Pavement Preservation Minnesota's Experience

ND Asphalt Conference
April 2, 2013

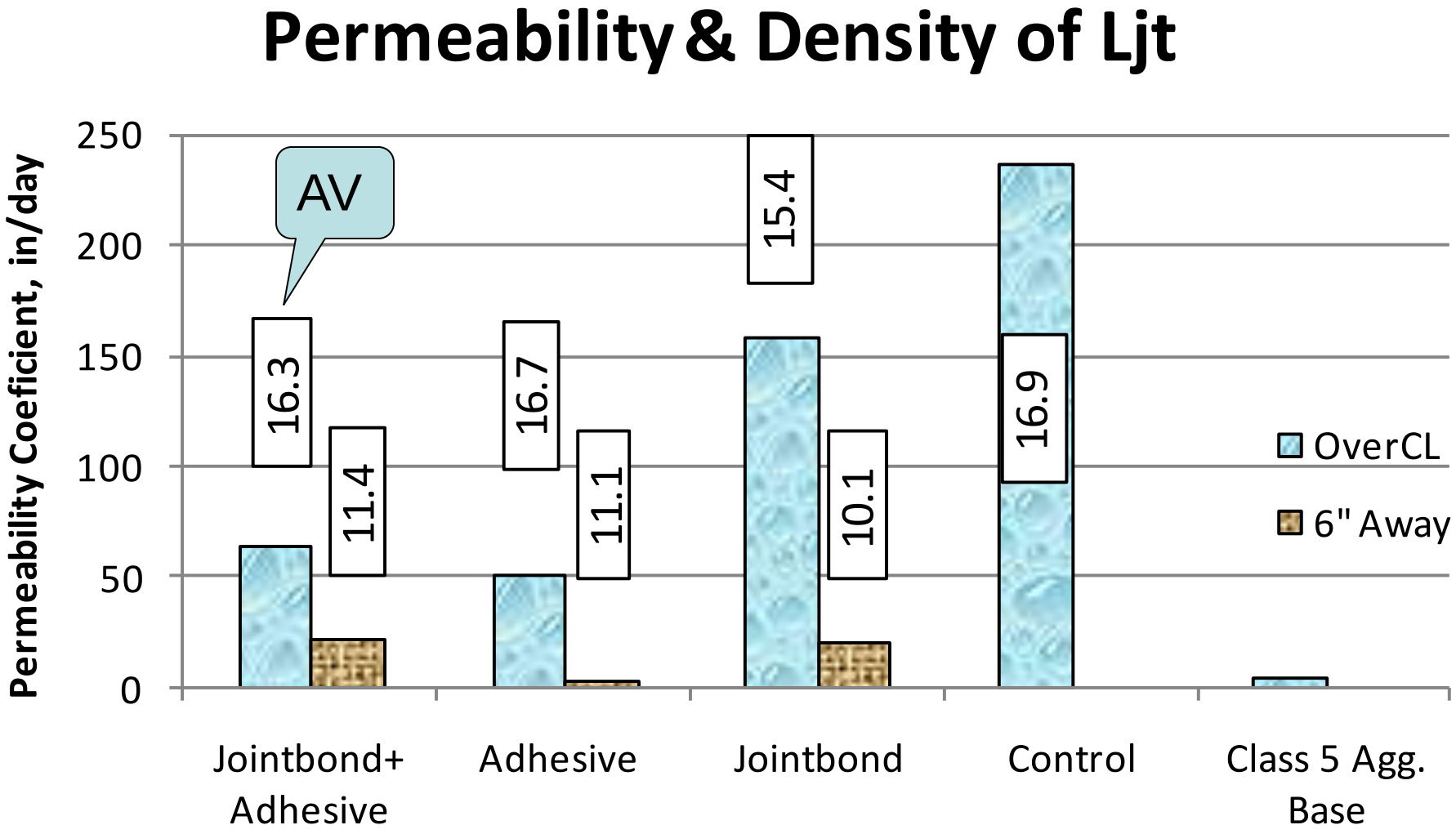
Jerry Geib

Research Operations Engineer
MnDOT Office of Materials & Road Research

Thermal Movement

Water, Water, Water

Results


Permeability & Density of Ljt
Permeability Coeficient, in/day
250
200
150
100
50
0
AV
16.3
11.4
16.7
11.1
15.4
10.1
16.9
OverCL
6" Away
Jointbond+ Adhesive
Adhesive
Jointbond
Control
Class 5 Agg. Base

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

	Passing lane	Driving lane
IRI Before	190 in/mi	125 in/mi
IRI After	96 in/mi	95 in/mi
% Improvement	49%	25%

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

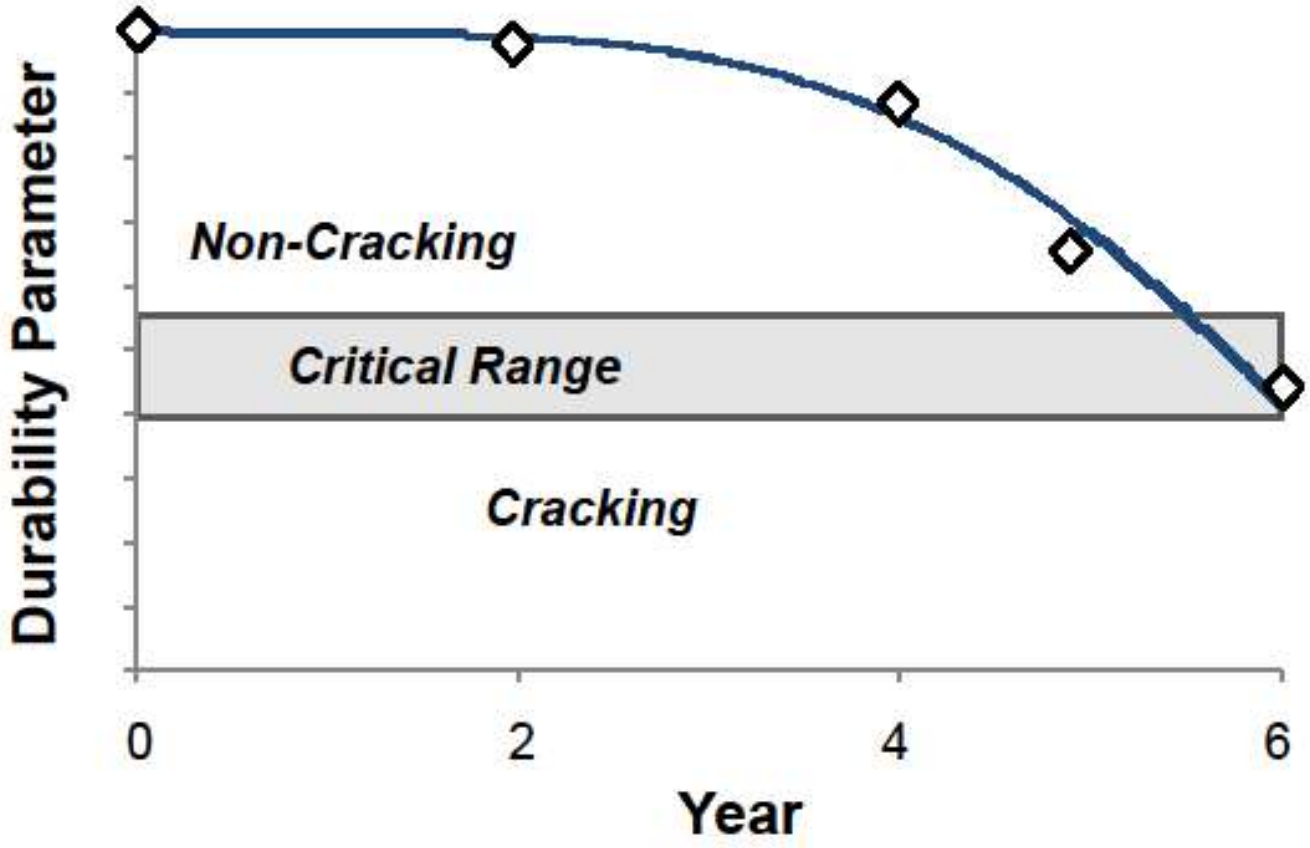
MnROAD Research Conference
Minneapolis, MN

October 4, 2011

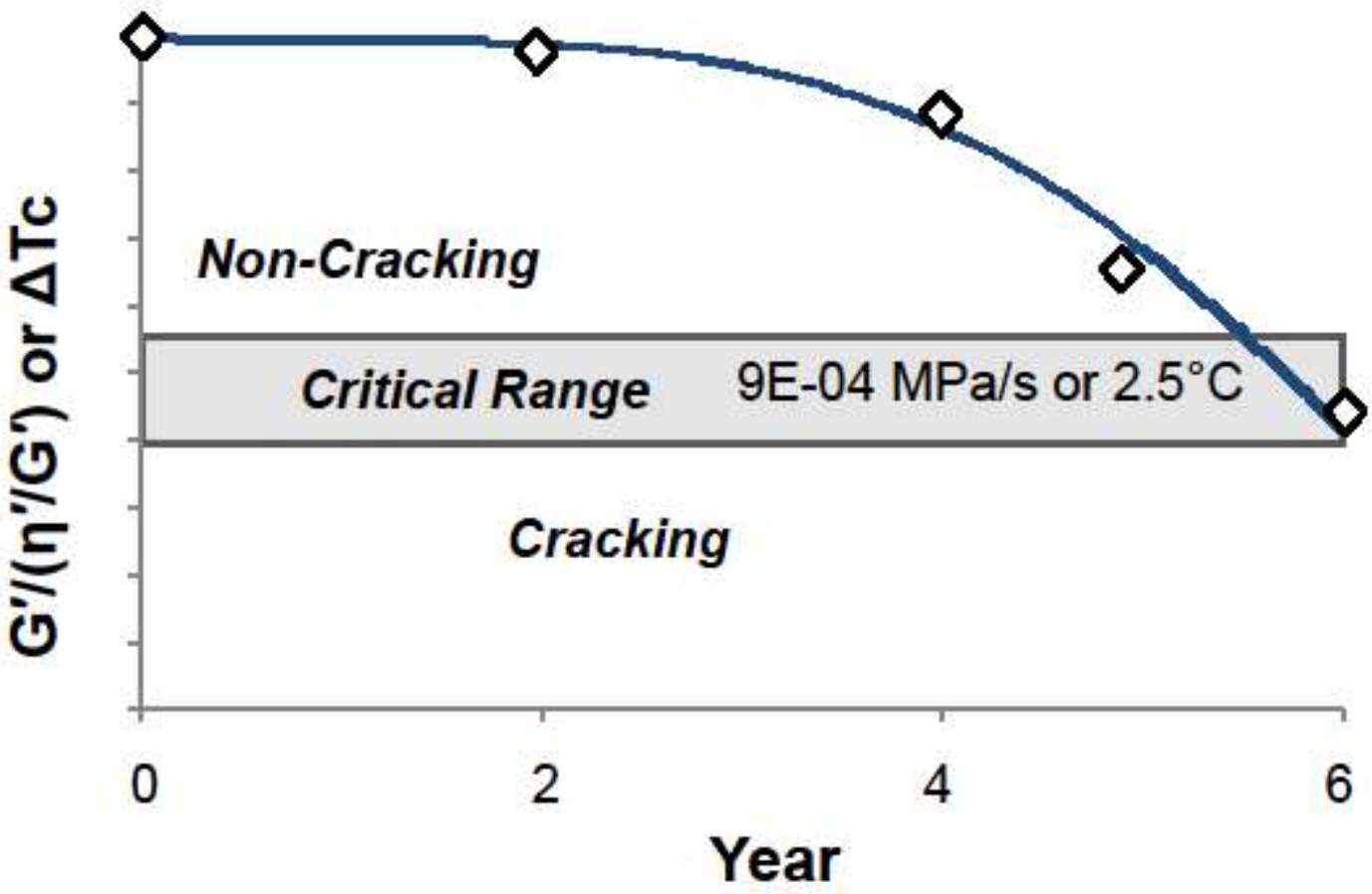
AAPTP 06-01 Research Objectives

- 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


Durability Parameter
Non-Cracking
Critical Range
Cracking
0
2
4
6
Year

Concept

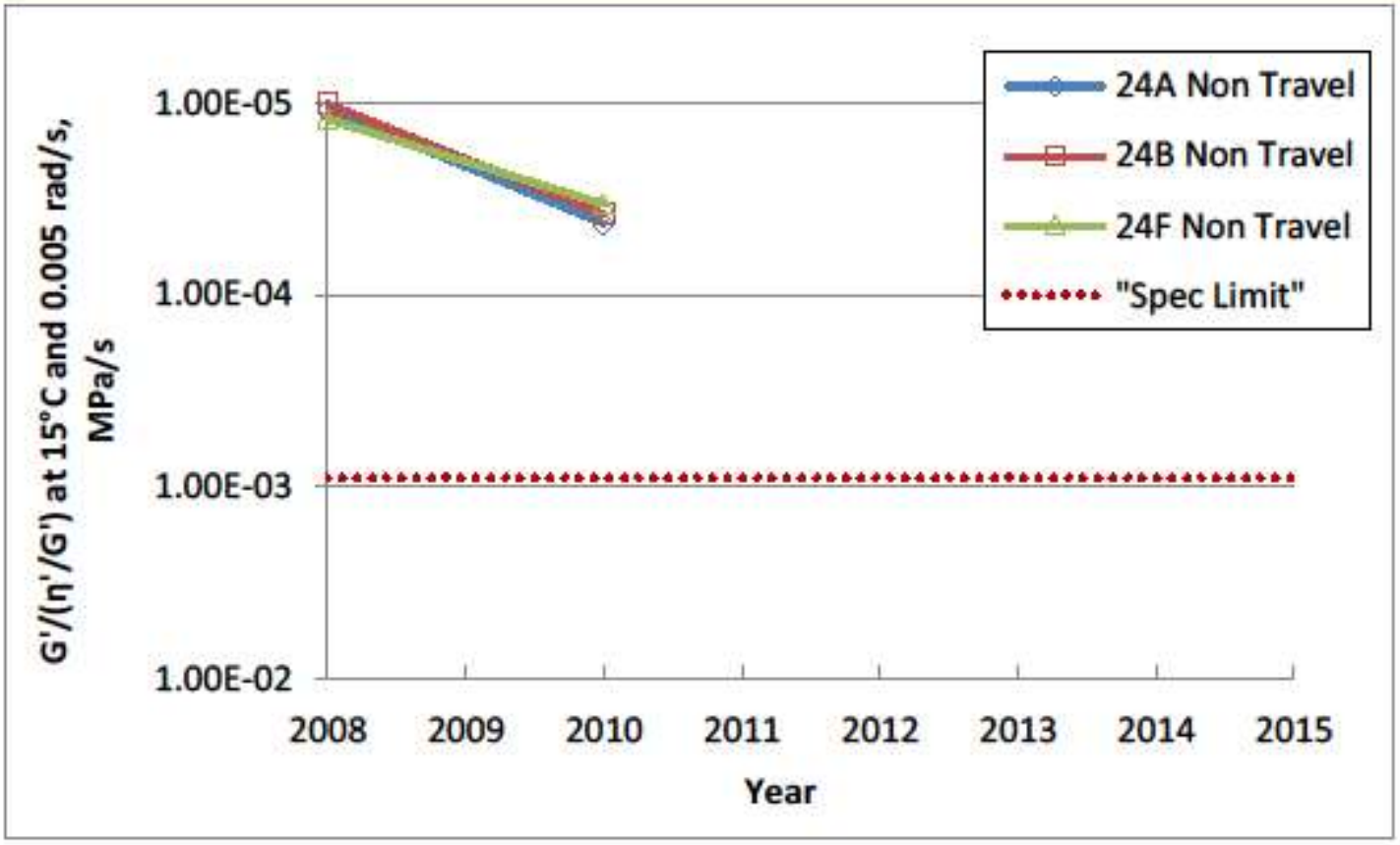

G'/(η'/G') or ΔTc
Non-Cracking
Critical Range
9E-04 MPa/s or 2.5°C
Cracking
0
2
4
6
Year

BBR Cracking Parameter - ΔTc

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

- Relationship to ductility
- Relationship to G'/(η'/G')
- Relationship to R-value (CA model)

MnROAD Cell 24



Bio based sealers

Bio based sealers

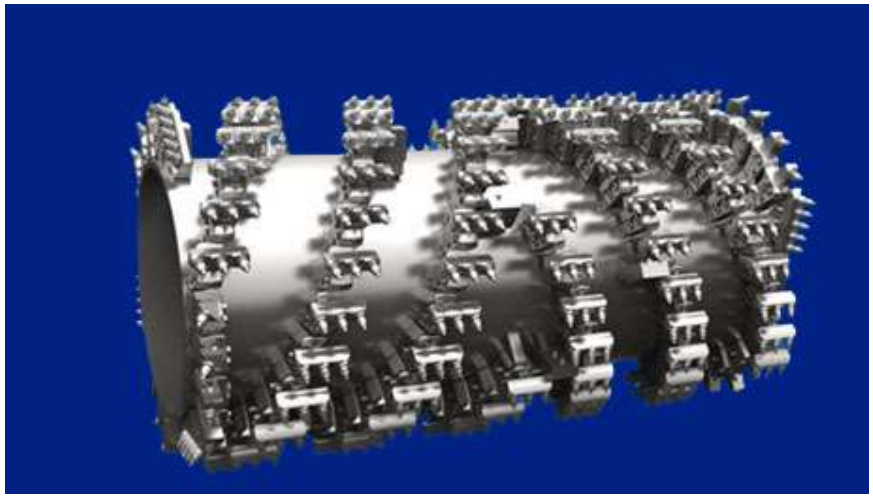
- Apply before year 2
- 0.015 gallons/square yard
- Does not effect striping
- No overspray issues (grass, curb)
- $1/sy
- Minimal friction loss

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!

- Jerry Geib, PE
  - Research Operations Engineer
  - 651-366-5496
  - jerry.geib@state.mn.us