THE WHITETOPPING REHABILITATION ALTERNATIVE

Midwestern Pavement Preservation Partnership Conference
October 26-28, 2009
Schaumburg, Illinois
What is Whitetopping?

- The application of a Portland Cement Concrete overlay to an existing asphalt surface.
- It can be placed over HMA or built up sealcoats.
- Originally designed with the HMA providing a base and some bond for the overlay.
- Overlay depths of 6 +/- inches.
Iowa Whitetopping Performance

- On county / city / airports – over 500 miles (2009)

- Primary system:
  - 2 inlays: I-80 W. of Redfield (13.5 miles)
  - Research Project: Iowa 21 S. of Belle Plaine (7 miles)
  - Change order: US 71 S. of Atlantic (1800’)

PTEC99
Adair / Madison I-80

- Inlay of a full depth ACC section
- 1979
- Milled 8”
- Paved 10” in the trench
- 22 years old to date
- Excellent condition
Iowa 21 UTW Research Project

- 7.1 miles long
- 65 test sections
- 1994
- Monitoring 41 sections
- ISU Research
  - Instrumented sections
  - Monitored for 5 years
  - Extended for 5 more years
PROOF OF CONCEPT PROJECTS

- Iowa 21, Belle Plaine (1994-2009)
- South D Street, Oskaloosa (2001-2009)
- Iowa 13, Manchester (2002-2009)
- East 18th Street, Des Moines (2009)
- Iowa 175, Odebolt (2007-2009)
VARIABLES CONSIDERED IN THE PROOF OF CONCEPT OVERLAYS

- Surface preparation – Mill, Broom, CIPR
- Overlay depth-2, 3.5, 4, 4.5, 6, & 8 inch
- Inclusion of fibers – None, Fibrillated, Monofilament, Structural.
- Panel size – 2, 4, 4.5, 6, 7, 9, & 12 ft.
- Sawing and sealing of joints – width, cleaning, seal/no seal
- Widening – ACC & PCC widening joints, curbs
IOWA 175 MAINTENANCE MILLING OF MIDSLAB AREA
OSKALOOSA PREOVERLAY CONDITION
IOWA 21 6X6 SLABS
EAST 18TH ST. DES MOINES
IOWA 175, 6x6 foot slabs
What have we learned?

- Surface Preparation
  - All the types worked
  - CIPR slows up work schedule & reduces performance
  - Allow at least 1 in. bond breaker for unbonded
  - Minimize the milling & surface preparation
  - Provide clean, cool (less than 110 deg F), dry placement surface
  - Fill wheel ruts with concrete
OVERLAY DEPTH

- 2-3 in. with strong base for urban w/curb
- 3.5-4.5 in. in open rural sections wo/curb
- Depth determined by truck traffic, existing pavement characteristics & elevation constraints
FIBER INCLUSION

- Use in depths of less than 4 in. rural open sections
- Use in depths of less than 3 in. curbed urban sections
- Fibers optional in depths over 4 inches
- Match fiber cost to performance goals of pav’t.
- Utilize to increase panel size for given OL depth
PANEL SIZE

- Maximum size panel = 18 x depth in inches
- Keep shape square if possible
- Maintain centerline joint and widening joint
- In composite pavements, controlled by base pavement
- Keep longitudinal joint out of wheel path where possible
JOINT DEVELOPMENT

- Saw narrow, early & do not seal or clean in rural section
- Saw narrow, early & seal in curbed section
- Seal with hot pour material & no backer rod
GENERAL CONCLUSIONS

- Thin overlays do perform well, use them!
- Evaluate existing ACC surfaces for depth, durability, uniformity in support and stripping potential
- Review as built plans in the design process to assist in establishing slab size and overlay depths
GENERAL CONCLUSIONS CONTINUED

- Overlay depth design for existing composite pavements is under development
- Teach Maintenance units how to maintain this type surface
- Remaining performance issue solutions tied to construction details
- Rehabilitation is possible in full or partial depth patches
IOWA OVERLAY RESEARCH IN 2009
FOUR PROJECTS

- Location and length
  - Osceola Co, Iowa 9, 8.8 miles, 2 lane stringline
  - Worth County, US 65, 11 miles, 2 lane stringless
  - Poweshiek County, V-18, 10 miles, 2 lane stringless
  - Johnson County, 5 miles, one lane, stringline
- Control quantities, reduce survey needs, reduce construction time, reduce traffic control problems
- Associated with National Overlay Implementation
System of Concrete Overlays

Concrete Overlays

Bonded Overlay System
- Bonded Concrete Overlay of Concrete Pavements
- Bonded Concrete Overlay of Asphalt Pavements
- Bonded Concrete Overlay of Composite Pavements

Unbonded Overlay System
- Unbonded Concrete Overlay of Concrete Pavements
- Unbonded Concrete Overlay of Asphalt Pavements
- Unbonded Concrete Overlay of Composite Pavements

Thinner

Old pavement is base

Bond is integral to design
Questions or Comments?
Thanks for your time and feel free to contact me if you have further questions.

Jim Cable P.E., L.L.C.
Phone 515-292-4460  Fax 515-292-0081
jkcable@iastate.edu