Nebraska Department of Roads
Agency Report

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Pavement Preservation Utilizing In-Place Recycling in NE

- History of In-Place Recycling in NE
- Foamed Asphalt Development
- Successes and Current Challenge
- Way Ahead
NE In-Place Recycling

- Hot-In-Place Recycling (2”)
  - ARA 1P/2P Polymer Modified Emulsion
- Cold-In-Place Recycling (4-6”)
  - High Float Emulsion
- Hydrated Lime Slurry Stabilization (4”)
  - Hydrated Lime and CSS1 Emulsion
- Full Depth Reclamation (6-12”)
  - Fly Ash or Cement
- Foamed Asphalt (4-6”)
  - PG Binder
• Foamed Asphalt
  – Cold water and compressed air injected into hot PG Binder in expansion chamber
  – Binder temporarily expands into numerous bubbles w/greatly increased surface area
  – Foaming reduces viscosity of asphalt allowing uniform mixing w/cold aggregate

300°F Binder

2.5% Water

Compressed Air
Equipment
• Initial Project – Hwy 74, Jct 281 East, 2012
• Project Summary
  – 18.6 mi
  – 84 TADT
  – 9” average core depth
  – Major stripping in cores
  – Major rutting
• Original Design – 7” CIR w/HFE + 2.5” Overlay
• Contractor Proposal – 6” CIR w/FA + 2.5” Overlay
• Mix Design/Specification based on MnDOT
  • 58-28 Binder, 60 Gyrations, (MnDOT)
  • Min 1250lbs Marshall Stability, 70% Retained (NDOR)
N-74 Pavement Condition
N-74 Construction
• Results
  – Rutting and Stripping eliminated
  – Expedited Construction
    • Faster curing in Sept Temps
    • Eliminated re-aeration required for HFE
  – $800K savings
• Additional Foamed Asphalt Projects
  – Hwy 91, Dunning Northeast, 2013
    • 2-4” Armor Coats/3-5” Bit Sand Base, 60 TADT
  – Hwy 138, Big Springs South West, 2013
    • 9” HMA, 51 TADT
  – Hwy 92, Ansley East, 2013/2014
    • 9” HMA, 64 TADT

• Built w/NDOR specification based on MN/IA
  – 25 gyrations, PG 52-34 (IDOT)
  – Some field adjustments to oil (lowering)

• Good Construction – Good Performance
• Hwy 26, Oshkosh – Lewellen, 2014
• Project Summary
  – 6 mi
  – 360 TADT
  – 11” average core depth
  – Major stripping in cores
  – Same mix design (25 gyrations, PG 52-34, 2% oil)
• Differences
  – 360 vs. 60 TADT
  – Extended 95°F vs. 70°F Temps
• Results
  – Looked good for 3 days........
• EVERYTHING RUTTED

• Field Adjustments
  – 2% → 1.5% → 1.2% → 1%
  – PG 52-34 → PG 58-28
• Results
  – ½ of 6 mile segment recycled
  – 4” of 5” depth cored out/replaced with HMA

• Lessons Learned/Current Challenge
  – What’s working in IA will not work for NE
  – Mix Design must be better tailored to NE materials
  – Much more testing will be required

• Way ahead
  – Projects in immediate future to include additional testing
    • PG 52-34, 58-28, 64-22
    • 25 & 60 gyrations
    • 77°F and 100°F+ Lab Temps
  – Further develop Foamed Asphalt as viable recycle option