Pavement Preservation
Minnesota’s Experience

ND Asphalt Conference
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Thermal Movement
Water, Water, Water
Results

Permeability & Density of Ljt

- Jointbond+ Adhesive: 16.3
- Adhesive: 11.4
- Jointbond: 10.1
- Control: 16.9
- Class 5 Agg. Base: 16.7

Permeability Coefficient, in/day

AV
New Products

- HiMA (highly modified asphalt)
- HiMA micro surfacing
- Texas underseal
- Aging study TPF-5(153)
- Bio based sealers
- Mastics
- Micro milling
HiMA (highly modified asphalt) pavement

- Kraton SBS polymer D0243, at 7.5%
- 76–34 with 25% RAP, vs 64–28 with 25% RAP
- On TH 100, paved 2011
- 1.5” and 2” mill and fill
- Similar reflective cracking into the 2nd winter, slight edge to Kraton
- NCAT cell North 7
HiMA micro surfacing

- MnRoad cell 1
- PG 49-34 base AC (vs. 64-22)
- Kraton SBS polymer D0243, at 6%
- Scratch 12 lbs/sy
- Surface course 15 lbs/sy
- 16% emulsion (vs. 13% typical)

- One lane mile on TH 23, District 3
Cell 1
## Cell 1 IRI

<table>
<thead>
<tr>
<th></th>
<th>Passing lane</th>
<th>Driving lane</th>
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<tbody>
<tr>
<td><strong>IRI Before</strong></td>
<td>190 in/mi</td>
<td>125 in/mi</td>
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<tr>
<td><strong>IRI After</strong></td>
<td>96 in/mi</td>
<td>95 in/mi</td>
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<tr>
<td><strong>% Improvement</strong></td>
<td>49%</td>
<td>25%</td>
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Texas underseal mill, seal coat, fill

- TH 101, R.P.~ 13.9 to 14.8
- 3" mill, two lift overlay, 64-28
- Underseal = seal coat on the milled pavement
- CRS-2p at 0.30 gal/sy
- FA-3 at 16 lbs/sy
- **NO REFLECTIVE CRACKS**, 2 winters
- Cracks in the standard overlay
TPF-5(153)  Optimal Timing of Preventive Maintenance for Addressing Environmental Aging in Hot-mix Asphalt Pavements

R. Michael Anderson, Asphalt Institute

MnROAD Research Conference
Minneapolis, MN

October 4, 2011
• Develop a practical guide identifying means to prevent and mitigate cracking caused by environmental effects.
• Develop one or more test procedures that could be used by a pavement manager to determine when preventative maintenance is needed to prevent the development of cracking (specifically block cracking).
Concept

- **Non-Cracking**
- **Critical Range**: $9 \times 10^{-4}$ MPa/s or 2.5°C
- **Cracking**

The graph shows the variation of $G'/\eta'$ or $\Delta T_C$ with respect to the year.
BBR Cracking Parameter - $\Delta T_c$

$$\Delta T_c = T_c\left(m\text{-value} = 0.30\right) - T_c\left(S = 300 \text{ MPa}\right)$$

- Relationship to ductility
- Relationship to $G'/(\eta'/G')$
- Relationship to R-value (CA model)
Bio based sealers
Bio based sealers

- Apply before year 2
- 0.015 gallons/square yard
- Does not effect striping
- No overspray issues (grass, curb)
- $1/sy
- Minimal friction loss
Mastics

• 3 manufacturer’s
  ✓ Crafco
    • PolyPatch and Mastic One
  ✓ Derry
    • Level & Go, and Recessed Repair Mastic
  ✓ Maxwell
    • Nuvo Gap
• Melt in kettle
• Big cracks, potholes
Micro milling

• Special provision is available
• 3x more teeth vs. standard mill
• Ride spec
• Cover with a new surface
Resources

• National Center for Pavement Preservation - 90 Videos !!
  http://nationalpavement2012.org/presentation-multimedia/
Conclusion

• Products are constantly evolving and improving
• How to measure success
• Quantify costs and benefits

Q. Will it work?
A. Try it, you will find out
Thank You!

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