Bonded Concrete Overlay of Asphalt – Urban Pavement Rehab Solutions

ACI Spring Convention
Milwaukee, WI
April 18, 2016
Design & construction protocols – concrete over asphalt

• Sometimes referred to as “whitetopping”
• Additional descriptive terms:
  ▶ Conventional, thin, ultra-thin (UTW)
  ▶ Based on level of bond, load carrying
• Original “whitetopping” was essentially designed as new concrete pavement with no focus on bond
• Bonded Concrete Overlay of Asphalt (BCOA):
  ▶ Measures taken to provide bond
  ▶ Concrete may or may not contribute significantly to load-carrying capacity but significantly enhances surface durability, thus pavement life
  ▶ Often an inlay configuration
References & technical resources

- ACI 325.13R-06, “Concrete Overlays for Pavement Rehabilitation”
“Conventional whitetopping” example

Before

After

Bone of concrete to asphalt is relatively unimportant when overlay design is essentially that of an independent pavement on an improved subbase.
“Conventional whitetopping”

- First documented use, 1926
Examples of whitetopping (little attention to bond)
Benefits – concrete overlay of deteriorated asphalt

• Saves expense of removing the asphalt, making productive use of the materials (more sustainable!)
• Economical way to enhance pavement capacity for expansion projects or change of traffic level
• Reduction of maintenance expenses accomplished via needed rehab
• Better safety & illumination with less energy
• Aesthetics & curb appeal
So, what’s different about BCOA?

- Typical applications are problem areas of extreme, rapid asphalt surface disruption under heavy traffic (rutting, etc.)
  - Intersections – most common
- Most projects rely on the existing asphalt pavement structure for most or all of the load-carrying contribution
- Concrete: new, durable wearing surface, ending frequent rehab cycles
- Concrete-to-asphalt bond generally allows for thinner concrete layers than in conventional whitetopping
  - Close joint spacings are needed to prevent debonding from panel curl & shrinkage
- Synthetic fibers common @ high dosage
- Many projects are designed for fast-track construction & rapid opening to traffic
- Economic justification usually based on less frequent maintenance requirements
BCOA construction

- Planning & traffic control
- Milling / inlay prep
- Cleaning of surface for bond
- Traditional placement / finishing
- Rapid joint sawing
- Accelerated curing
- Often: opening to traffic in 24-48 hours, immediate sequencing of adjacent lane placements
Milling and cleaning – critical for bond
Milling and cleaning – critical for bond
Lots of joints to cut
Immediate, effective curing

**BCOA construction**

Insulated curing blankets may be needed, seasonally
Projects
First project in Mississippi - frontage road intersection, I-55 @ County Line Road, Jackson MS – October, 1996
Projects

County Line Rd @ 20 years
Projects

Other MDOT projects

Collinsville

Hattiesburg

Newton

Carthage

Macon
Projects

US 78 Intersections at Memphis
Projects

South Pittsburg, TN
Projects

Main Street – Jasper, TN
Projects

Savannah, TN

General aviation airport runway
## Projects

### New Orleans French Quarter BCOA

- Cooperative Endeavor Agreement between the City and Convention Center – $6.5 million
  - Downtown Infrastructure Improvement Project
- City Council approval of budget - June, 2013

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<td>Improvements to sanitation services to be used over a 2-year period including new bins and enhanced operations</td>
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| TOTAL INVESTMENT                                             | $6,451,000            |
Projects

Iberville & Julia streets – conditions prior
Projects

Iberville & Julia streets – construction
Projects

Iberville & Julia streets
Projects

US 78 EB weigh station at Olive Branch, MS, 1999
US 78 EB weigh station at Olive Branch, MS
Parking lot overlay guide for designers and contractors

• How to evaluate existing asphalt
• Determining overlay thickness based on 3 different zones.
  ▶ Car parking area
  ▶ Access roads
  ▶ Heavy duty truck Lanes
• Surface preparation
• Placement procedures and tools
• Joint layout guidelines
• Supplemental information for determining use fibers and dowels

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Questions?

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