What’s New for Your Street

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Topics

• Overlaying / Paving Streets
• New method to re-new streets
• Stripping under chip seal
Overlaying Streets

- Tack
- Reduce cracking
- Seal Curbs
Tack
Tack Needs Properly Applied

- Css-1h diluted 1 to 1 at place of manufacture
- Proper size nozzles
- Enough ground speed
- Clean surface
Bad verses Good
Use proper binder

- -34 should be used on all streets
- Residual 52-34
- Arterial 58-34 or 64-34 if enough ESSALS
- Saw and seal intersections, and man holes
- Why?
Transverse Cracking VS Age

- For New Construction < 1998:
  \[ y = -0.2768x^2 + 6.1296x \]
  \[ R^2 = 0.9228 \]

- For New Construction > 1999:
  \[ y = -0.0258x^2 + 0.5566x \]
  \[ R^2 = 0.9098 \]
Seal Joint between street and curb

- MnRoad research shows 85% reduction in water infiltration when sealing joint between pavement and shoulder
Stripping of HMA under Chip Seal

- Some streets develop potholes 2 to 5 years after chip seal is placed
- Appears mainly in wear course
- Almost always in curb & gutter section
Research Project

• Cored streets with issues
  – Found high air voids 9 to 14%
• Looked at stripping of HMA test methods
• Made up samples of HMA that were not susceptible to stripping at 3 different air voids levels
  – 7, 10, & 15% air voids
  – Higher air voids failed stripping test
• Summer 2011 cored more streets
Research Project

• Tested cores for the following
  – Field permeability
  – Lab permeability
  – Air voids

• Found low density in cores in areas suffering stripping issues

• High permeability

• This lead to stripping in HMA
Permeability Testing

- Measure Time for water to “fall” a given distance:
  - 7% AV ~20 min
  - 15% AV ~1.5 min
Air Voids from 9 to 16%

Tier 2 Permeability vs. Fog Seal Application Rate at MnROAD

Permeability (in/day)

- k Before
- k After
- k, 2 Yrs After

<table>
<thead>
<tr>
<th>Location - Transition</th>
<th>Application Rate (gsy)</th>
<th>Permeability (in/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-18 (0.10)*</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>18-17 (0.15)</td>
<td>200</td>
<td></td>
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<tr>
<td>17-16 (0.20)</td>
<td>150</td>
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*K₀ taken as 18-17
Early Recommendations

• Use specified density for all HMA paving
  – Eliminate ordinary compaction
• Chip seal very early in streets life
  – Seem to help reduce issues
• Do field evaluation of condition of streets before planning chip seal projects
• Reports should be out middle of summer
• Working on method to fog seal residual street instead of chip sealing
Alternate method of reconstruction of streets
Emulsion Stabilized FDR
Modified Double Chip Surface
60 + laps per day at 80K
Why?

- Residual Street have low truck loadings
- Less expense than mill off and replace
- Uses 100% of in place materials
- Lower assessments to property owners
- Less greenhouse gases