Chip Seal and Microsurfacing Practices in the Midwest

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Midwest Pavement Preservation Partnership Conference - September 2014
Why Maintenance Emphasis?

• The country has significant investment already in place
• Increasing the life span of existing assets between major rehabilitation cycles improves the roadway’s life cycle cost
• Recent study from the Asphalt Institute concludes that early maintenance decreases a roadway’s oxidation
Common Applications in the Midwest and its emulsified asphalts

- Microsurfacing
  - CQS-1HP (CSS-1HP Slurry)
  - CQS-1P
- Slurry
  - CQS-1H
  - CSS-1H Slurry
- Cold-in-Place Recycle
  - CIR-EE
  - SBEE
  - PG 49-34 (PG 52-34 CIR)

- Chip Seals
  - CRS-2P (CRS-2M, CRS-P, CRS-1HP)
  - CRS-2
  - HFRS-2
  - HFRS-2P (HFP)
  - HFMS-2 (AE-150S, HFE-90)
  - HFMS-2S (HFE-150)
Emulsion Mill
Common Aggregates Utilized in the Midwest

- Granite
- Quartzite
- Limestone
- Natural gravels
- Trap Rock (basalt or igneous rock)
- Slag (by-product of coal burning process)
1/4” Granite
3/8” Granite
1/4” Granite
3/8” Granite
1/8” Trap Rock
3/8” Limestone (uniform gradation)
Limestone (non-uniform gradation)
Crushed natural gravel with limestone
Natural gravel (smooth side)
Natural gravel (fractured face)
Slag
Chip Seal Designs

- 1/8” Trap Rock
- ¼” Granite
- 3/8” Granite
- 3/8” Granite
- 3/8” Natural crushed
HFRS-2P Compatibility
HFRS-2 Compatibility
MnRoad Chip Seal (I-94)
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MnRoad Chip Seal (I-94)
3 roller passes with rubber tired rollers
Recent Trap Rock Chip Seal
Recent Trap Rock Chip Seal
Granite Chip Seal
Recent Limestone Chip Seal
Recent Limestone Chip Seal
Recent Pea Gravel Chip Seal
Recent Slag Chip Seal
Recent Slag Chip Seal
Recent Slag Chip Seal
1 Day Old Chip Seal (pre-fog seal)
CFS-1 D50 Fog Seal Trial (normally fog seal with CSS-1H D50)
CFS-1 D50 Broken in < 10 minutes
Microsurfacing

- MnDOT requires a return to traffic within 1 hour
- Other Midwest states do not have this return to traffic requirement
- Chemistry of the CQS-1HP / CQS-1P is different based on the set time requirement
Recent Type II Microsurfacing (CQS-1HP & Granite) (Still brown)
Recent Type II Microsurfacing (Turning black, Set time ~ 15 minutes)
Scratch Coarse
Surface Coarse
Surface Course
Implementation of Flexible Microsurfacing

• CQS-1HP has historically been done utilizing PG 64-22 and either natural or synthetic latex

• CQS-1P projects have been implemented with
  – PG 58-28 and synthetic latex
  – PG 49-34 and SBS polymer

• Current challenges
  – Wet Track Abrasion values are higher
  – Chemistry needed to be tweaked to speed up set time
CQS-1P Test Strip (mid 60’sF, low humidity, set in ~ 20 minutes)
CQS-1P Test Strip
New Stillwater, MN bridge
New Stillwater, MN Bridge
Existing Stillwater, MN Bridge
Questions?