Pavement Maintenance Best Practices

Thomas J. Wood

Agenda

- Why pavement maintenance / preservation is important
- Dealing with cracks
- When to apply a surface treatment
- Fog Sealing
- Micro Milling
- UTBWC
- Thin Lays

Why Pavement Preservation is Important

- Condition of pavements are declining
- Costs are rising
- Revenues are flat
- Natural resources are being depleted

Why Pavement Preservation is Important

- Traffic volume are increasing
- More trucks
  - Heavier trucks
- Roadway need to be updated to carry higher traffic levels

Dealing With Cracks

Dealing With Cracks

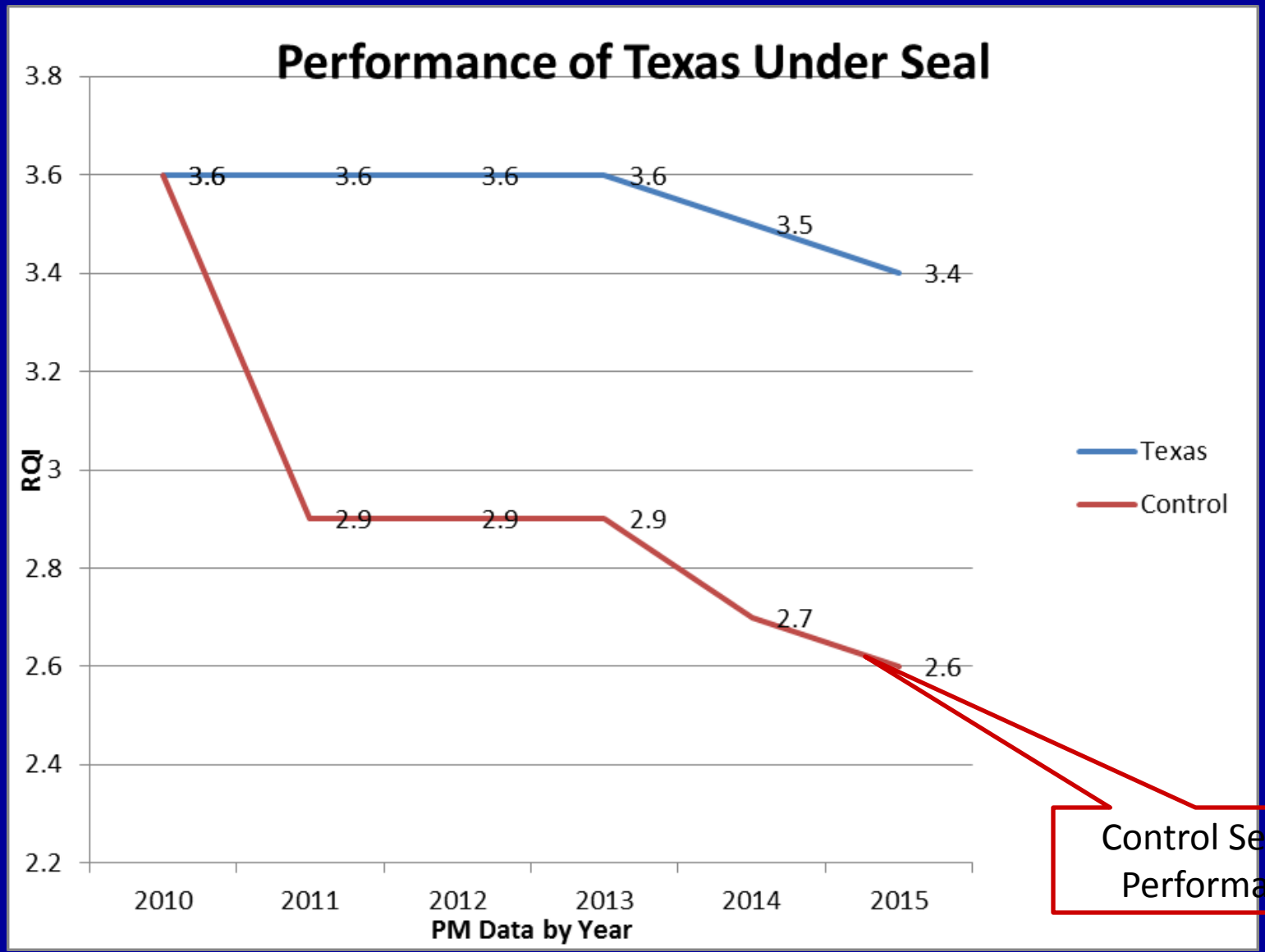
- Starts with using proper PG grade binder
- MnDOT uses -34 new construction
- See delay in cracking over -28
- MnDOT is studying Fracture Energy to see if the test can determine resistance to cracking of mixture

Dealing With Cracks Using a Texas Under Seal

Texas Under Seal (TUS)

- Chip Seal applied before HMA Overlay
  - Milled surface
  - Non milled surface
- ⅜” minus chip
- CRS-2p
- Light on cover aggregate
- Can pave as soon as rolling & sweeping is completed

TUS Performance Data



TUS

- Why does it perform
  - Acts as stress relief membrane?
  - Super Tack?
    - Have had other tack methods with higher peak strengths
  - Limits water infiltration from base?

TUS

- As of end of 2015 construction year 10+ projects have been built
- Seeing 30 to 40% reduction in reflective cracks after one year
- Not sure how long effect will last but appears to be cost effective

Why you need to crack seal!

Why Crack Treatment?

- Prevents water intrusion into subbase
- Prevents incompressible intrusion
- Improves ride quality smoothness
- Slows down pavement deterioration
- COST-EFFECTIVE

Why You Should Treat Cracks

- Protect your largest investment
- Pavement failure imminent
- Crack treatments are cost-effective, up to 9 years of (75% effectiveness) performance
- Extends pavement life

What cracks to treat?

- All cracks soon after they appear… any crack opening will allow moisture penetration into pavement foundation (subbase)
- At minimum all cracks ≥1/8”
- Rout and Seal
- Clean and Fill

How to Seal Cracks

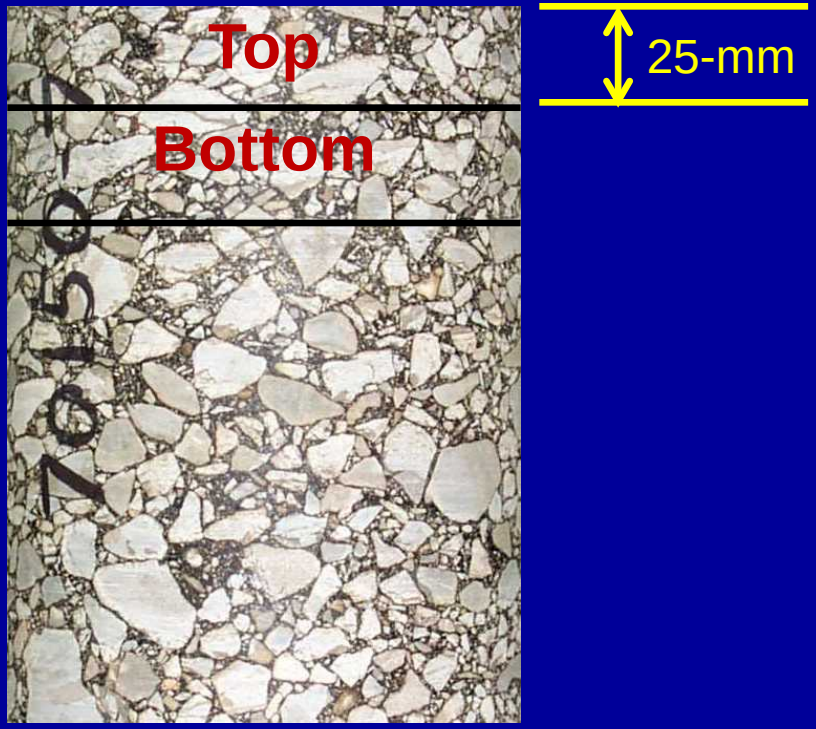
- Rout & Seal use on newer pavements with transverse crack spacing greater than 20’
- Clean & Seal older pavements and longitudinal cracks

Don’t forget edge joints

When to Apply Surface Treatment (Chip Seal)

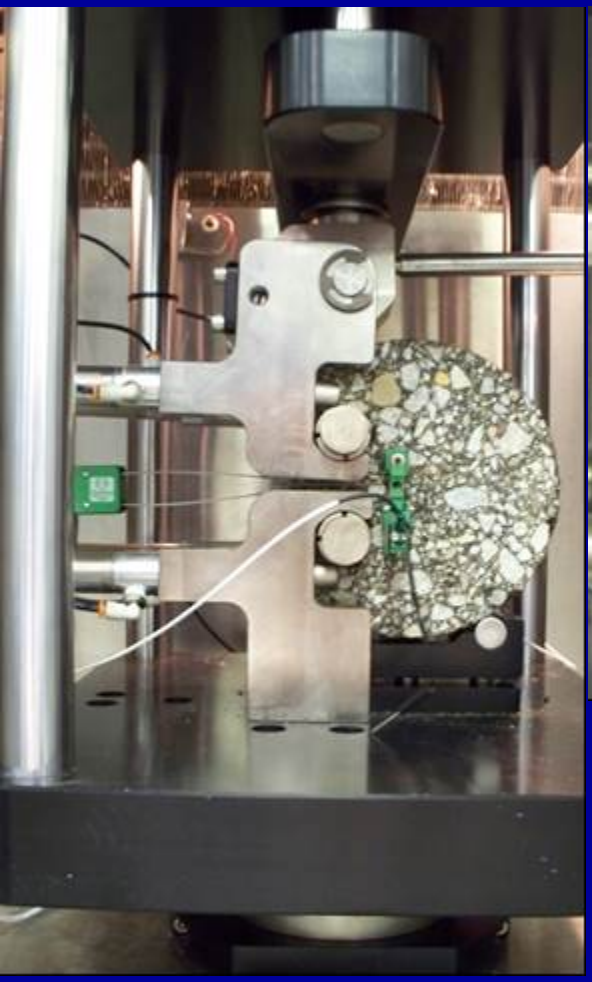
- Built aging study
  - Because 15 years take 15 years
- 3 inch Mill & Fill 1999
  - PG 58-28 binder
  - Chip seal 1 mile section each year starting in 2000
  - Last sections was chip seal 2004

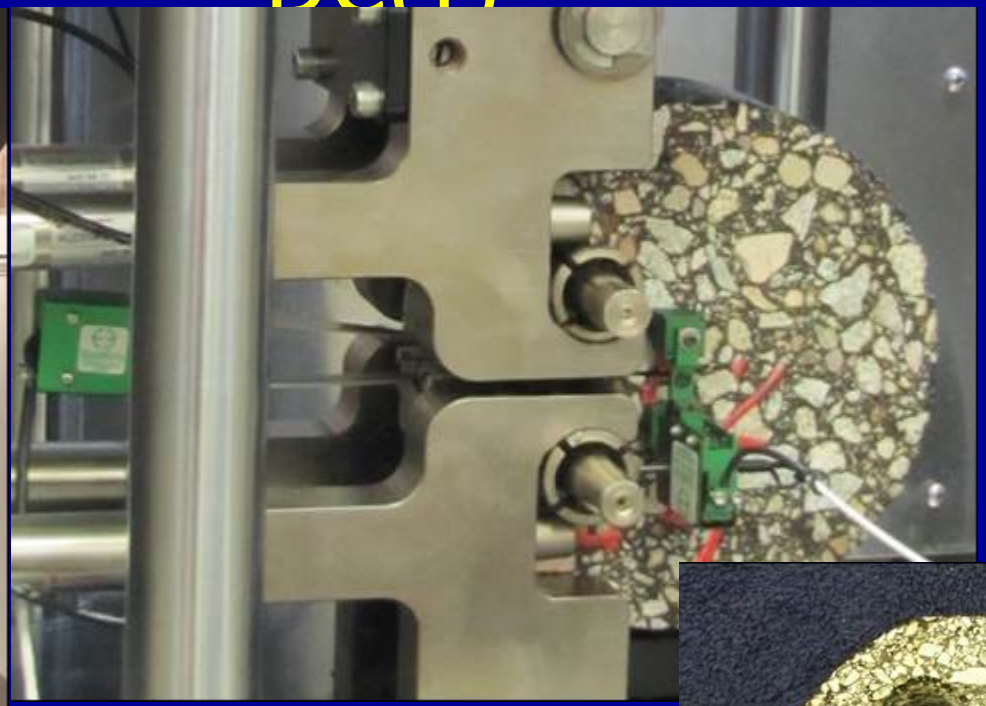
TH56 Cores



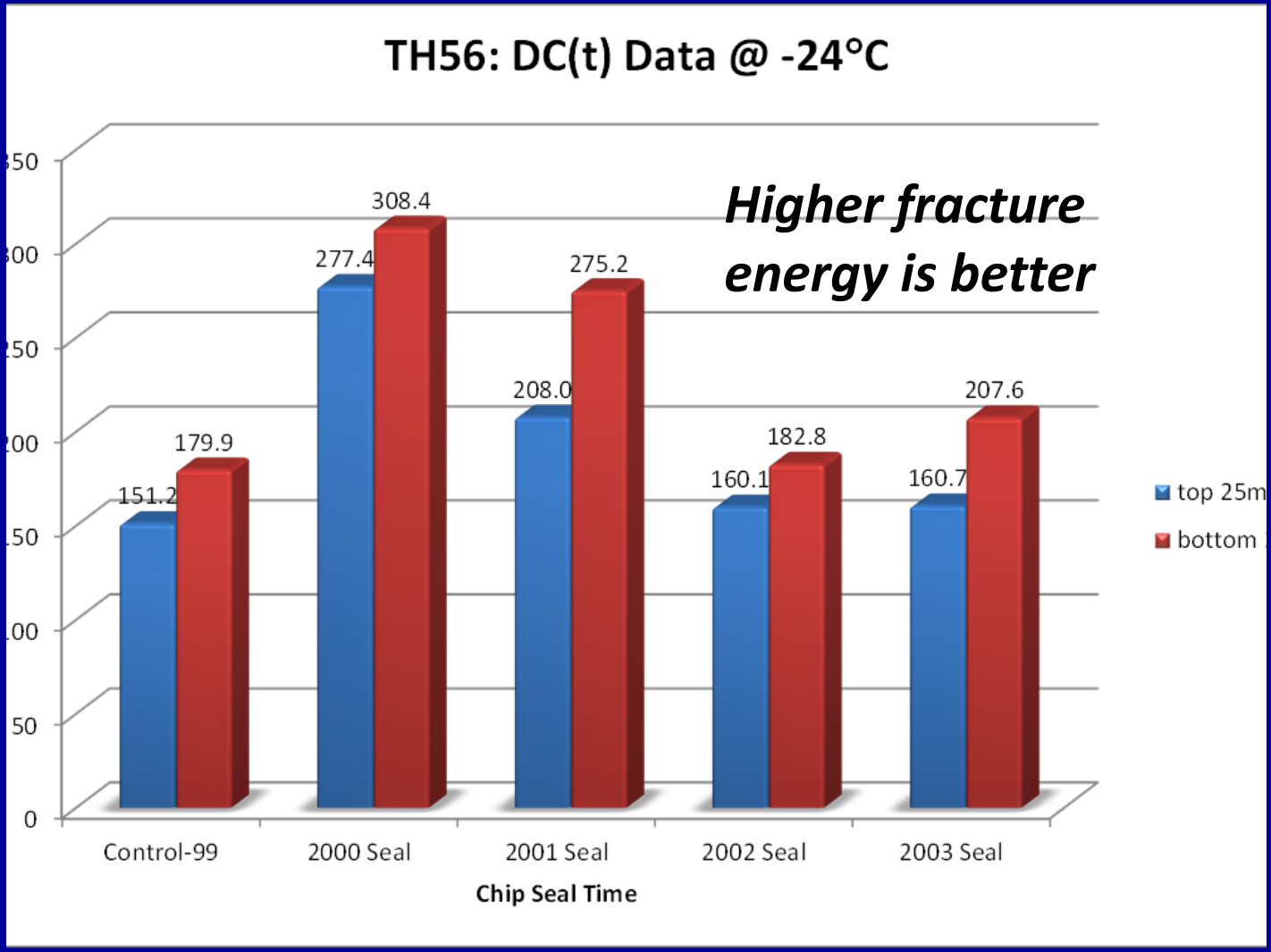
- Cores
  - Remove chip seal (if any)
  - Cut into two 25-mm layers
  - Test for fracture energy (cracking potential)
  - Recover component asphalt to check aging

Disk-Shaped Compact Tension Test: DC(T)





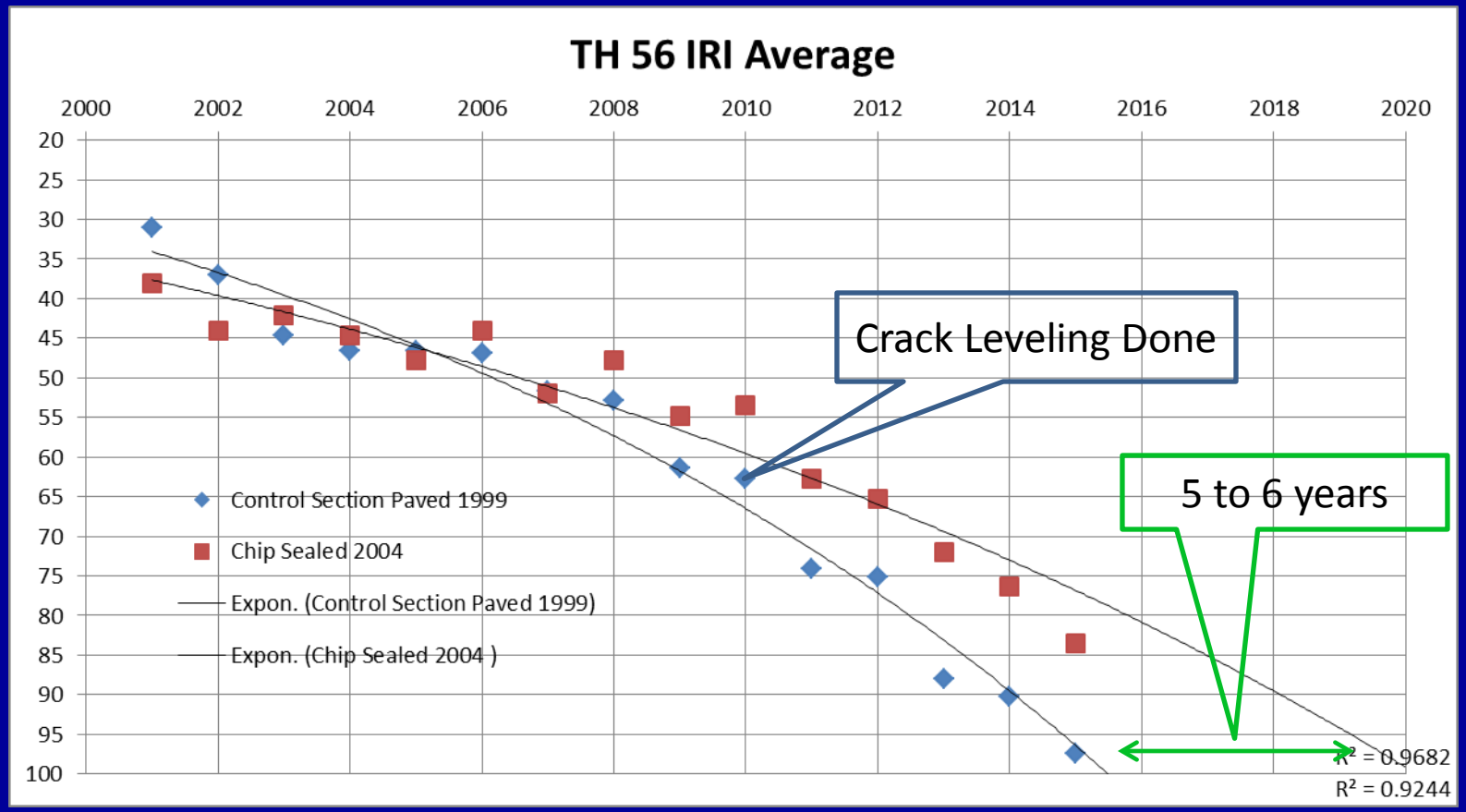
DC(T) Results: TH-56



Asphalt Institute's 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



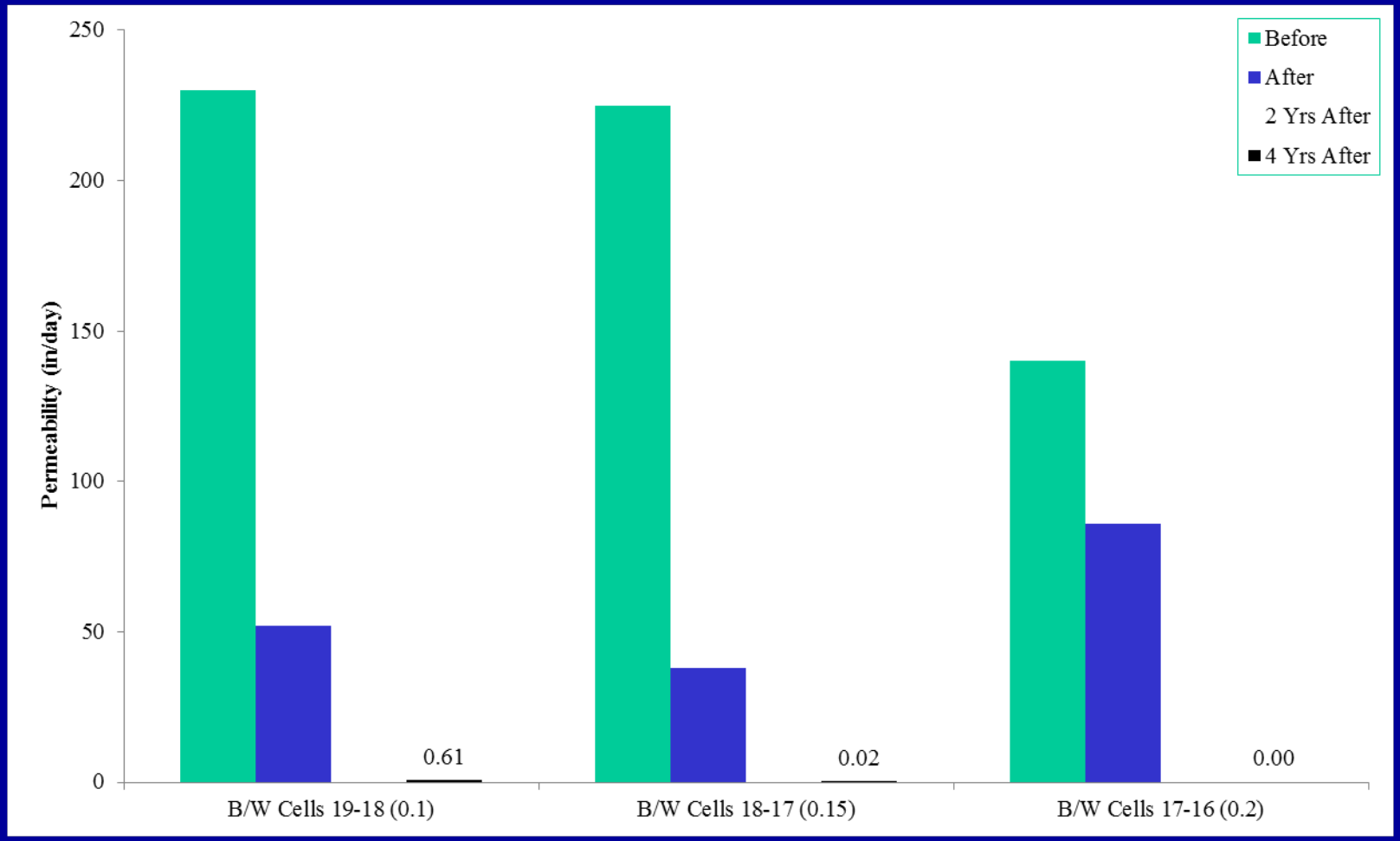
Control Section Never Chip Sealed

Last Section Chip Sealed 2004

Value of Fog Sealing

Why Fog Sealing Shoulders (Picture taken in 2009)

Fog Sealing still working after 4 years



Micro Milling with PP Treatments

Micro Milling with Pavement Preservation Treatments

- Why?
  - PM treatment normal have limited ride improvement
- What are the performance targets
  - Equal to 2 inch mill & over lay
  - Quicker than overlay
  - Less costly overlay

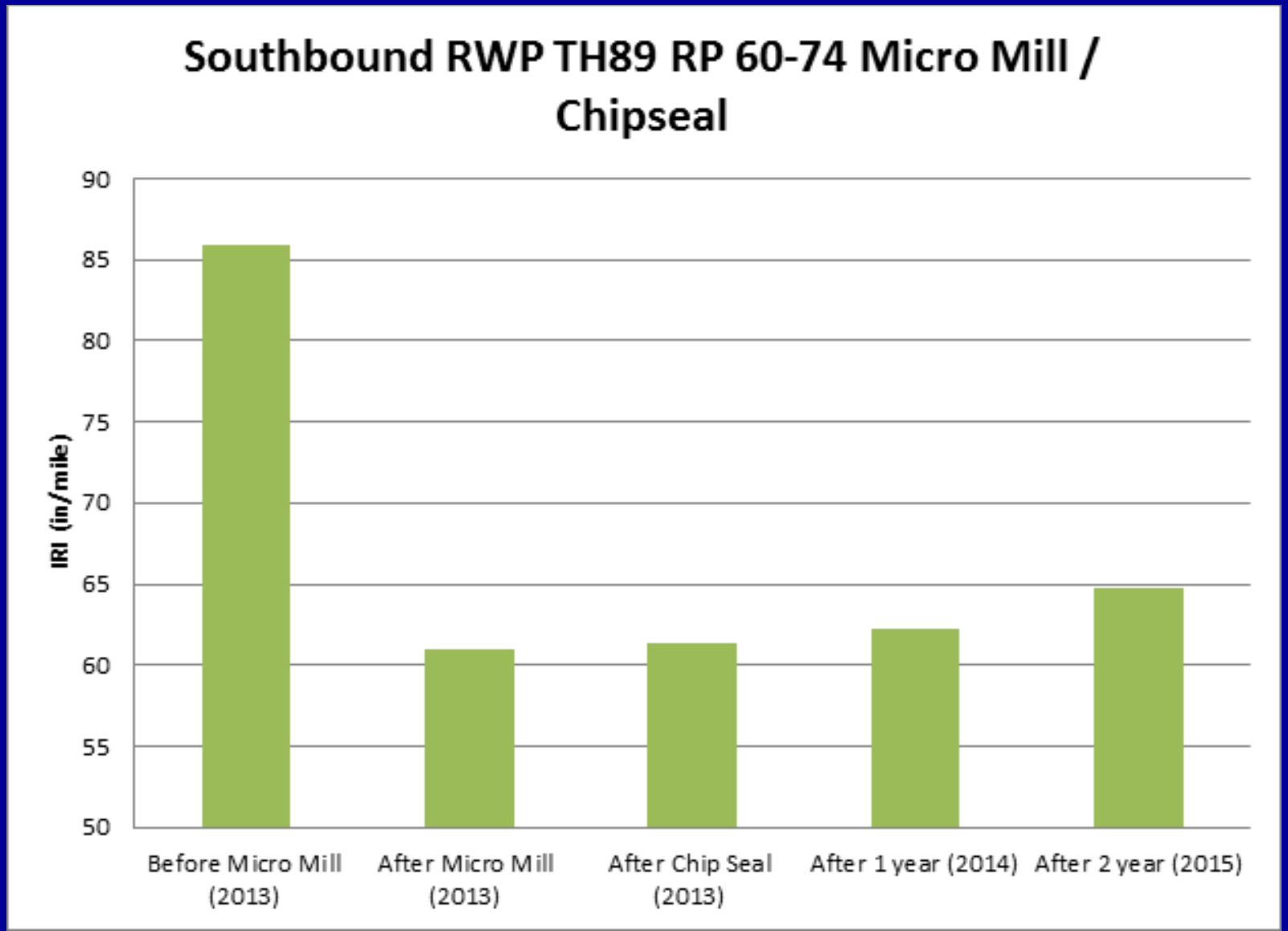
Micro Milling with Pavement Preservation Treatments

- Cost comparison
  - Chip seal 40% of the cost of 2 inch M & L
  - Micro Surfacing 60% cost of 2 inch M & L
  - UTBWC 90% cost of 2 inch M & L

Micro Milling

Micro Milling with Chip Seal

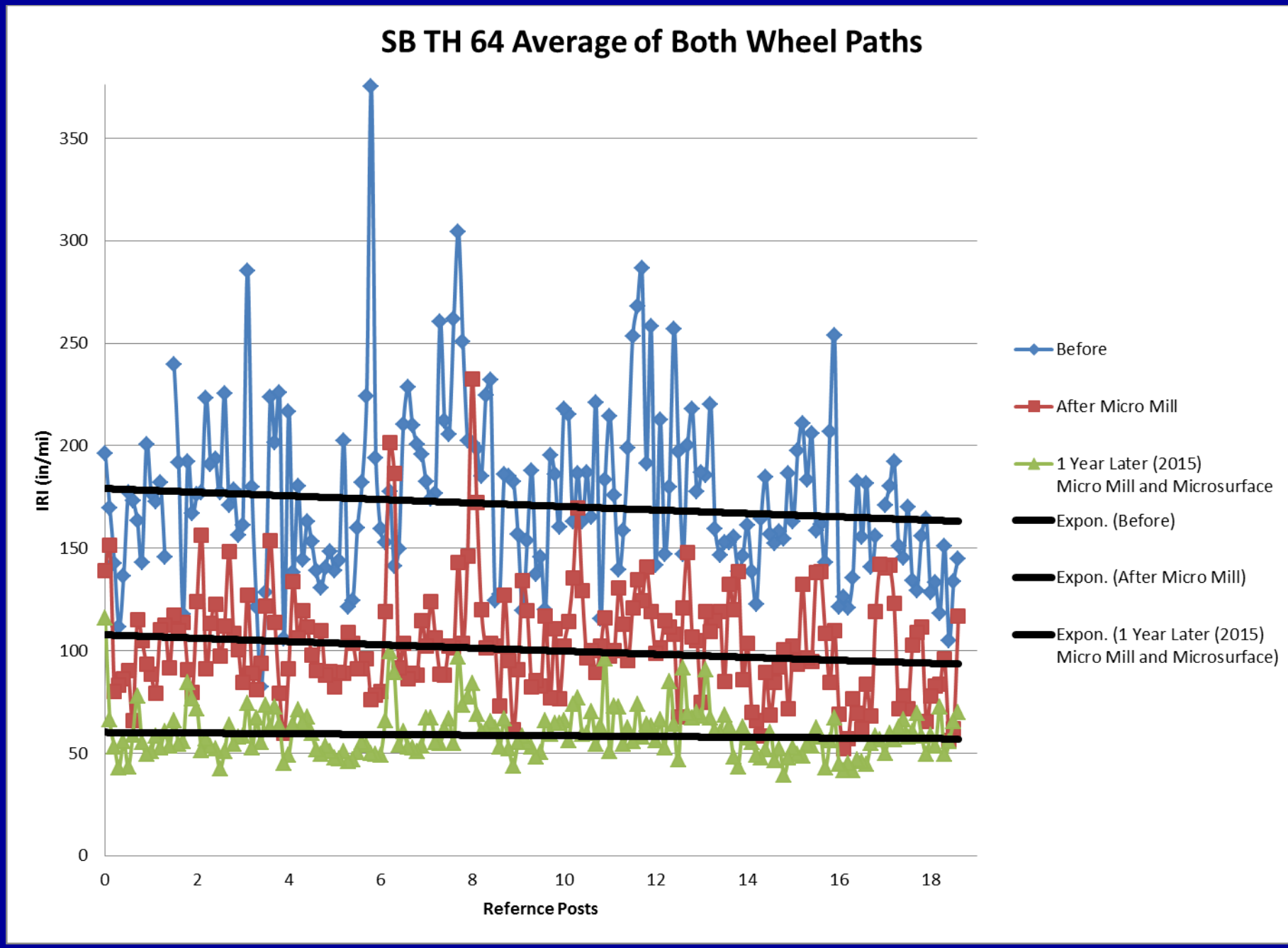
Results for Chip Seal



Micro Milling with Micro Surfacing

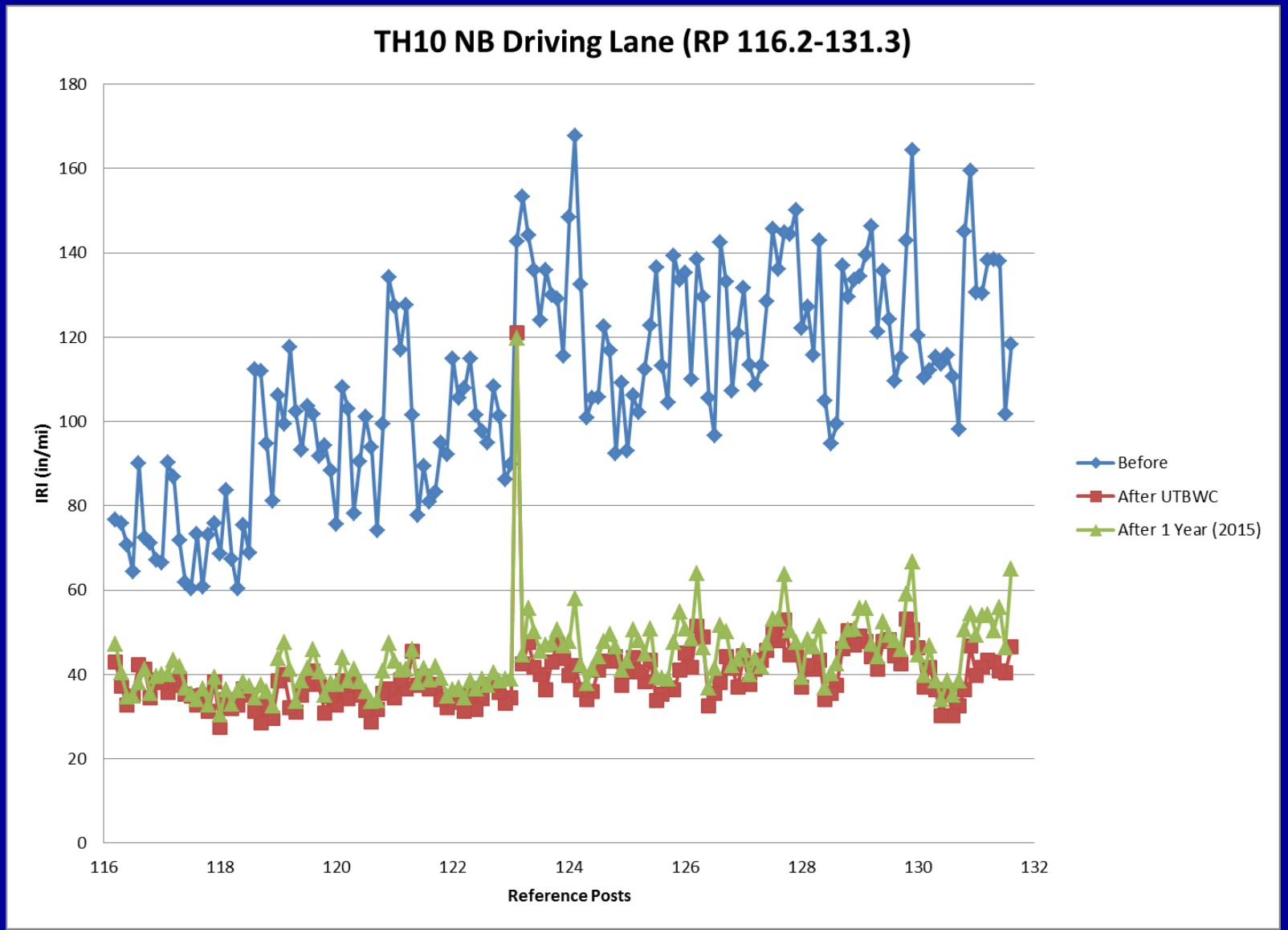

SLOW
SPEED LIMIT 55
09.09.2014 09:21

TH 64 Pre Condition


SB TH 64 Average of Both Wheel Paths
IRI (in/mi)
0
50
100
150
200
250
300
350
0
2
4
6
8
10
12
14
16
18
Refernce Posts
Before
After Micro Mill
1 Year Later (2015) Micro Mill and Microsurface
Expon. (Before)
Expon. (After Micro Mill)
Expon. (1 Year Later (2015) Micro Mill and Microsurface)

Current Condition

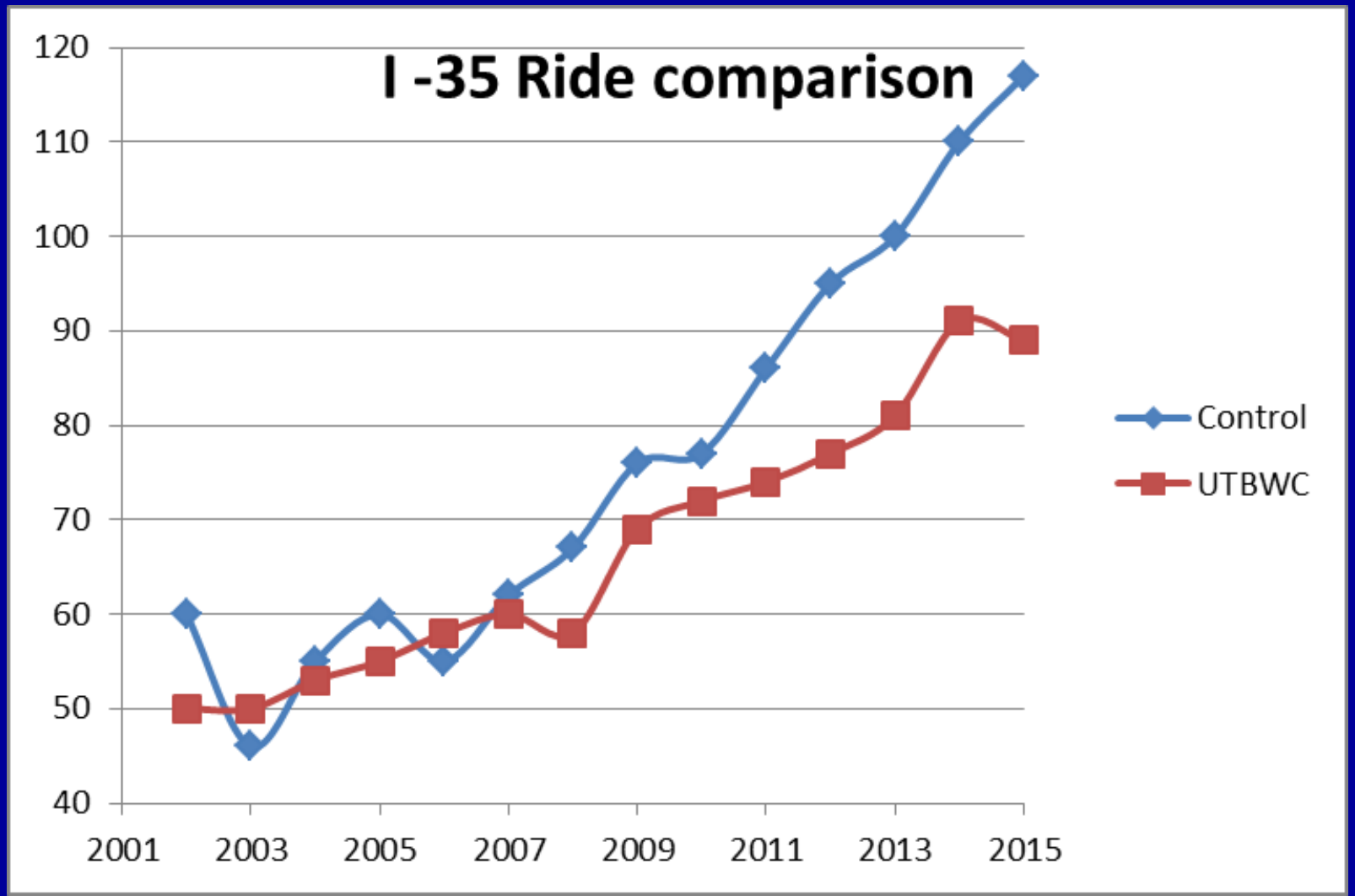
MM with UTBWC



UTBWC Performance As Wearing Course

- I-35
  - MP 18 to 12
- Paved 2001
- Old concrete pavement
  - Jointed 27’ panels
- Plan to overlay with 4.5 inches level 5 Super Pave
- Center 2 miles received ¾ inch of UTBWC also

UTBWC Performance



UTBWC

Control Section

Thin Lays HMA

- 4.75 mm mixture
- Placed ¾ inch or less
- MnDOT has limited experiences
- Will be building 5 test sections next summer as part of NCAT Partnership

Thin Lays HMA

- Will use different binders PG 58-28, PG 58-34, and high polymer loading
- 50% RAP
- 5% RAS
- Will use spray paver to apply all sections
- Will evaluate same as all other PP treatments in study

Goals of PP

- To maximize value of pavement
- To extend useful life of pavement
- To allow saving to be used to do right fix on pavement at end of their life
- To pay for expansion of system as needed
- To save the environment


Thank You!
STOP

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