quote from Jamie Waller, PE, TDOT materials and tests manager for aggregate, concrete, & soils, “...after reviewing the data it appeared that the composite section was successful. TDOT will be reviewing some of these testing measures and equipment to possibly include in our program for the future.”