Crack Surfacing

Rocky Mountain Asphalt Conference and Equipment Show
Denver, Colorado – February 25, 2010

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Wyoming Department of Transportation

Sunday, March 28, 2010
Definition (what)

- Maintenance strategy (another tool)
  - Generic term; set apart from filler, sealant (less complex than micro surfacing)
  - As wide as 36-inch band

- Pre-manufactured material that is a homogeneous, blended mixture of binder and aggregate for repairing cracks, potholes, depressions, and utility cuts in existing asphalt pavement
  - Crafco PolyPatch, PolyPatch Fine Mix
  - Deery American Level & Go, Repair Mastic
Definition (what)

- **Binder**
  - (proprietary blend of asphalt, polymer, filler, etc) —

- Meets or exceeds
  - PG88-28
  - (rotational viscosity N/A)
    - DSR Torsion bar tests, temperature sweep 2002 (ATS RheoSystems)
    - GLWT, TSRST data (UW 2003-2005; MPC report)
Aggregate

- 3/8-inch max.
  - LA abrasion loss, 35% max.
  - Sand equivalent*, 45% min.
  - Plastic index*, NP
  - MgSO₄ Soundness loss, 18% max.

*(based on minus No. 4 [4.75 mm] fraction)
Background (why & where)

- Wide cracks (>1.5 inch)
  - Stone intrusion
  - Minimize waste of sealant (form factor, …)
- “Recessed”, deep cracks (hear / feel them)
  - Improve ride (decreased roughness)
  - Extend service life (seal against water)
- Plant Mix Base correlation
- Versatile for highways, airports (runways, taxiways, aprons), …
Application (when & how)

- Installation (all year)
  - Winter preferable (pavement temp. ≥40°F)
    - Cracks at widest (mat shrinkage)
  - Clean & Dry (pavement temp. ≥40°F)
- Melter / Applicator
  - Continuous agitation/mixing
  - Gravity feed chute discharge (internal augur)
  - 380° - 400°F
- Squeegee to shape/smooth (technique)
  - Mound slightly, cools down flat/level

Sunday, March 28, 2010
Application (when & how)

- Configuration(s) –
  - Flush
  - Recessed
Melter / Applicator
Melter / Applicator
Application (when & how)

- **Acceptance** –
  - Pay unit by volume; cubic foot (CF)
    - Measure by pound (LB)
    - Test for density (LB/CF); ASTM D71 WY Modified
  - Lot size; 900 CF
    - 3 to 5 sublots, 300 CF max. each
    - 1 field sample per subplot
      - two (2) boxes w/silicone release lining, 15 LB each box
    - Quantity ≤450 CF,
      by certification & one premixed sample
## Projects (examples)

<table>
<thead>
<tr>
<th>Year</th>
<th>Location(s)</th>
<th>Quantity</th>
<th>Unit Bid Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>WY 93, MP 18.5 – 26.1 (first trial section)</td>
<td>24620 LB</td>
<td>1.62</td>
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<td>2002</td>
<td>WY 313, MP 116.8 – 121.8</td>
<td>62740 LB</td>
<td>1.12</td>
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<td>WY 387, MP 100.0 – 102.3</td>
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<td>US 26, MP 0.0 – 8.9</td>
<td>352 CF</td>
<td>110</td>
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<td>2003</td>
<td>I 25, MP 69.0 – 75.3</td>
<td>455</td>
<td>169</td>
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<td>2004</td>
<td>I 25, MP 51.6 – 58.5</td>
<td>235</td>
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<tr>
<td>2006</td>
<td>I 25, MP 200.0 – 210.9 Cheyenne, Guernsey Airports</td>
<td>1840</td>
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<td>2007</td>
<td>Buffalo Airport</td>
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<td>2008</td>
<td>US 14, MP 193.6 – 200.1 US 85, MP 229.0 – 247.8 WY 112, MP 0.0 – 7.6</td>
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<td>2350</td>
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</tbody>
</table>
Projects (examples)
Disadvantages –

- Workability (inelastic, very thick slurry)
- N/A for shallow, narrow cracks (<1.5”)
  - WY 313 lessons
    - Installation (finish surface; mounding)
    - Subsidence (underlying structure)
- Cracks will reflect back up through (stiffness)
Advantages –

- **Ride improvement**
  - Smoother, less annoying ride; less vehicle wear
  - IRI decreased by average 10%+
    - 15 inches per mile less after installation

- **Economical**
  - Less expensive than overlay, milling, leveling, etc.
  - Extend service life
    - Separating/splitting somewhat similar to crack sealant

- **Durability**
  - Greater than crack sealant (snowplow wear)
Advantages –

Field Performance

- Success with all products (vs. MPC report, lab testing)

Customer (WYDOT) feedback –

- Favorable
  - “holding up very well”
  - “works pretty good in the right situations”
  - “right tool for the right job”
  - “maintenance foreman like it”
Acknowledgements

- **University of Wyoming**
  - Steve Carter, Dr. Ksaibati, George Huntington
  - Mountain-Plains Consortium
    - (www.mountain-plains.org)
    - Evaluating the Effectiveness of Hot-Poured Crack Surfacing Material, *MPC Report No. 06-180* (March 2006, 121 pages)
Acknowledgements (cont’d)

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  - Steven Colo

- Wyoming DOT
  - Aeronautics Division
    - John Jordy, P.E., Greg Hampshire
  - District 2
    - Mark Williams, P.E. (Casper); Buck Klemola, P.E. (Torrington)
  - Materials Program
    - (ref: Mountain-Plains Consortium report)

- Suppliers
  - Crackfiller Mfgr - Lisa Zentner
  - Crafco - Lowell Parkison
  - Maxwell Products - Mike Diamond
Questions ?