Iowa's Experience with Fast Track Concrete-

Where it all began!

Jim Grove
Senior Project Engineer
FHWA/Global Consulting Inc.

Mark Dunn
Operations Research Engineer
Iowa DOT

Outline

- History
  - First Fast Track project
  - Fast Track II
  - Uses
- Non destructive testing for strength
  - Maturity
- Lessons learned

History

- Mid 1980's
  - Iowa placed several bonded PCC overlays
  - 1986: US 71 Buena Vista County
  - Two lane highway
- Rapid opening of PCC overlays as alternative to HMA overlays

History

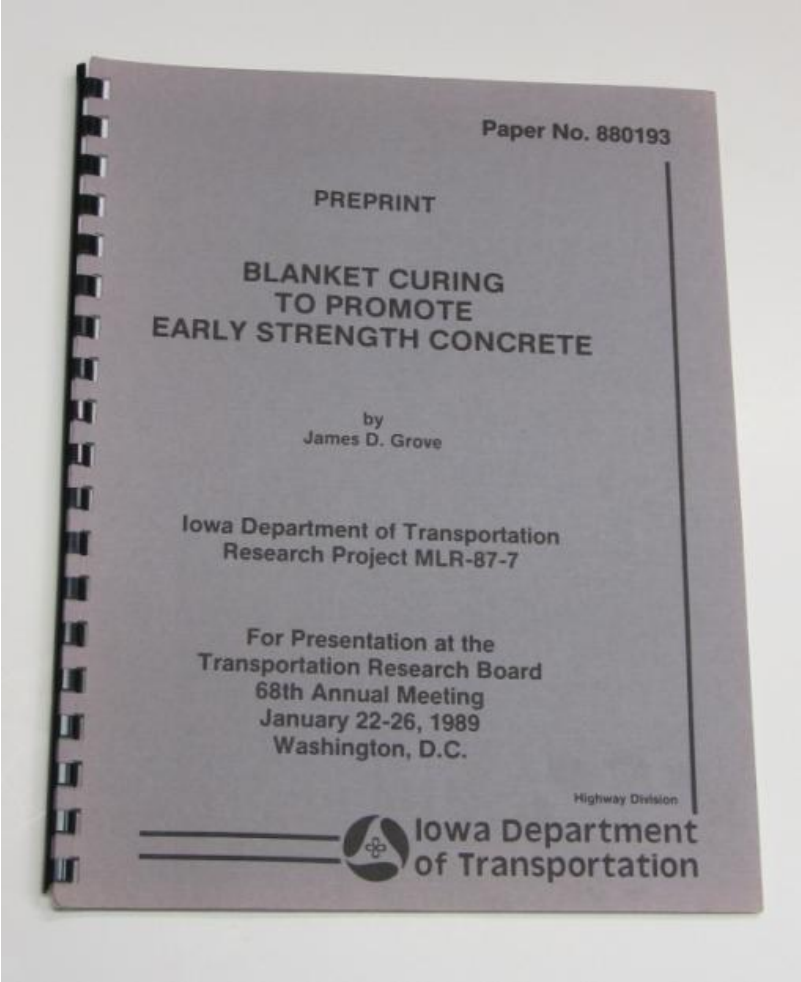
- 1985
- Industry and Iowa DOT met to brainstorm ideas for rapid opening of PCC paving
- Concrete Mixes
- Curing
- Measuring strength

History

- US 71 Buena Vista County, Iowa
- 1986 - First Fast Track project in the US
- Mix
  - 640 lbs Type III cement
  - 70 lbs Class C ash
- Opening within 12 - 24 hrs
- Strengths
  - 400 psi MOR (CPL) 8 hrs

History

- 1987 - 9 more fast track projects
- 1987 – Research blanket curing of conventional mixes with Type I cement Boone Co.



History

- 1988 – Fast Track II trial
  - US 20 at Epworth, Iowa
  - October, 1988
  - First demonstration of maturity
  - FHWA trailer assisted with project

History

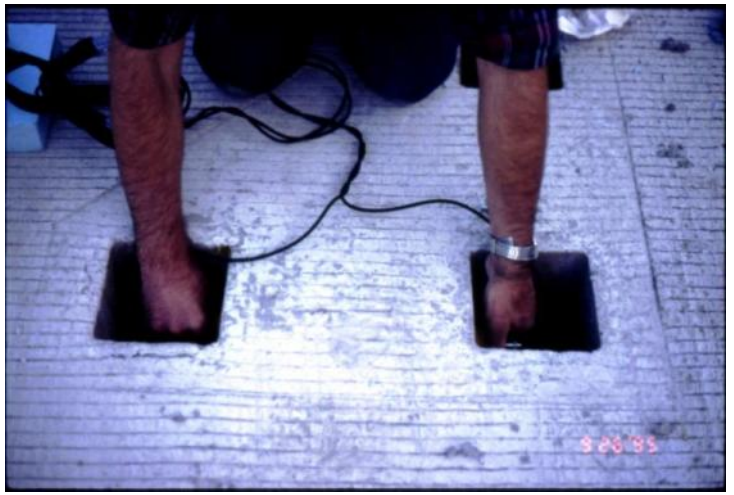
- 1989 – IA 100 in Cedar Rapids
- Fast Track II for intersections
  - 822 lbs Type III cement
  - 350 psi MOR-CPL 7 hrs
  - Close at 6 PM / Open at 6 AM
- Fast Track for mainline
  - 710 lbs Type III cement
  - 400 psi MOR-CPL 12 hrs
- Blanket curing
- Maturity & Pulse velocity used

History

- 1994 – IA 3 Franklin County
- Half width bonded overlay with pilot car
- Fast Track II
  - 822 lbs cement
- Maturity & Pulse velocity used to open pavement to traffic each night
  - Opening in 8-10 hrs

History

- 1995 – Lee County
  - Great River Road
- Limited access for local traffic
- Maturity & Pulse velocity used to open pavement to traffic
  - Pulse velocity more cumbersome
  - Conclusion: Maturity was better in the field
- Conventional mix
  - 350 psi MOR-CPL 12-24 hrs



Maturity Method to Determine Opening Strength

- Since 1997 - Contractor option added to Standard Specifications
- Has become standard practice for opening pavements to traffic
- Opening conventional mixes 18-36 hours during summer conditions- no Fast Track practices

Maturity Method to Determine Opening Strength

- Simple
- Make beams/cylinders at the plant 1st day of paving
  - Very little cost
  - Field concrete
  - Contractor option
- Develop the maturity/strength curve
- Validate once per month

Lessons Learned

- Early deterioration exhibited in high percent of projects utilizing Type III cement
  - High curing temps (>160 °F)


I-80 Pottawattamie Co. @ I-680


US 71 Buena Vista Co.

Lessons Learned

- A few projects utilizing Type III cement and placed in fall performed better
  - Cooler conditions during construction

Lessons Learned

- Standard paving and maturity allows opening within 36 hours during normal summer weather
- Thin overlays
  - IA 13- Thin concrete overlay
  - 9 days of paving
  - Opening strength in less than 24 hours each day
  - No Fast Track-conventional paving

IA 13 Manchester

Lessons Learned

- Don’t use Fast Track techniques unless the contactor is ready to open when the strength is reached
- Fast Track is a process, **not** just the mix!
- Sawing, sealing, shouldering, traffic control- All have to be ready!

Jim Grove
FHWA/ Global Consulting Inc.
Office of Pavement Technology
Phone: 515-294-5988
Mobile: 515-450-3399
jim.grove@dot.gov

Mark Dunn
Iowa Department of Transportation
Operations Research Engineer
515-239-1447
Mark.dunn@dot.iowa.gov