



# ***PCC THIN OVERLAY EXPERIENCE IN IOWA***

Iowa DOT Webconference

Ames, Iowa

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# *A TALE OF FIVE PROJECTS*

- Iowa 21, Belle Plaine (1994-2004)
- South D Street, Oskaloosa (2001-2006)
- Iowa 13, Manchester (2002-2007)
- East 18<sup>th</sup> Street, Des Moines (2003)
- Iowa 175, Odebolt (2007)





## ***VARIABLES CONSIDERED IN THE DESIGN OF THE 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

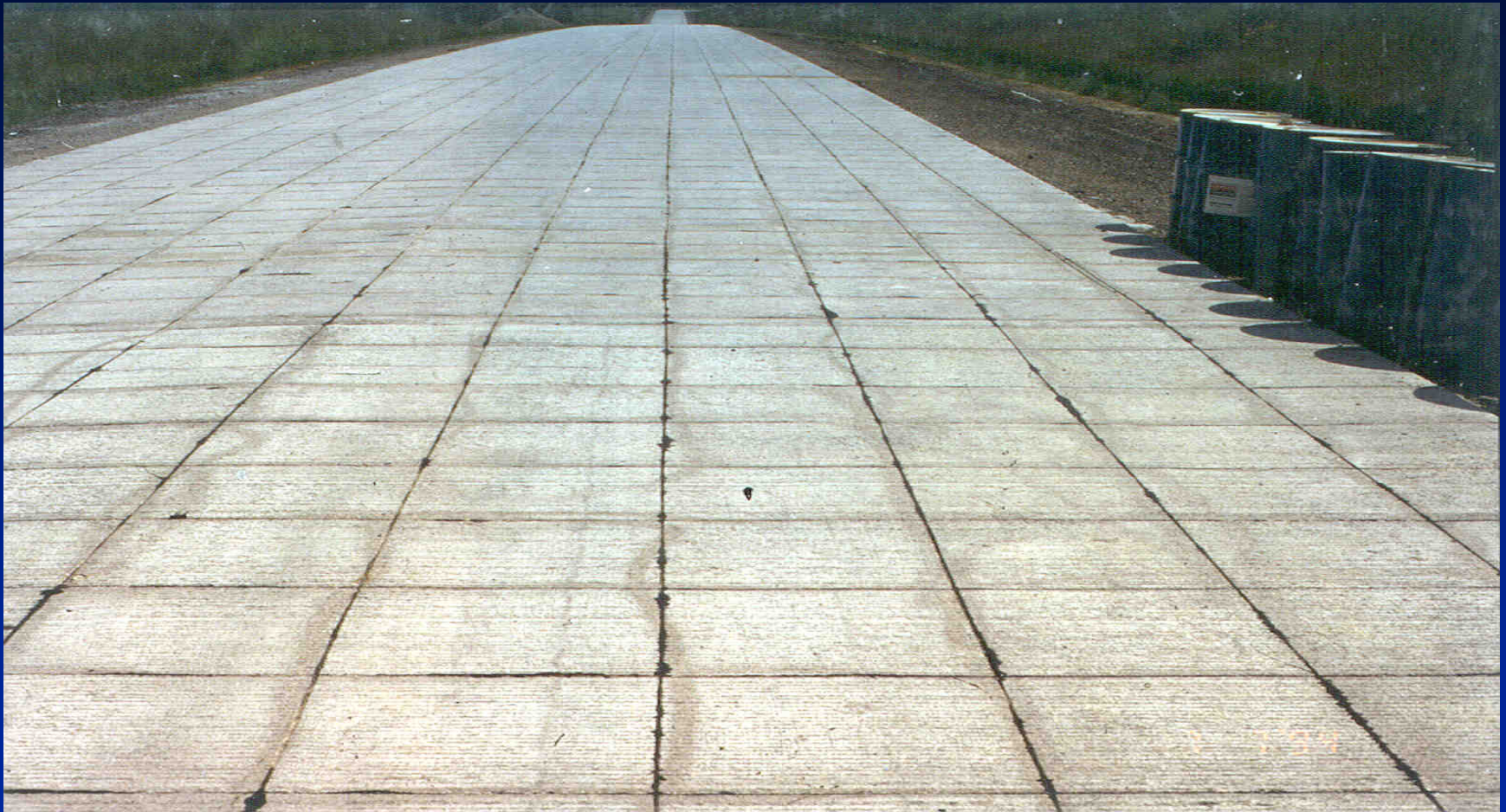


# IOWA 21 PAVING OPERATION





# IOWA 21 2X2 SLABS



# IOWA 21 4X4 SLABS





# IOWA 21 6X6 SLABS





# *IOWA 13 PREOVERLAY CONDITION*







# *IOWA 13 ROTOMILLED SURFACE*





# *OSKALOOSA PREEOVERLAY CONDITION*







# *EAST 18<sup>TH</sup> ST. DES MOINES*





***IOWA 175 7x7 foot slabs***



# *OVERLAY DISTRESSES NOTED*

- Corner in the outer wheel path
- Longitudinal cracks in outer wheel path/rows
- Transverse cracks in outer wheel path
- Fractured slabs
- Corner in the inner wheel path





**IOWA 13 LONGITUDINAL CRACKS**





**IOWA 175 LONGITUDINAL CRACK**





***Iowa 13, Interior Corner Crack***



# ***WHAT HAVE WE LEARNED ?***

- Surface Preparation
  - All the types worked
  - CIPR slows up work schedule and performance
  - Allow at least 1 in. bond breaker for unbonded
  - Minimize the milling and surface preparation – clean & proper cross slope
  - Provide clean, cool, dry placement surface – less than 110 deg F
  - Do not remove wheel ruts, fill 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 as insurance against losing slab fragments
- 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, subdivide according to dimensions of 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 hotpour material and no backer rod





# ***WORKING WITH EXISTING WIDENING***

- Alts. – remove or bridge with new overlay/  
widening
- Add tie bar @ 30 in. centers across the widening  
joint/joints
- Develop a sawed joint over existing widening  
joint only when it occurs in wheel path.



***Iowa 13, longitudinal Crack (Knife and widening related)***



***Iowa 175 Longitudinal Crack (widening related)***



# ***CONSTRUCTION CONCERNS***

- Badly constructed headers
- Expansion joints at buried structures
- Urban drainage improvements
- Bridge core outs
- Abutting existing ACC
- Existing PCC intersections (bonding)



# ***GENERAL RESEARCH CONCLUSIONS***

- Thin overlays do perform well, use them !
- Existing ACC surfaces must be evaluated for depth, durability, uniformity in support of the overlay and stripping potential
- As built plans must be reviewed in the design process to assist in establishing slab size and overlay depths



# ***GENERAL RESEARCH CONCLUSIONS CONTINUED***

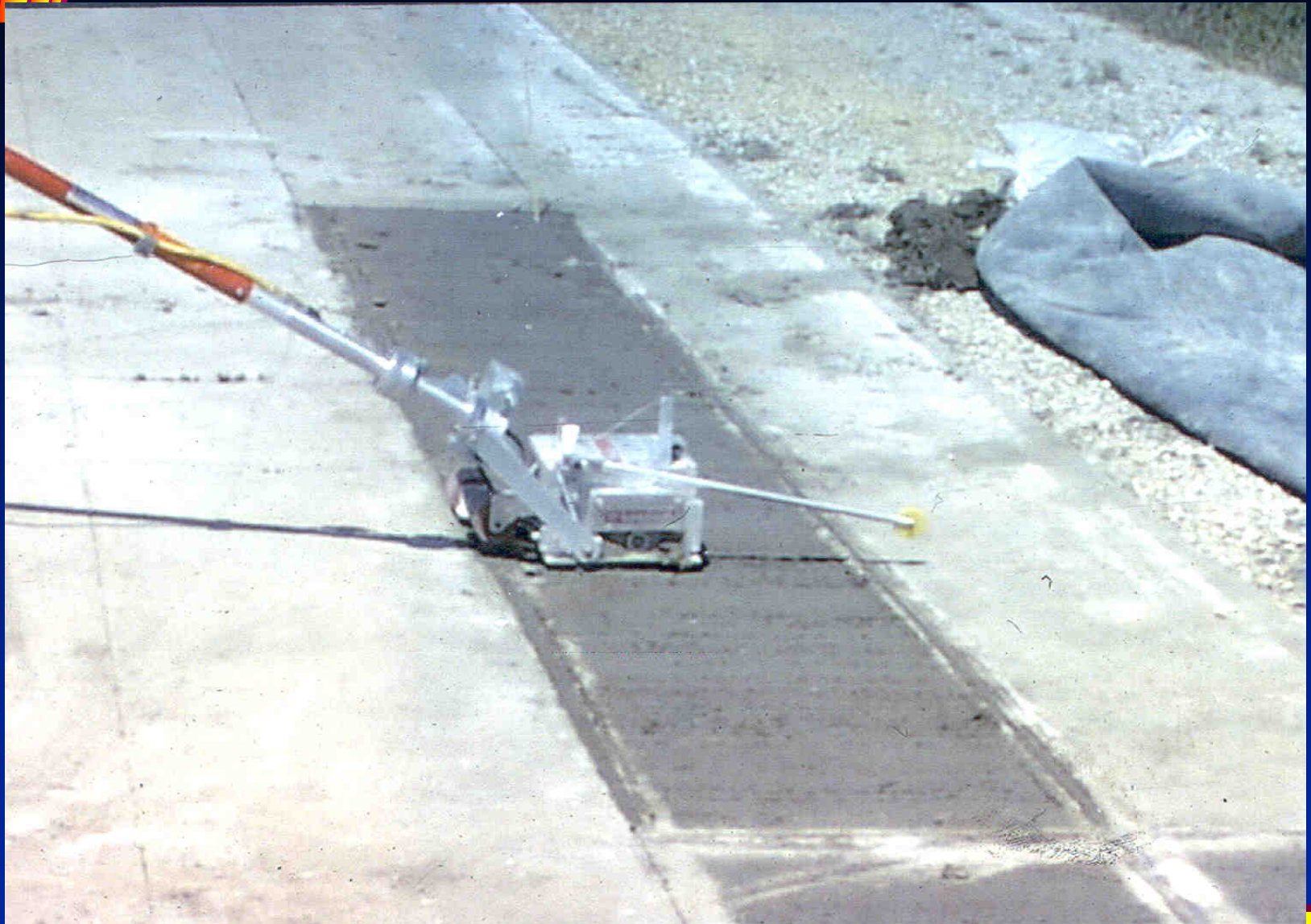
- Overlay depth design for existing composite pavements is under development
- Teach Maintenance units how to maintain this type surface
- Remaining performance issue solutions tied to construction details















## Questions or Comments?

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

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