# *THE WHITETOPPING REHABILITATION ALTERNATIVE*

Midwestern Pavement Preservation Partnership Conference

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# *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

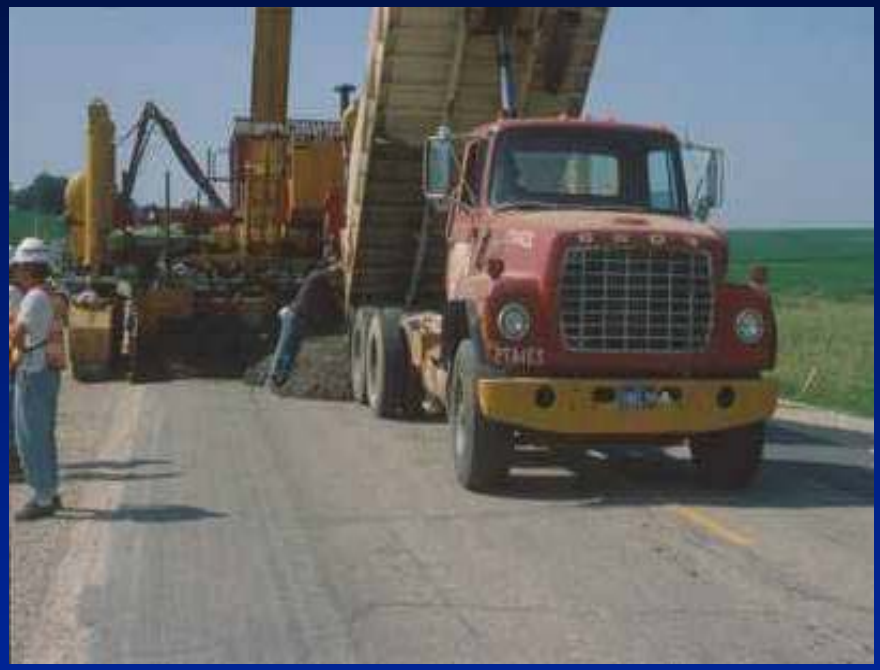
- On county / city / airports – over 500 miles (2009)
- Primary system:
  - 2 inlays: I-80 W. of Redfield (13.5 miles)
  - Research Project: Iowa 21 S. of Belle Plaine (7 miles)
  - Change order: US 71 S. of Atlantic (1800')

# 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)
- Iowa 9, US 65, V-18, Old US 218 (2009)

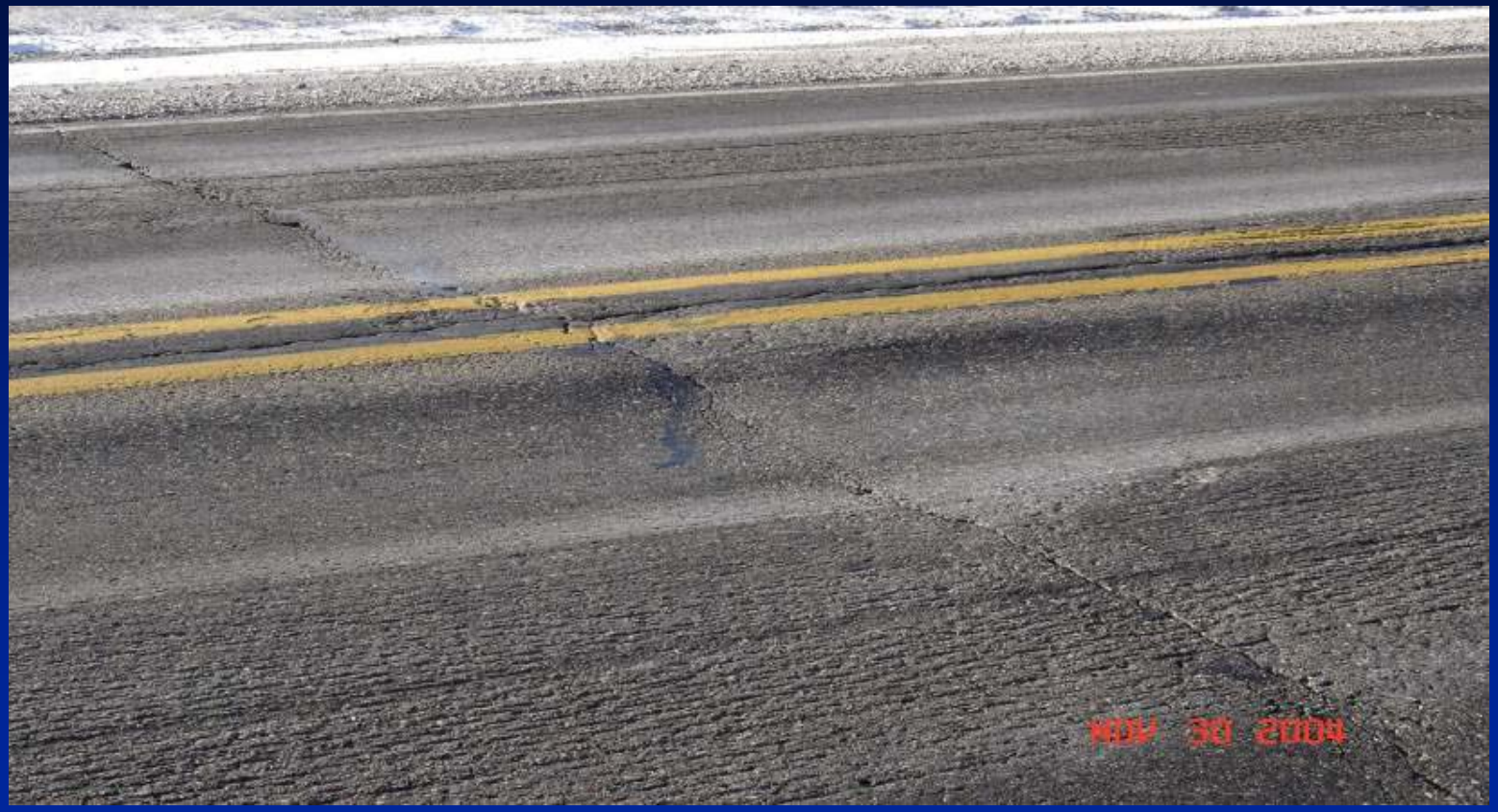
# VARIABLES CONSIDERED IN THE PROOF OF CONCEPT OVERLAYS

- 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

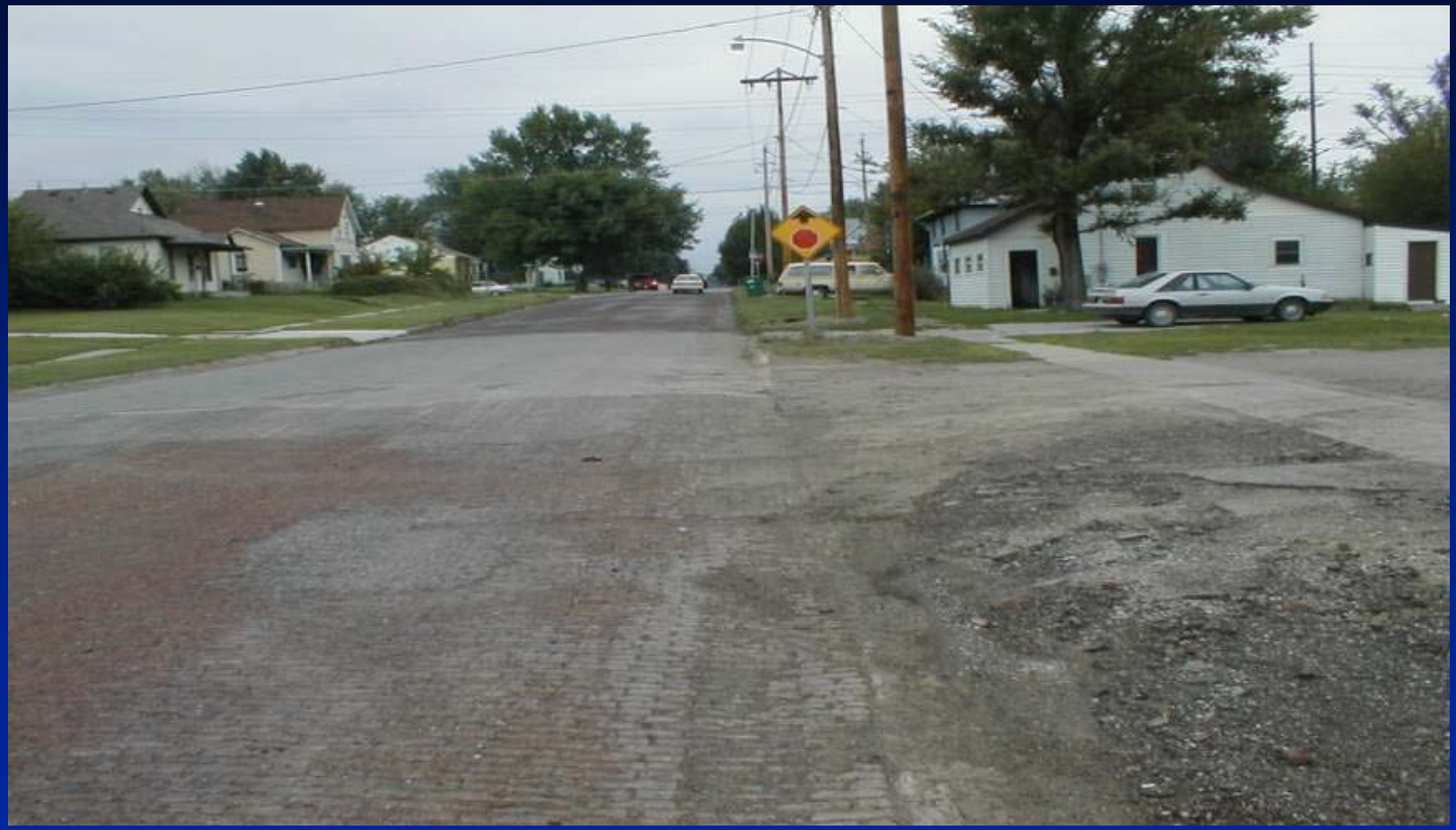
# IOWA 21 PAVING OPERATION

# IOWA 13 ROTOMILLED SURFACE

# IOWA 175 MAINTENANCE MILLING OF MIDSLAB AREA

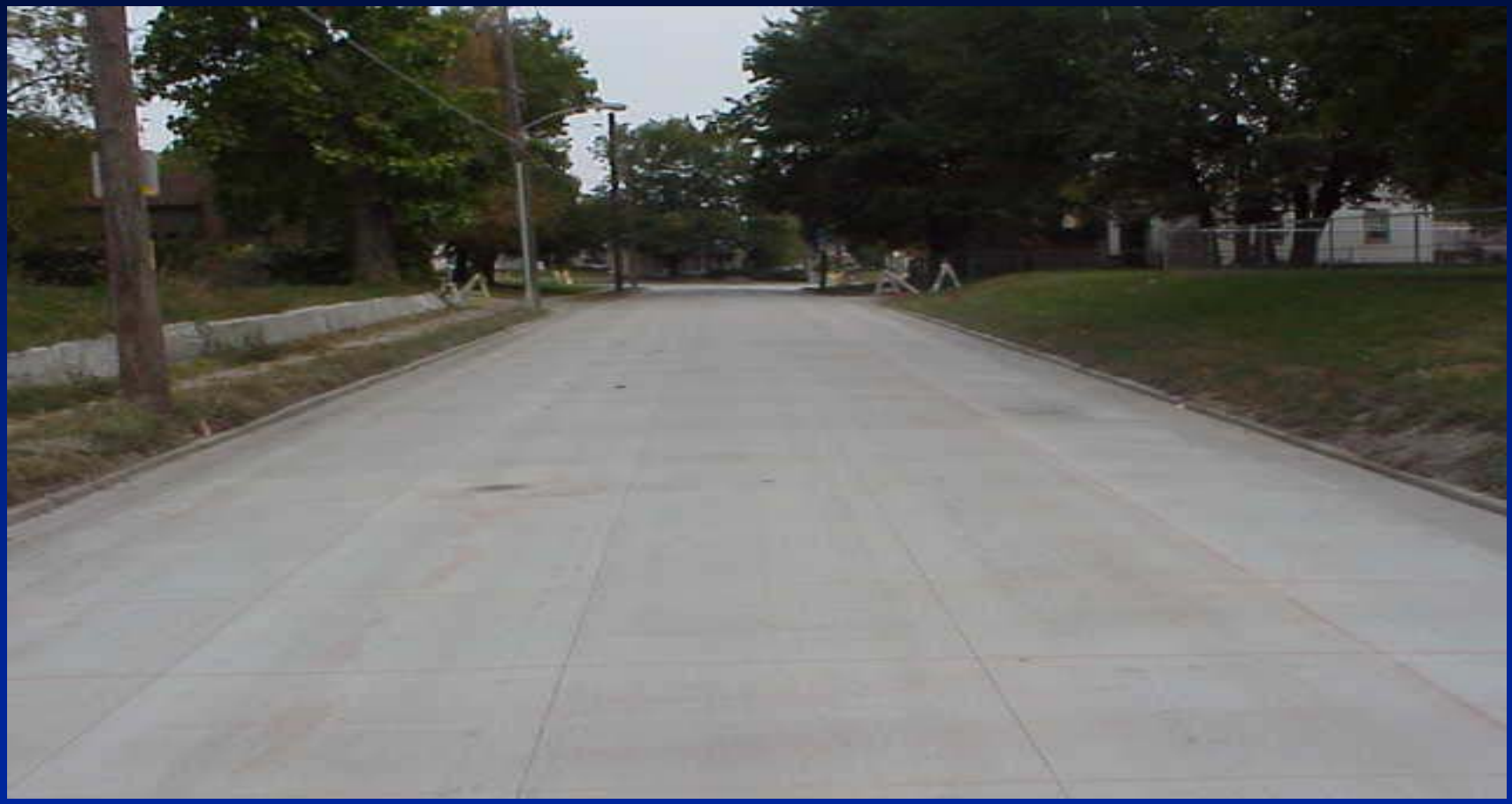


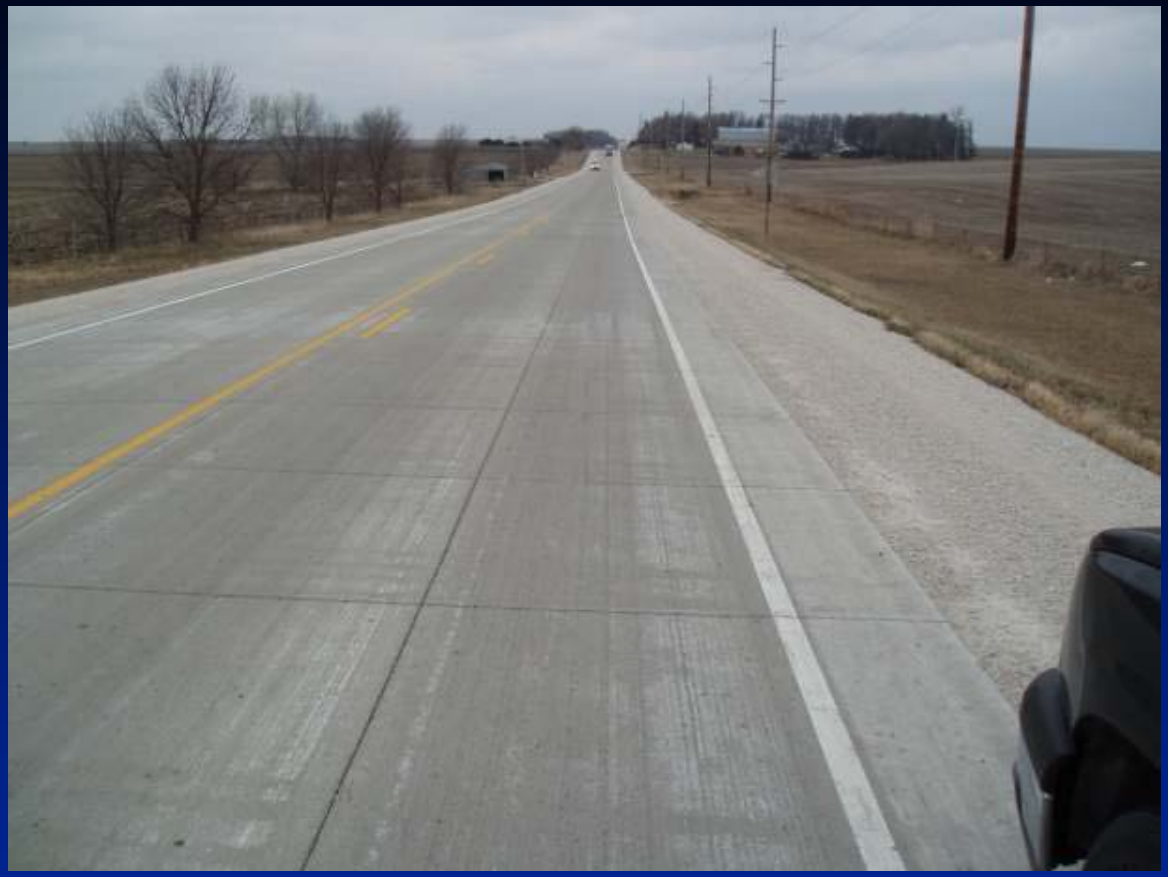
# OSKALOOSA PREOVERLAY CONDITION



# 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 CONTINUTED

- 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, 8.8miles, 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

Thinner

Thicker

## Concrete Overlays

### Bonded Overlay System

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



Bond is integral to design

### Unbonded Overlay System

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



Old pavement is base

Questions or Comments?

Thanks for your time and feel free to contact me if you have further questions.

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