



# Pavement Preservation at MnROAD

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October 8, 2013

*Your Destination...Our Priority*





# MnROAD

*Office of Materials and Road Research*

**A long-term accelerated pavement testing facility that gives researchers a unique, real-life laboratory to study and evaluate the performance of materials used in roadway construction.**





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**Interstate-94**  
**Existing**  
**Westbound**  
**Eastbound**





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“Mainline”  
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**Low Volume Road**

# MnROAD Operations

- ▶ Research project development and support
- ▶ Partnerships
- ▶ Construction coordination
- ▶ Sensors (9,000+ installed)
  - Static (Environmental)
  - Dynamic (Traffic Loading)
  - Install – Maintain
- ▶ Traffic loadings
  - LVR 80K Truck
  - ML Traffic Switches
- ▶ Performance monitoring



# Performance Monitoring

- ▶ LWD, IP, PMS- IRI
- ▶ Distress Surveys
- ▶ ALPS – rutting
- ▶ ALPS 2 – Warp and Curl
- ▶ Fault Meter
- ▶ Skid Trailer
- ▶ Dynamic Friction Tester
- ▶ Circular Texture Meter
- ▶ OBSI



# Specialty Testing

- ▶ Grip Tester (FHWA)
- ▶ RoboTex
- ▶ Rolling Resistance





# MnROAD Phase I Benefits

- Improved policies and specifications save Minnesota \$33M annually

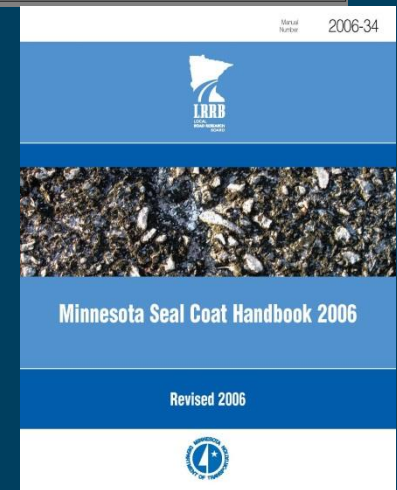
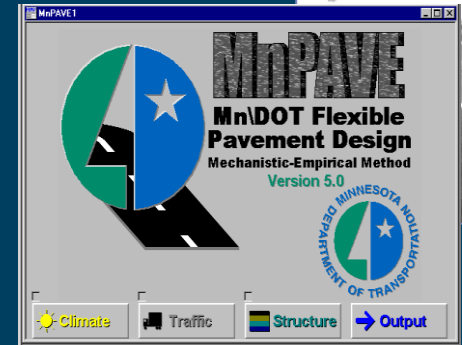
Seasonal Load Limits

Improved Design Methods

Improved Construction Techniques

17 Years of Data to Share

- Environment drives performance
- Young engineer training



# Transportation Engineering and Road Research Alliance

**“A dynamic partnership of government, industry, and academia that continuously advances innovations in road engineering and construction.”**



# TERRA Members

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## Industry

- Aggregate & Ready Mix Association of MN/RMC Research and Education Foundation
- American Engineering Testing
- Braun Intertec
- Caterpillar
- Concrete Paving Association of MN/American Concrete Pavement Association
- Flint Hills Resources
- Mathy Technology and Engineering Services
- Midstate Reclamation and Trucking
- MN Asphalt Pavement Association
- Road Science

## National

- Norwegian Public Roads Administration
- U S Federal Highway Association

## State and Local

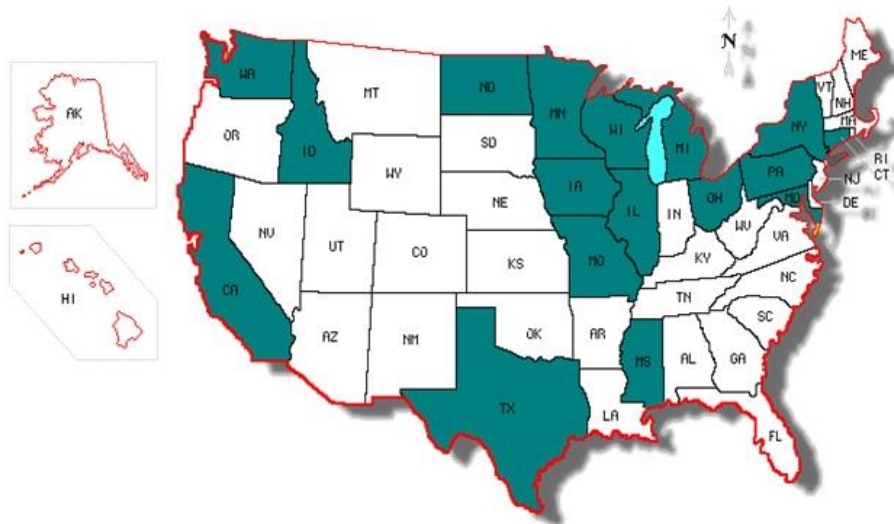
- Iowa DOT
- Michigan DOT
- Minnesota DOT
- Minnesota Local Road Research Board
- New York State DOT
- North Dakota DOT
- Wisconsin DOT

## University

- Iowa State University
- Michigan Tech University
- National Center for Pavement Preservation
- University of Minnesota

# MnROAD Phase 2 Partnerships

- ✓ 7 Pooled Fund Projects initiated by TERRA
  - ✓ 17 States + FHWA + LRRB + Industry
- ✓ 15 Additional Projects
  - ✓ Mix of Industry, LRRB, MnDOT
- ✓ 1 Strategic Highway Research Program (SHRP2) Project



# Benefits of the TERRA Alliance

- ✓ Improved collaboration between public, private, industry, and academic stakeholders
- ✓ Capacity to anticipate future needs and trends
- ✓ Research partnership expansion
- ✓ Leverage funds to meet common goals
- ✓ Quicker adoption of innovations

# Minnesota's Thermal Movement



# Ultra Thin Bonded Wear Course

2	3	4
1" UTBWC	1" UTBWC	1" 64-34
2" 64-34	2" 64-34	2" 64-34
6" SFDR	6" SFDR	8" SFDR
6" FDR	2" FDR	
	2" CL 5	9" FDR + Ash
26" CL4sp	33" CL3sp	
Clay	Clay	Clay

- 2 ¾ – 3" HMA on Interstate
- Stabilized FDR
- Constructed in 2008 by Road Science
- Over 4 Million ESALs – very little distress



# INNOVATIVE DIAMOND GRIND





# PCC Surface Characteristics (Diamond Grinding) Pooled Fund + Industry



- **Results**

- Noise/Durable/Safety Improvements
- Partnership with industry, states, FHWA
- Cost are becoming more competitive

- **Benefits**

- Implementation: 94 Clearwater, 52, 35 Duluth
- Good for areas where no room for noise walls
- Other states are requesting spec



# Micro Surfacing Kraton Partnership

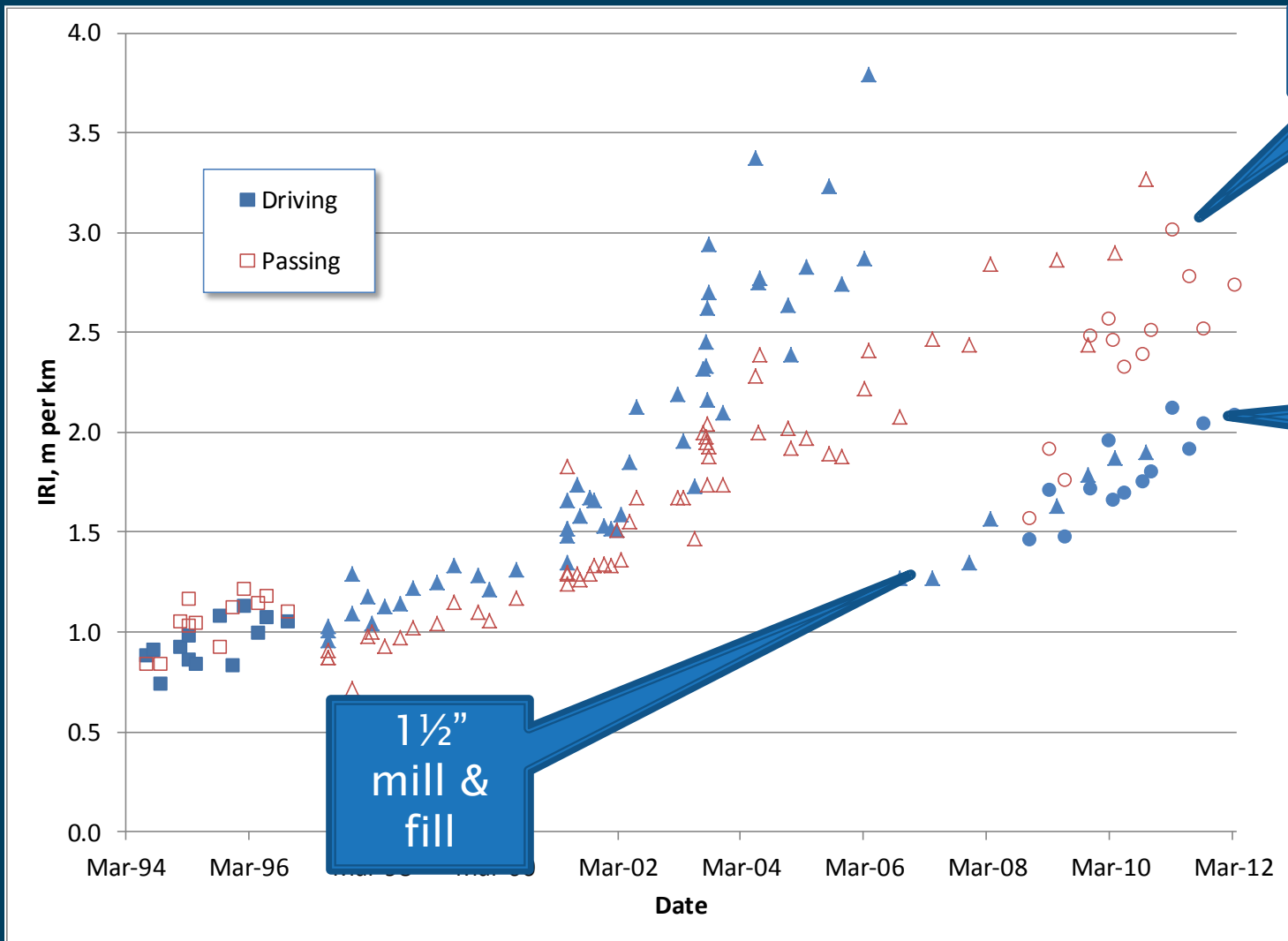
- ▶ 6" HMA+ 33" CL 4, 1993
- ▶ Severe transverse & Longitudinal wheel path
- ▶ 2006 Right lane: 1 ½ inch mill & fill PG 52 – 34
- ▶ Goal:  
Find a better “cheap fix” for worn out pavements



04/25/2012 14:00



# IRI



190  
in/mi

126  
in/mi

1 1/2"  
mill &  
fill



# Micro Surfacing June 2012

- Tack coat – Scratch Coat – Final surface
- Granite Type II Aggregate
- 6 % Kraton polymer modified base asphalt instead of 3% post added latex
- Base PG 49–34 instead of PG 64–22



# Results

- ▶ Immediately after construction (June 2012)
  - Right lane 95 in/mi
  - Left lane 96 in/mi
- ▶ September 2012
  - Right lane 100 in/mi
    - 21% improvement in ride
  - Left lane 99 in/mi
    - 48% improvement in ride
- ▶ September 2013
  - Some Reflective Cracking
  - IRI 100, 106



# PCC Patching Materials Study



# MnROAD Joint Deterioration



# Topical Joint Sealants

- Evaluate Materials and Methods to seal face of joints
  - Bonding
  - Permeability
  - Scale Resistance
- Larry Sutter, Michigan Tech, Industry Partners



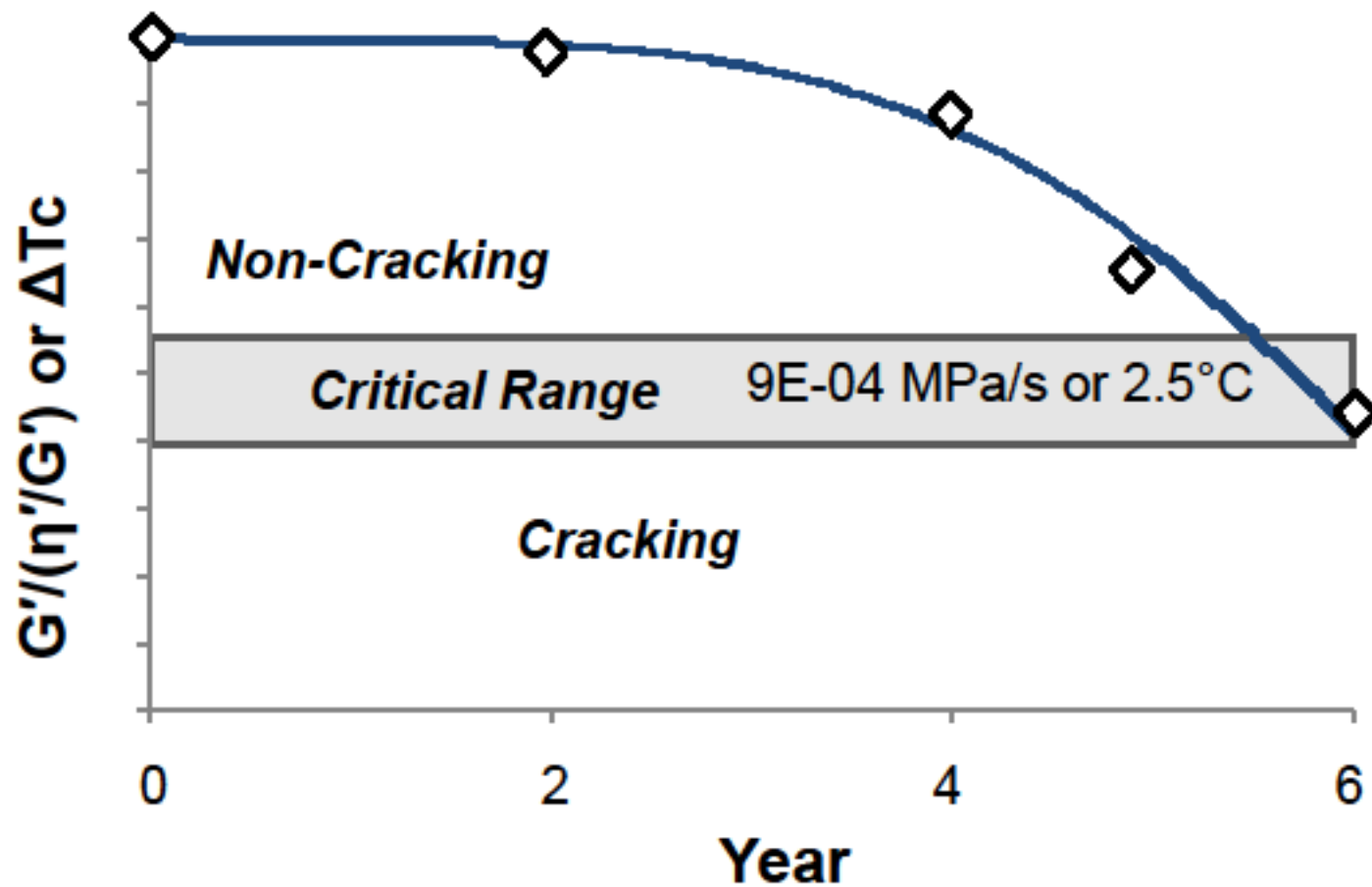


# Optimal Timing of Preventive Maintenance for Addressing Environmental Aging in Asphalt Pavements

- ▶ Primary Objective
- ▶ develop and validate technology that can be used by highway agencies to determine the proper timing of preventive maintenance to mitigate damage caused by asphalt aging
- ▶ Mike Anderson, Asphalt Institute
- ▶ Pooled fund MN, MD, OH, TX, WI, LRRB



# Concept



# Aging Study

- ▶ To stop aging seal the pavement at year one.
- ▶ Low volume loop – annual applications
- ▶ Durability factor
- ▶ Cores this fall will be tested by AI



# PNA CoVex Plate Dowels



# What's Next at MnROAD?

- ▶ Minor construction as needed
- ▶ Plan for Phase 3 in 2016:
  - Preservation
  - Rehabilitation
  - Construction Uniformity
  - Sustainability



# SHRP 2 Pavement Preservation Workshop at MnROAD

[www.mndot.gov/mnroad](http://www.mndot.gov/mnroad)

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# Thank You



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