MnROAD/NCAT Partnership
Safer, Smarter, Sustainable Pavements through Innovative Research

Jerry Geib
March 28, 2018
TPF-5(375)

National Pavement Preservation Study

3 years at $50k/year
Outline

• MN weather
• MnDOT site
• Ride Data
4% coldest population

- 4M Minnesotans
  - 2.9M other Americans
- 8.8M Canadians
- 87M Russians
- 108M Chinese
Low Temperature Cracking

- **Development of SuperPave**
  - Original MnROAD Test Sections (PG 64-22, PG 58-28)
  - 1999 MnROAD Test Cells (PG 58-28, PG 58-34, PG 58-40)

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[Bar chart showing linear feet of cells for different years and pavement grades with markers for 5-year and 10-year data points.]

*February 2, 1996*

-39.4 F
Jan. 4, 2018 -44F in Embarras, MN

Map showing temperatures across Minnesota, with the lowest temperature at -44F in Embarras.

Map credits to MN Department of Transportation.
National Pavement Preservation Study

Mille Lacs County

Rum River Bridge
RP 189.9

CSAH 8
Low Volume Road
2.5 mile section

RP 185.3
National *Pavement Preservation* Study

- **Goals**
  - National Study (Climatic zones)
  - Provide consistently collected data / analysis
  - *Quantify the life extending benefits*
    - Improve and/or extend the pavement life
    - Cost effectiveness
PreTreatment Condition
US-169 Northbound Lanes
PreTreatment Condition
CSAH-8
East and Westbound Lanes
Micro surfacing, CSAH 8

Average IRI (in/mile)

Pre-Construction
Post-Construction
10-Nov-16
11-Apr-17
8-May-17
31-May-17
14-Jun-17
29-Jun-17
14-Jul-17
25-Jul-17
8-Aug-17
23-Aug-17
7-Sep-17
20-Sep-17
5-Oct-17
19-Oct-17
6-Nov-17
16-Nov-17
30-Nov-17

Sec. 4 - Over Single Chip Seal
Sec. 8 - Over Fibermat Chip Seal
Sec. 9 - Over Scrub Seal
Sec. 11 - Over Crack Seal and Transverse Mastic
Sec. 12 - Type II
Sec. 13 - Double (Type II over Type II)
Chip Seal Treatments, CSAH 8

- Sec. 2 - Over Crack Seal/Transverse Mastic
- Sec. 3 - Single
- Sec. 4 - Micro over Single Chip Seal
- Sec. 5 - Double (FA 2 over FA 2.5)
- Sec. 6 - Triple (FA 2 over FA 2.5 over CA-70)
- Sec. 7 - Fibermat
- Sec. 16 - ABR over Fibermat
- Sec. 18 - ABR over Chip Seal

Average IRI (in/mile)

Pre-Construction, 10-Nov-16, 11-Apr-17, 8-May-17, 31-May-17, 14-Jun-17, 29-Jun-17, 14-Jul-17, 25-Jul-17, 8-Aug-17, 23-Aug-17, 7-Sep-17, 20-Sep-17, 5-Oct-17, 19-Oct-17, 6-Nov-17, 16-Nov-17, 30-Nov-17
Open Graded Friction Coarse “OGFC”

August 2016 – Hardrives Contractor

OGFC/PCC conventional tack
OGFC/PCC ultrafuse tack
OGFC/HMA ultrafuse tack
OGFC/HMA conventional tack
“It was not our wealth that made our highways possible; rather it was our highways that made our wealth possible”,

Thomas Harris McDonald
Commissioner of Public Roads
1939 – 1953
Thank You

Jerry Geib

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<tr>
<th>ADT</th>
<th>I</th>
<th>US</th>
<th>MN</th>
<th>total</th>
<th>%</th>
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<td>96</td>
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St. Louis CR 4 & 16

- CR 4. 58-28, 30% RAP. Cracked every 50’ during the 1st winter.
- CR 16. 58-34, 20% RAP. No cracking during the 1st winter.
Minnesota's Story

(about 20 years ago)

Design for the loads

(and Hope to)

Survive the environment

(thermal cracking)
Minnesota's Story
(today)
Design for the loads
Design for the environment
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<th>MINNESOTA</th>
<th>ALABAMA</th>
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<td><strong>Total area</strong></td>
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<td>86,935 sq. mi.</td>
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<td><strong>Population</strong></td>
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<td>5,519,952</td>
<td>4,863,300</td>
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<td><strong>Lane miles</strong></td>
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<td>DOT Lane miles</td>
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<td>Interstate lane miles</td>
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Auburn dew points

- 70-74F  Very Humid, quite uncomfortable
- 75-80F Extremely uncomfortable, fairly oppressive
- Over 80F Severely high, deadly for asthma

- Summer of 2015. ~ 70+ dew points from June 15 – Sept 11.

- MN  12 days total over 70+
  - Jan 2015  9 days below 0,  Feb 12 days below 0