I-65/70 South Split
CRC Pavement Replacement Project,
Why CRC?

David Holtz, P.E.
Pavement Director, INDOT

Lisa Egler-Kellems, P.E.
Senior Pavement Design Engineer, INDOT

March 12, 2014
South Split CRCP Design

**Reason for project**

- Numerous bridge hits to several structures within South Split area.
- Pavement is not distressed.
South Split CRCP Design

- **Reason for project**
  - Early questions and issues:
    - What can we do to buy time and increase the clearances?
      - Mill off existing HMA overlay and rehabilitate the underlying Jointed Concrete; interim or permanent solution?
      - Ordered pavement coring.
      - Ordered Falling Weight Deflectometer to determine pavement and subgrade condition.
      - Ordered Ground Penetrating Radar to determine if this concrete had wire mesh and how deep.
      - Analyzed the pavement and determined the remaining life.
South Split CRCP Design

- **Change of mission:** Fix it now!
  - Look at options to raise bridges and/or lower pavement.
  - **Bridge-centric options eliminated!**

- **Initial pavement option alternatives**
  - 3 options for replacement, rehab not viable
    - HMA Pavement – 20 year design life
    - Jointed Plain Concrete Pavement – 30 year design life
    - Continuously Reinforced Concrete Pavement – 50+ design year life
South Split CRCP Design

- **HMA Pavement option**
  - 19” HMA with sandwiched OG drainage layer, SMA surface and new underdrains.
  - **Advantages:**
    - Local contractor experience.
    - Perpetual pavement, only smoothness issue in year 20.
  - **Disadvantages:**
    - Too thick! Did not fit within limited space available due to waste water siphon.
    - Drainage layer too deep to drain into storm sewers.
  - Failed feasibility screening criteria.
South Split CRCP Design

- Jointed Plain Concrete option
  - 12.5” PCCP with 15’ joints and 1.5” dowels on subbase for PCCP with new underdrains.
    - Advantages
      - Local contractor experience.
      - Fit within limited space available due to siphon.
    - Disadvantages
      - Maintenance of joints required during the 30 year design life.
      - Overlay necessary at 30 years, would recreate same problem we have now.
        - Only a 30 year life? Can we do better?
        - Cost of MOT in this area, i.e., 14 trucks per MOT event.
South Split CRCP Design

- CRC Pavement option
  - What is CRC?
    - INDOT hasn’t built it in many years.
    - Very bad experiences (multiple) on I-65.
    - Very old CRC still being used on SR 37.
    - Poor diagnosis of failure(s) at that time and misconstrued lesson(s) resulted in “BAN”?
  - Challenge!
    - How do we quickly lose our poor past practice and reasoning, and develop competence?
South Split CRCP Design

- CRC Pavement option
  - What is CRC?
    - Worked with INDOT Office of Material Management to start development of specification.
      - Utilized experience that Illinois DOT had with CRC.
      - Modified Illinois standard drawings and specifications.
    - Crash course in design principals for CRC.
    - Use AASHTOWARE PavementME™ software for pavement analysis; same as other two options.
    - Concerns about building long lasting subbase and subgrade to match long lasting CRC were raised.
South Split CRCP Design

Subgrade issues:

- Dense graded HMA subbase was utilized to provide very stable platform for CRC.
- Utilized drainable #53 stone under dense graded HMA to provide subgrade drainage layer.
- Worked with INDOT Office of Geotechnical Services to develop subgrade treatment that extends pavement life.
  - Developed specification for cement-treated subgrade that requires strength of 120 psi at 48 hours.
South Split CRCP Design

- Performance curves:
  - HMA:
South Split CRCP Design

- **Performance curves:**
  - Jointed Plain Concrete:
South Split CRCP Design

- Performance curves:
  - Continuously Reinforced Concrete:
South Split CRCP Design

- **CRC pavement selected:**
  - Long lasting, costs of MOT in this location are high.
  - No joints to seal, MOT operations are very dangerous.
  - Life cycle analysis based upon the 50 year design life of the CRC versus 30 years for the Jointed Plain Concrete showed that this was the most cost effective option.
  - Good location to try this because of the option of full closure.
South Split CRCP Design

- **Team effort:**
  - Tony Zander, Concrete Materials Engineer
  - Nayyarzia Siddiki & Athar Khan, Office of Geotechnical Services
  - LaDonna Rowden, ILL DOT Pavement
  - David Holtz, Pavement Director
  - Chris Moore, Greenfield Pavement Engineer
  - Mike Prather, Pavement Area Engineer
  - Kumar Dave, Pavement Design Manager
South Split CRCP Design

- Here’s to 50 more years of CRC pavement at this location.
- More to come?