Construction of an Unbonded Concrete Overlay Under Traffic
US 18, Iowa

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(A tribute to Dr. James Cable)
Overview

• Project description
• Constraints
• Design
• Traffic management
• Construction
• Things we learned the hard way
Project Overview

• 2 lane county road (2 counties)
• ~2400 ADT
• 18.8 miles long
• Existing composite pavement
• 4 bridges
Project Overview

• Existing system
  – 1938 PCC 18’ wide
  – 24’ Asphalt overlay 6” thick
  – Rutted and raveled
  – Tenting from poor condition concrete joints
Constraints

• Widening from 24 to 32 feet
• Traffic had to be maintained
• 2 mile max work zone for patching & milling
• 3.5 mile max work zone paving
• Cross slope had to be adjusted
Design

Diagram showing the design of a pavement with dimensions and layers.
• Survey existing surface
• Develop database
• Create profile

Reference points are 250 +/- and stagger on opposite sides

ATV Laser – z coordinates
GPS – x, y coordinates

Survey – GPS / Total Stations
Traffic Management

PAVING SEQUENCE EAST TO WEST

Pre-Paving: Milled Trench, Install Steel, Clean Surface
Paving: Pavement and Safety Wedge
Post-Paving: Rock Shoulder, Striping Centerline, Signs
Patching Traffic Control
Pilot Car
Construction

1. Subdrains, patching, drains, shoulders
2. Bridge approaches
3. Mill asphalt
4. Place overlay
5. Connections
Partial Depth Milling
Partial Depth Patching
Partial Depth Patch
Full Depth PCC Patches

- Average 30 per day
Full Depth PCC Patching
Milling

- 7’ wide machine
- Minimum ½” to 1 ½” maximum
- Centerline pass controlled by total stations
- Remainder controlled by sensor off milled surface
Skipped Mill and Pull Off
Traffic

- Steel
- Milled & Cleaned Surface
- Truck Avoiding Steel
- Traffic Control Min. Safety Distance
- Milled Surface (Existing 12’ Lane)
- Gravel

New Concrete Overlay

US18 Bonded Concrete Overlay
Paving

- Average Paving per day 6,800 to 7,500 ft.
- Heated water for cold weather
Stringless Control
Placing Safety Edge
Safety Edge
Removing Safety Edge
Things We Learned

• Know what is there
• Details matter
• Building under traffic is slower and does cost more
• Communication is critical
• But it can be done!