Project Profile

BondTekk™ Bonded Pavement Technolgies

General Project Information

Project Location:	Delaware SR-1, US 13 to SR 273
Road Owner:	Delaware Department of Transportation
Application:	BondTekk™ CR (crack resistant overlay) - experimental
Date Placed:	June 7, 2006
Applicator:	Gorman Bros. Construction

Delaware SR-1 with BondTekk™ CR crack resistant overlay

The Delaware Department of Transportation (DelDOT) is researching methods of addressing Alkali-Silica Reactivity (ASR) issues in Portland cement concrete (PCC). A topical treatment of lithium nitrate is one of the methods being evaluated to extend service life of PCC. Given the success of the sealing capabilities of BondTekk Nova (also known as NovaChip® ultrathin bonded wearing course UTBWC), a more aggressive treatment was tried as a potential solution. This and other experiments led to a new BondTekk product, BondTekk™ CR.

The idea was that the ASR could at least be arrested if water (needed for the reaction) was prevented from entering the concrete from the surface, thereby preventing further damage. The questions addressed by this field trial were as follows:

- Will BondTekk CR help mitigate the ASR with the PCC?
- Will BondTekk CR reduce cracking?
- Can an application up to 0.3 gallon per square yard (gsy) of polymer-modified asphalt emulsion (PMAE) be placed without construction issues and without any bleeding or flushing? How does performance compare to 0.2 gsy?
- Will the use of an increased application PMAE arrest ASR and lengthen the service of concrete pavements in Delaware?

DelDOT conducted this 4.5 mile trial on the four-lane SR-1 starting near the intersection with US 40. The 0.3 gsy test section was in the passing lane of SR-1 beginning 1,000 feet from the US 40 interchange and proceeding north for 1,000 feet. Most of SR-1 had topical treatments of lithium applied in the mid-1990's, however, the general condition of the concrete pavement was considered poor due to the degree of ASR initiated distress, which predominantly was in the form of spalling in the wheel paths at the joints. The concrete pavement had a joint spacing of 40 feet.

Mix and Trial Information

The product was a Type C gap-graded mixture with a PG 64-22 binder content of 5.2%. The emulsion was a polymer modified cationic emulsion manufactured by Gorman Brothers. A single lift of BondTekk CR mix, used as an interlayer, was placed 1.5 inches thick over 0.3 gsy PMAE or 0.2 gsy over the concrete pavement (ASR damaged PCC), depending on the section. A Superpave mixture with a 2-inch lift was placed over the BondTekk CR interlayer.

Construction Observations

The temperature of the mix immediately behind the screed was between 288°F and 302°F. The paver speed was maintained between 25 to 30 feet per minute.

- No construction issues were encountered using a PMAE application rate as high as 0.3 gsy. No emulsion was observed running from the edge of the gap-graded overlay. Rollers were able to pull up right behind the paver as they had been doing for the lower emulsion application rate. There was no evidence of emulsion bleeding or flushing to the surface at the time of placement.

Performance

A pavement condition survey was conducted by Road Science personnel on October 21, 2009. Performance to date is excellent with the pavement condition rating (PCR) of 98. There were no cracks or other distresses noted in the test section. The control section PCR was 95, exhibiting one reflective crack at the end of the bridge approach as well as one distortion in the outside lane just north of the crack.

Photos

Before BondTekk™ CR application

During BondTekk™ CR application

After BondTekk™ CR application

Awards

Delaware Asphalt Pavement Association Award - 2006
DelDOT Outstanding Project Award - 2006

For more on this project, the BondTekk™ CR process or other solutions available in your area, contact your local Road Science™ representative.