Pavement Preservation Overview

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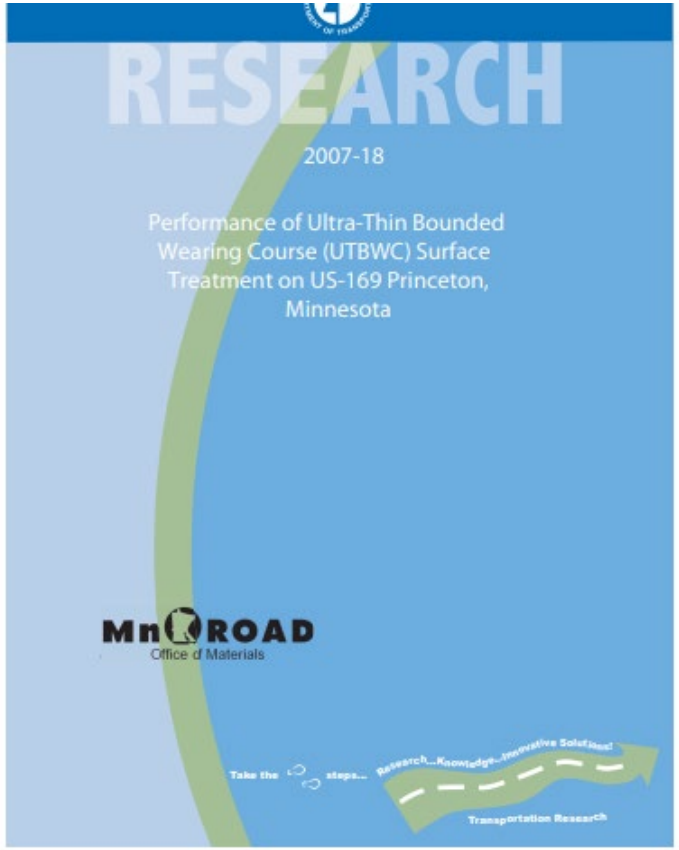
Pavement Preservation

- **Pavement Preservation**: “Work that is planned and performed to improve or sustain the condition of the transportation facility in a state of good repair. “MnDOT”
- Doing the right thing on the right roadway at the right time
- 3 classes for your Preservation project
  - Preventive Maintenance
  - Reactivity
  - Hospice

Performance



Why Pavement Preservation

Table 5.1 Weibull parameters obtained for various treatments overlaid on different substrates.

Type of Treatment	Type of Substrate	Threshold Time to Failure, t_o	Failure Mode, β	Remaining Service Life, μ
UTBWC	BOB [1]	0	Wear-out failures	13
	BOC [1]	2		8
Chip Seals	BOB	0	Wear-out failures	9
	BOC [1]	0		8
	BAB	0, 2		8 - 10
Micro-surfacing	BOB	0, 2	Wear-out failures	10 - 11
	BOC	0		9 – 15 [2]
	BAB	0		8 - 9

[1] NDDOT does not have substrates that have been overlaid with this type of treatment.

[2] Significant difference observed between two data sets from t-test analysis.

Agenda

- Ultra Thin Bonded Wearing Course
- Micro Surfacing
- Chip Sealing

UTBWC

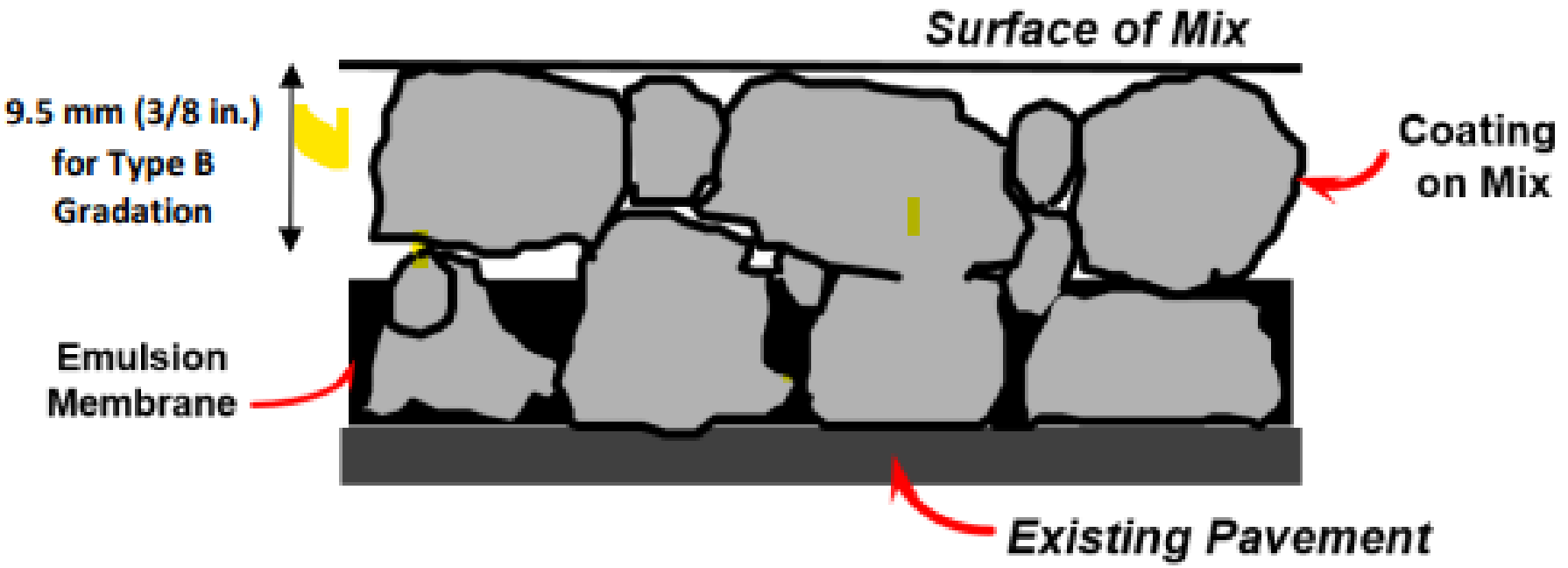
What is UTBWC

- An UTBWC is formed in one pass with the application of a heavy, polymer-modified asphalt emulsion tack coat and a gap-graded, polymer-modified 0.4 in. to 0.8 in. (10 mm to 20 mm) HMA layer. It is placed using a spray paver.

How

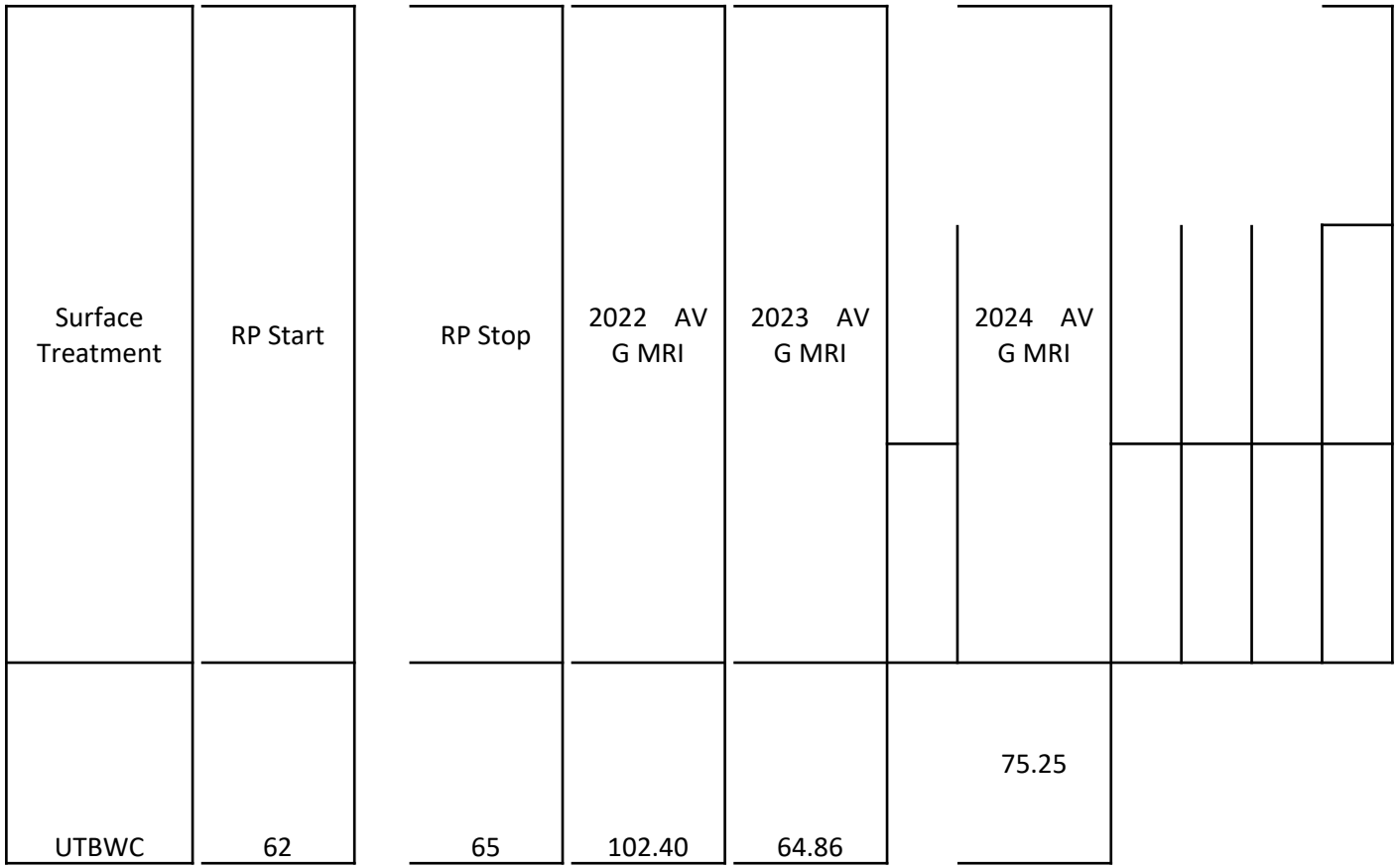
- Application of polymer modified emulsion
- CRS-1p
  - 0.17 to 0.22 g/y^2
- Applied just before the mod. HMA is applied
- Forms water proof seal of surface
- Strong bond
- Gap graded polymer modified HMA

UTBWC

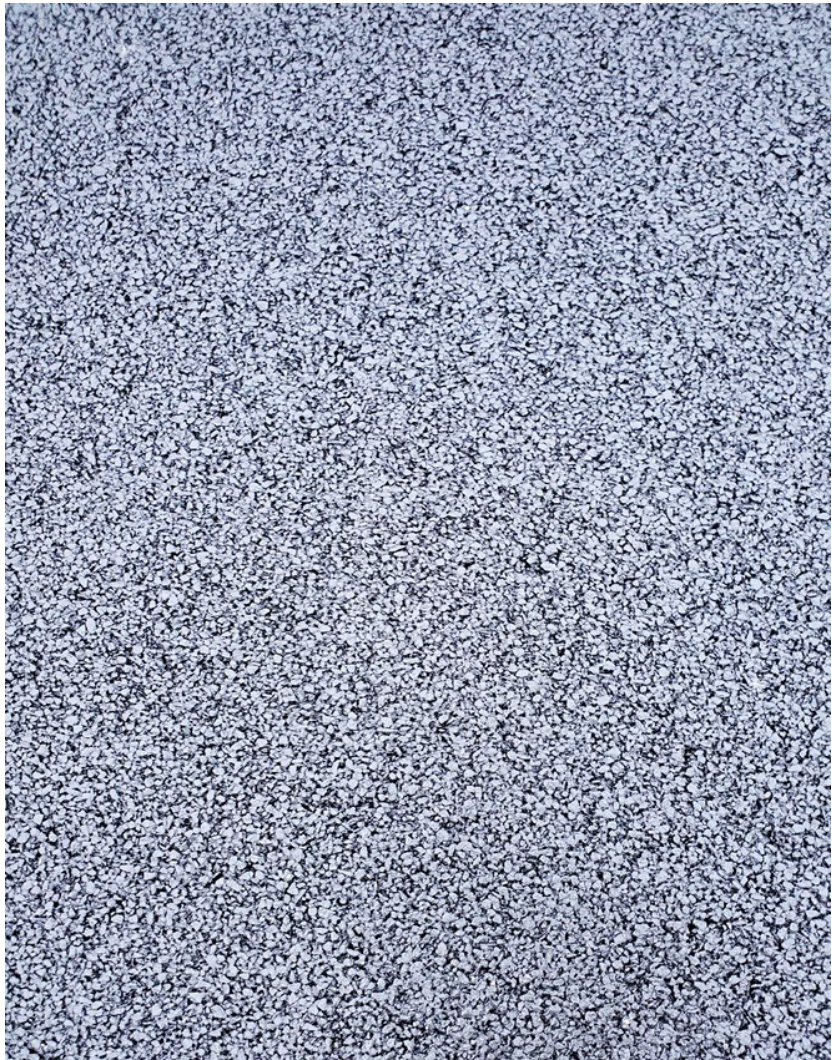

Surface of Mix
9.5 mm (3/8 in.)
for Type B
Gradation
Coating
on Mix
Emulsion
Membrane
Existing Pavement

Application

Micro Milled
Surface


Surface Treatment
RP Start
RP Stop
2022 AV G MRI
2023 AV G MRI
2024 AV G MRI
UTBWC
62
65
102.40
64.86
75.25

Finished Product




Micro Surfacing

Topics

- What is Micro/Slurry
- Project selection
- Inspection details

What is Micro Surfacing

- Homogenous mixture of aggregate and asphalt emulsion
  - Like a Dairy Queen Blizzard
- Slurry cure by air drying
  - Top down
- Micro Surfacing chemical cure
  - Will cure and set at night
- Used for Surface treatments
- Rut filling
- Ride improvement
- Improve Friction

Micro Surfacing

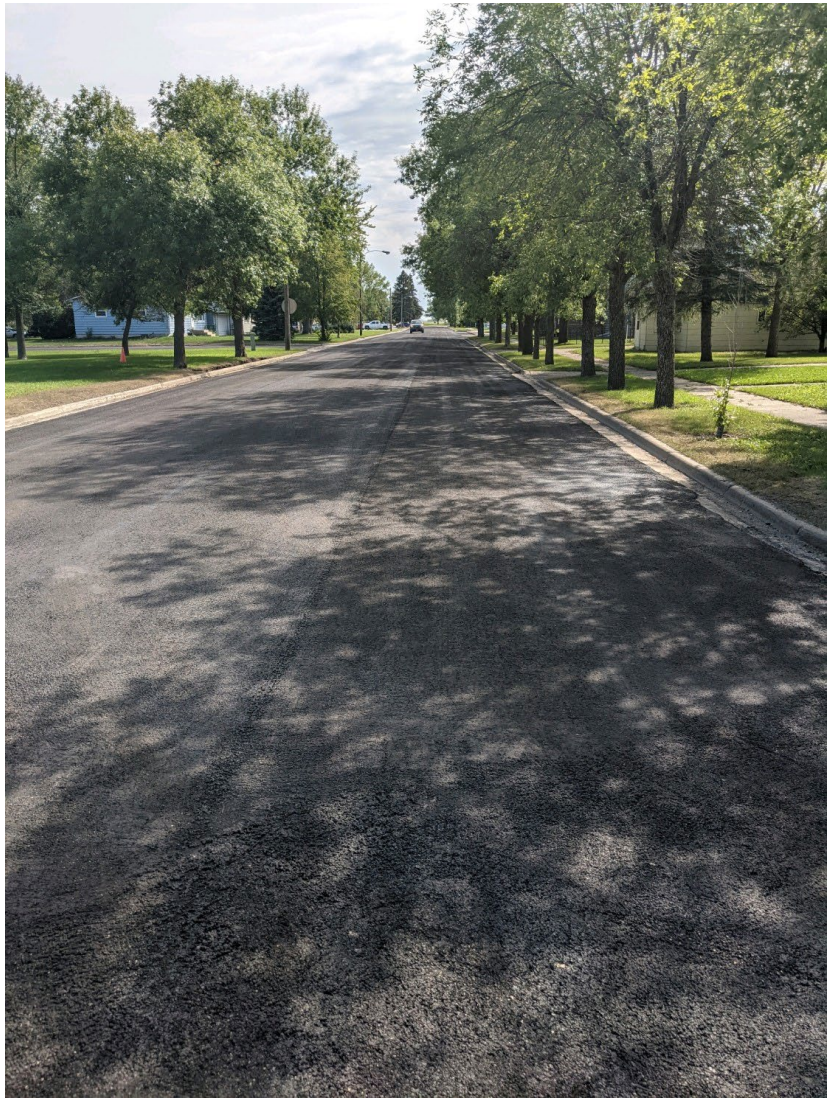
Project Selection

- Structurally sound
- Small potholes ok
- Raveling ok
- Flushing ok
- Aged and oxidized ok
- Slurry should only be used for surface treatment
  - One layer thick

Not Good Candidate

Ride Improvement

Ride Improvement



In Place of Thin Overlay

Ride Improvement
Cupped Cracks

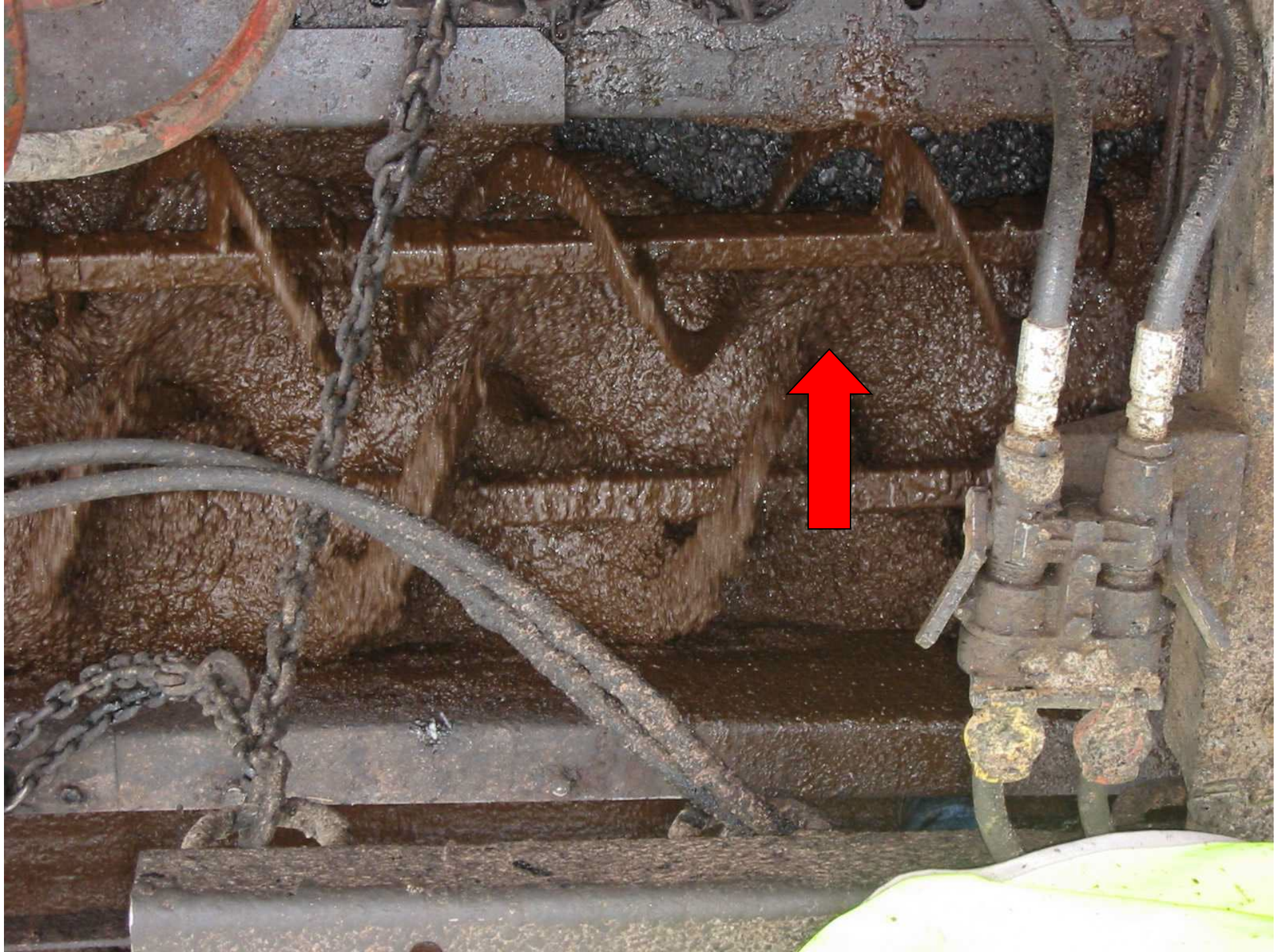
Rut Filling

Rut Filling
Scratch Course

Finished Rut Filling

Micro Milling Followed By Micro Surfacing

Construction Details



Managing Over Size Rock

Cold Mix Drag Marks or Over Sized Rocks

Drag Marks

Dirty Strike Off Drags

Debonding

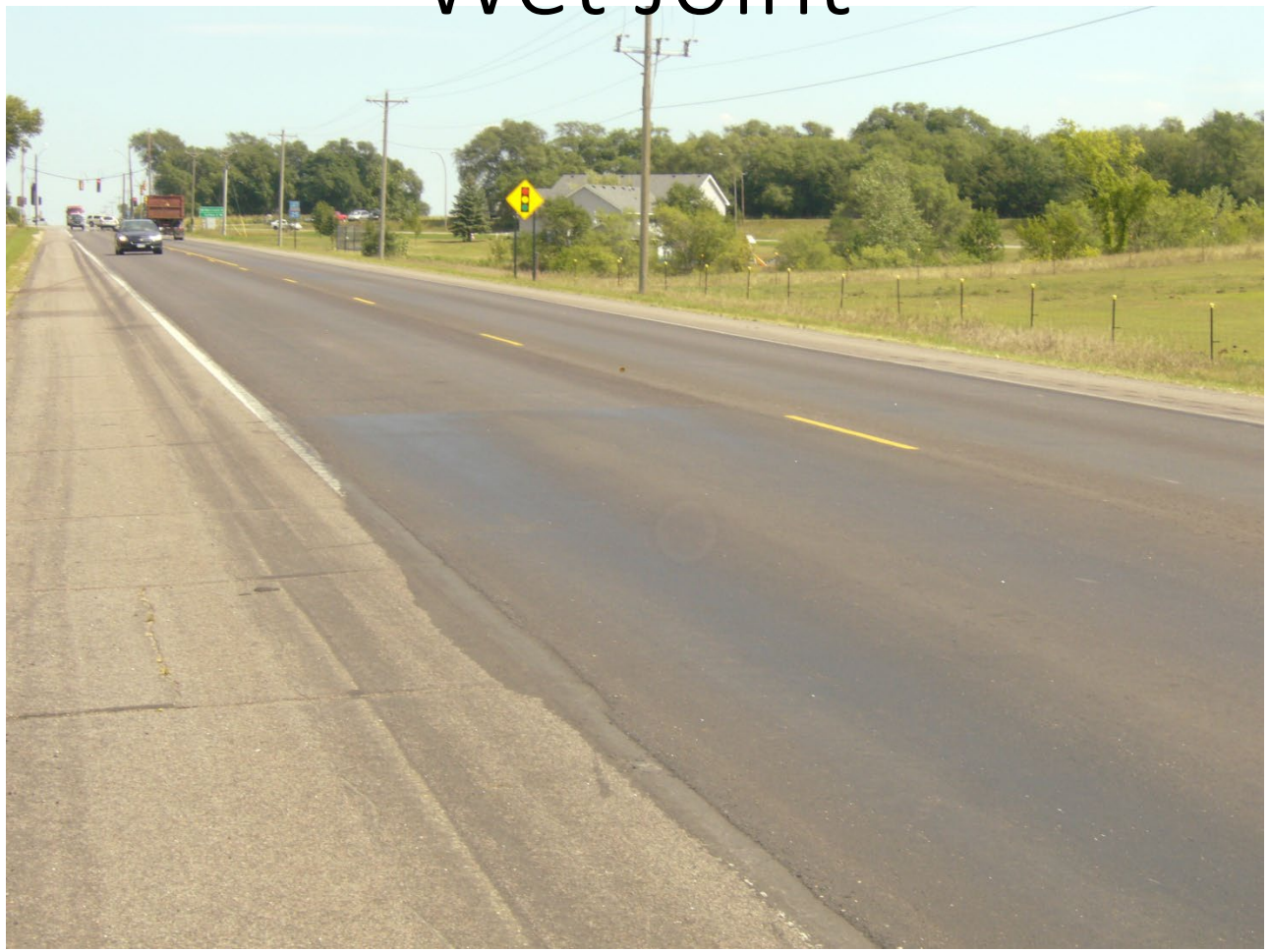
Squeegee Work

Bad Squeegee Work

Start - Stop Joint

Bad Joint

Wet Joint



Good Center Joint

Bad Overlapped Center Joint


MACK

Flushing & Wet


09/22/2009 10:03

Missed Center Joint

Bad Edge Line - Highway

Bad Edge Line - City

Good Straight Edge Centerline

Good Straight Lines

Unprotected Manhole

Cover Structures

How it should look

Tips

- Structurally sound pavement
- Early in life for PM treatment
- Scratch then surface course yields better finished product
- Check yields often
- Watch how much water is added

Questions?

Chip Sealing Update

- Updated Seal Coat Handbooks is available
- Use of RAP for aggregate has been used in North Dakota
- Using chip sealing to lightly surface gravel roads is increasing
- Scrub sealing

When to Apply Chip Seal

- Built aging study
  - Because 15 years take 15 years
- 3-inch Mill & Fill 1999
  - PG 58-28 binder
  - Chip seal 1 mile section each year starting in 2000
  - Last sections was chip seal 2004

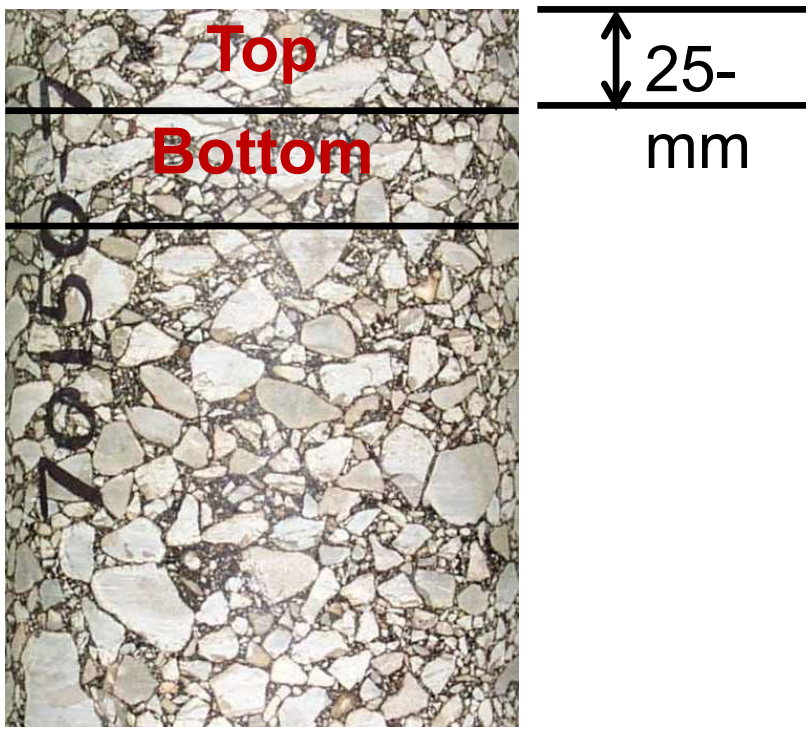
Aging Study

- Cored in 2011 for Asphalt Institute study
- Wanted to see what effect PM has on aging
- When is best time

Aging Study

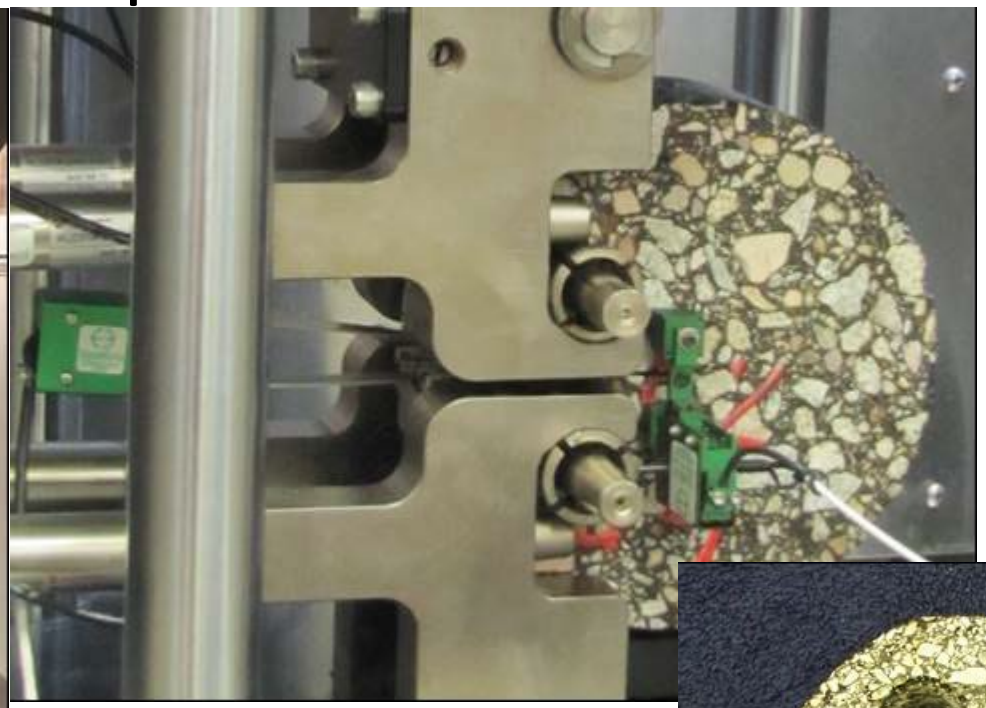
MINNESOTA TH 56 SITE LAYOUT				
14 TO 15	13 TO 14	12 TO 13	11 TO 12	10 TO 11
2000	2001	2002	2003	CONTROL
1 YEAR	2 YEAR	3 YEAR	4 YEAR	Age when treated
ORIGNAL CONSTRUCTION- 1999				

TH56 Cores

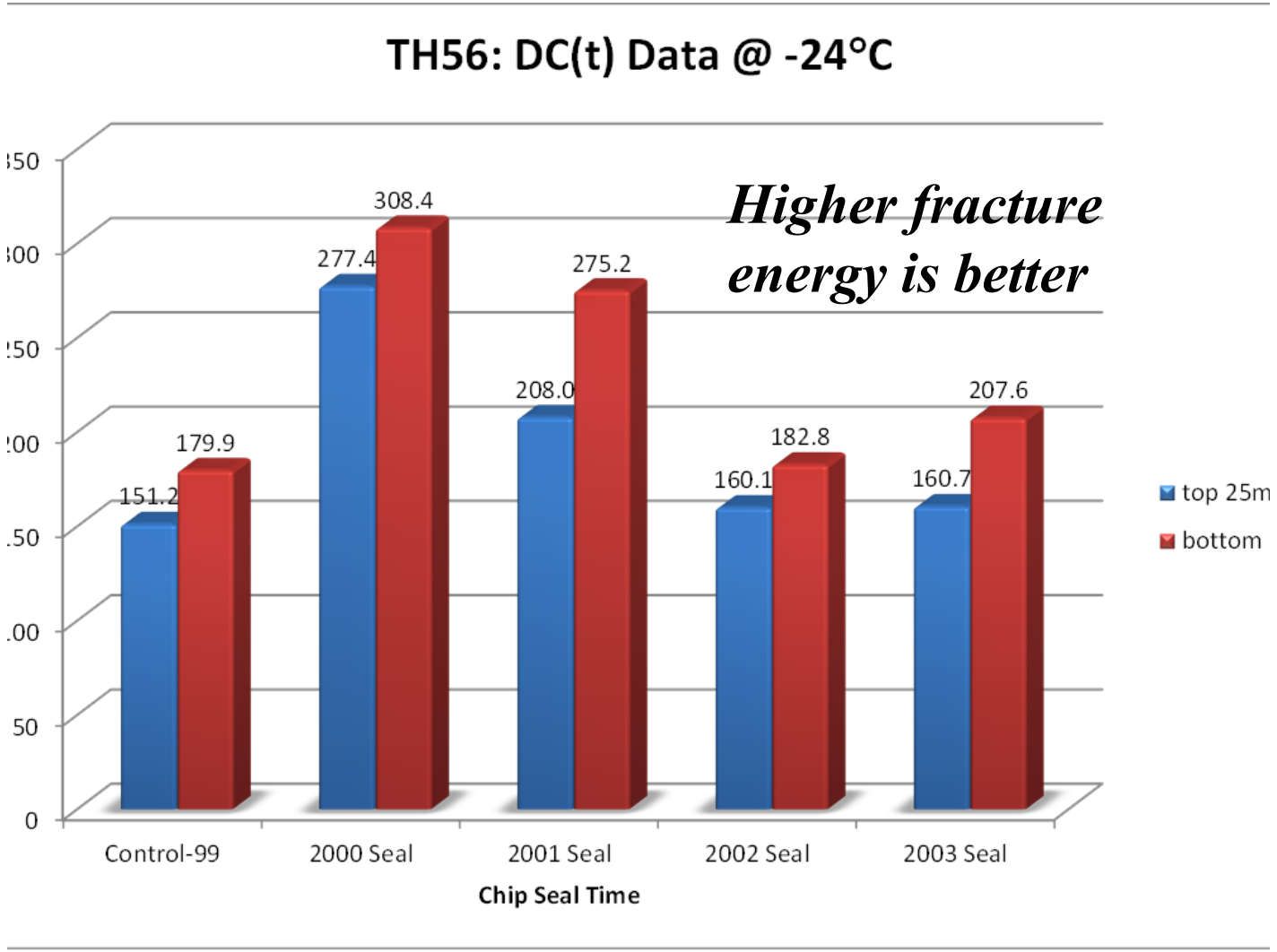


- Cores
  - Remove chip seal (if any)
  - Cut into two 25-mm layers
  - Test for fracture energy (cracking potential)
  - Recover component asphalt to check aging

Disk-Shaped Compact Tension Test: DC(T)



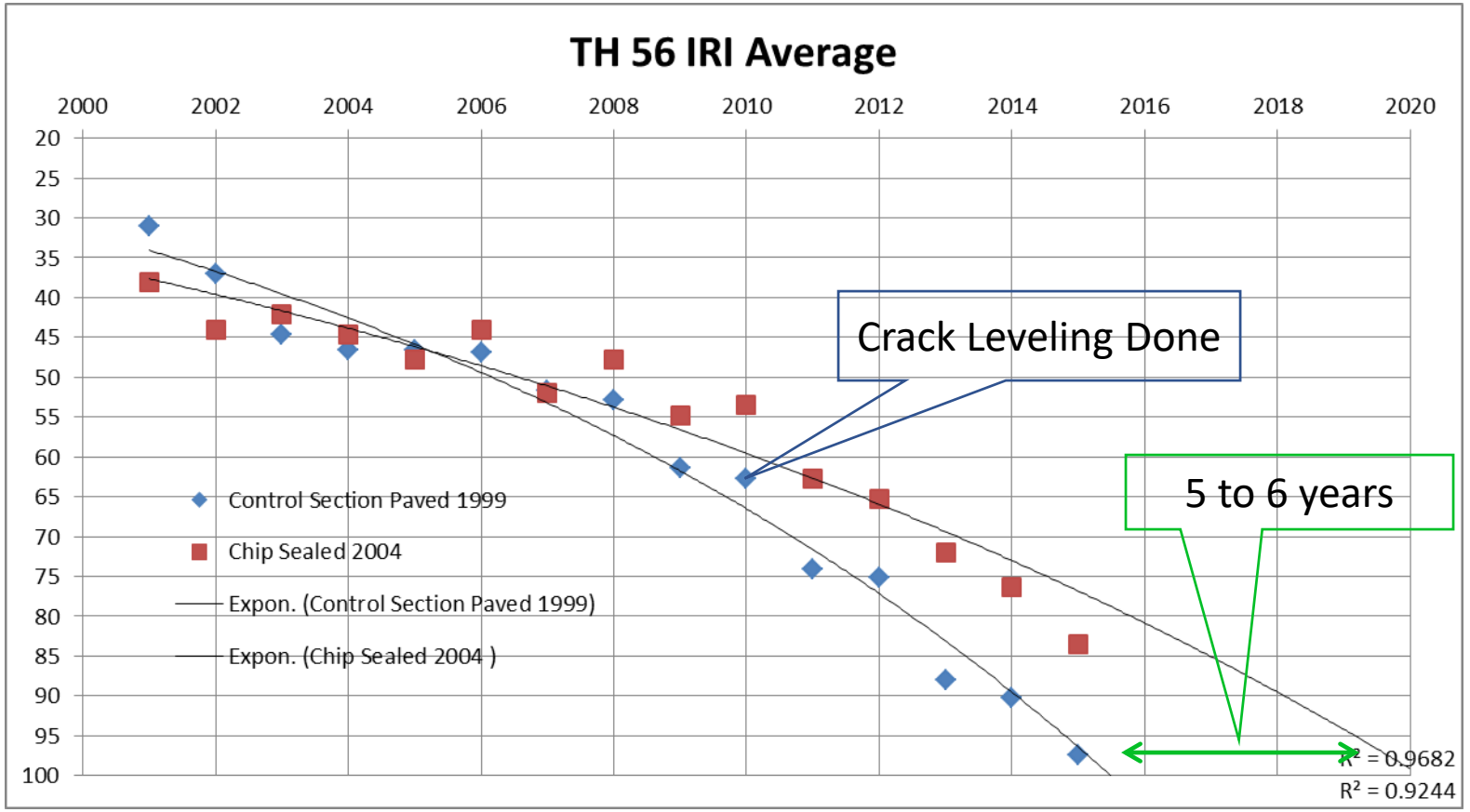
DC(T) Results: TH-56



TH56 Findings

- Sealing improves resistance to aging (cracking)
- Sooner is better when sealing
  - Waiting for 3 or more years to seal after construction produced similar results as unsealed pavement related to DCT
  - Sealing after 1 or 2 years showed improvement in resistance to aging (cracking)

MnDOT's Pavement Management Ride Data



Control Section Never Chip Sealed

Last Section Chip Sealed 2004

Scrub Seal

Scrub Seal

Scrub Seal

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Thanks

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