The I-20/I-59 Interchange with McAshan Drive in Jefferson County, Alabama is a busy diamond interchange. McAshan Drive has significant heavy truck traffic from the 795-acre Jefferson County Metropolitan Industry Park, to Norfolk Southern’s Intermodal rail to truck facility, as well as an active truck stop. “This is a typical diamond interchange, but the high truck counts have contributed to the deterioration of the asphalt pavement on both sides of the concrete bridge,” said Ken Couch, PE, county transportation engineer for the Birmingham area of Alabama DOT (ALDOT).

With most everyone across Alabama facing transportation funding issues, finding a feasible solution was important for all entities involved. “The City of Bessemer, Jefferson County, ALDOT and the Federal Highway Administration (FHWA) worked together to fund the project,” said Couch. “The goal was to restore the pavement to the point that it could weather the heavy truck traffic.”

The initial design called for building up the asphalt road to provide the pavement strength needed, but that meant raising the elevation of the bridge over the interstate. Rather than raising the bridge, the decision was made to remove the existing pavement and dig deeper to place the extra material. To minimize the amount of digging and remain on grade with the bridge, ALDOT explored Roller-Compacted Concrete (RCC) as a solution. Although RCC is commonly used in industrial areas, this would be the first road pavement project for the Birmingham area.

RCC is a no-slump concrete, compacted by high density pavers and vibratory rollers, with no reinforcing steel, forms or finishers. Unlike asphalt, RCC does not rut, shove or produce potholes. It is resistant to hydraulic fluid and oil spills, and will not soften under high temperatures. Limited maintenance costs during its lifespan, reduced construction times (10 inches of RCC in a single pass vs. multiple lift placement with HMA), and structurally sound pavement with early strength gain, made RCC the right choice for this project.

The project included 9,726 square yards of RCC, which was used to pave from the end of the bridge to the on/off ramps on both sides. RCC pavement also extends to the truck stop driveway. Other work included repair and buildup of the part of the asphalt road that leads to the interchange and cast-in-place concrete work at the top of each ramp. A curing compound was also applied and construction joints sawed as early as possible to reduce the chances of random cracking.

“Borings taken prior to design indicated a crushed stone base layer,” said Couch. “We discovered that the degradation of the pavement led to water in the subgrade and no stone in some areas.” In the areas that did not provide enough support for the RCC pavement, the contractor, A.G. Peltz, an American Concrete Pavement Association member, had to undercut and replace material. “This project was different because we are usually a subcontractor, but we were the prime contractor on this project,” said A. G. Peltz Project Manager Rodney Woodham.

Woodham’s crew handled the grading and placement of 10 inches of RCC but subcon
RCC completed, awaiting striping

completed and open for traffic

Couch shares that one lesson learned in this – the first RCC road pavement in the area – was related to contract language. “Detail work, such as the top of the entrance and exit ramps, required cast-in-place concrete to provide the transition from the RCC pavement to the ramp,” said Couch. “We did not anticipate that and will provide a separate line item for that work in the future.”

“It was an efficient process with the same paver used to spread and compact the base that was used to place the RCC,” said Couch. He does see RCC as a potential solution for road projects that have long, uninterrupted stretches of pavement, for which temporary lane closures to allow cure times are possible. “I will recommend use of RCC to my supervisors again for the right application,” said Couch.

Assistant Project Manager, Brian McCollum, County Transportation, East Central Region/Birmingham Area, said “It was a great experience working on this project and getting to see this product in action first hand. It was good also to work with a contractor that had patience with us throughout the process, as this was a learning period for many of us involved.”

By:
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tracted the asphalt milling to another company.

To allow time to cure, lanes across the bridge and entrance/exit ramps were constructed in phases. Traffic was re-routed to the next interstate exit to minimize traffic at the work site. RCC is not traditionally designed as a final riding surface for higher speed traffic; therefore, ALDOT elected to diamond grind the pavement to improve rideability.

“Two main benefits of RCC are its ability to place 10 inches of concrete in a single pass, as well as its minimal long-term maintenance expectations. This accelerates the initial construction process and keeps road downtime to a minimum,” said A.G. Peltz Business Development Manager Chris Carwie. “With McAshan Drive being a key access point for both the Norfolk Southern’s McCalla Intermodal Transfer Facility and Jefferson County’s 795-acre Metropolitan Park, the use of RCC in this application will increase the structural value of the roadway and hopefully spur additional industrial and commercial development. McAshan Drive offers a prime example of how utilizing RCC can provide owners and engineers with a viable solution for urban reconstruction projects.”

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