

When is best time to do PM Does it Pay

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Agenda Items

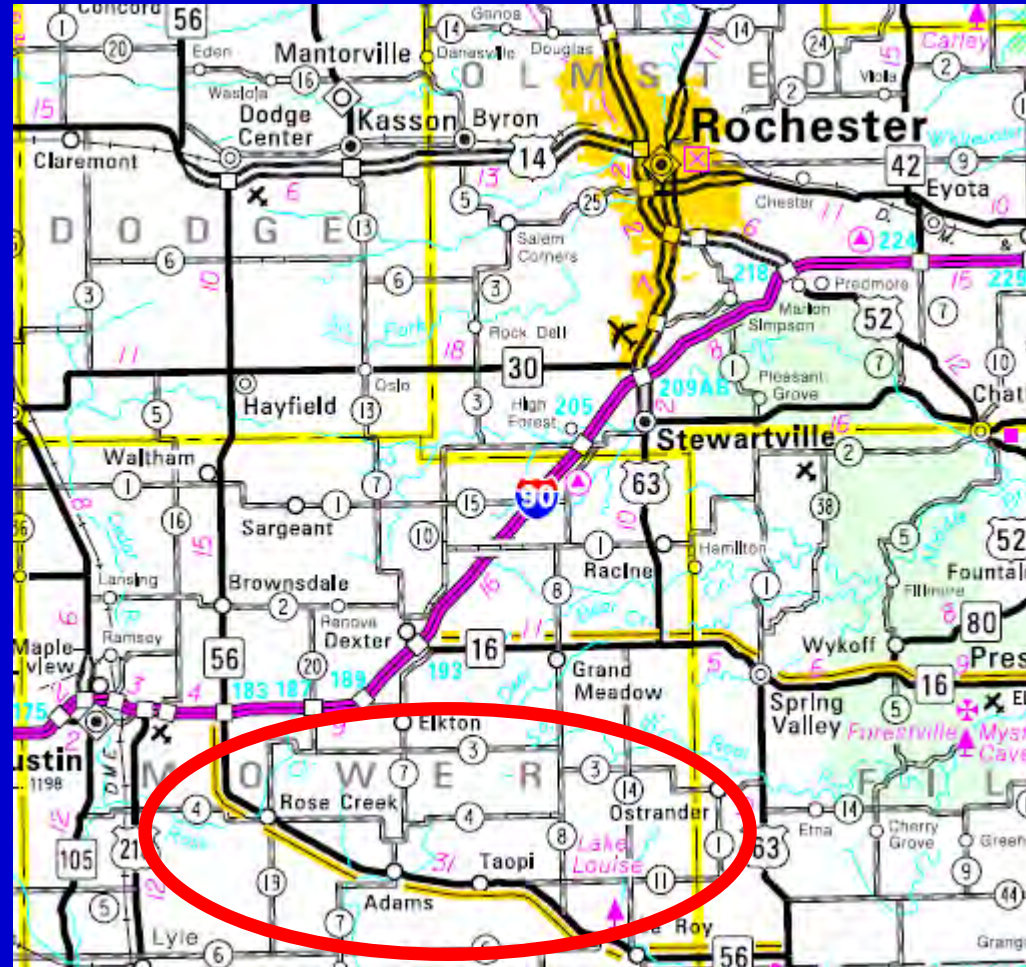
- Fracture Energy Finding
 - Optimal Timing of Preventive Maintenance for Addressing Environmental Aging in HMA Pavements (Pooled Fund Project)
 - Asphalt Institute
- TH 56 Aging Study
 - History
 - Performance

TPF-5(153) Research Objectives

- Primary Objective
 - to develop and validate technology that can be used by highway agencies to determine the proper timing of preventive maintenance in order to mitigate damage caused by asphalt aging

TH56 Test Sections

- TH56
 - two-lane rural highway with ADT of 2000 (reported at time of construction)
 - test sections located between I-90 and Leroy, MN



TH 56 Aging Test Site

What was Done & Why

- Built aging study
 - Because 15 years take 15 years
- Concurrent sections of roadway paved 4 years apart
 - CIR & Mill & Overlay
 - Chip seal 1 mile on each section a year starting in 2000
 - Last sections was chip seal 2004
 - Maintenance Chip Seal Project
- Wanted to see what effect PM has on aging
- When is best time

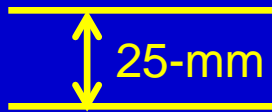
Mill & Overlay

- 3" mill and overlay 1999
- PG 58-28 binder
- Cored in 2011 for Asphalt Institute study

TH56 Test Sections Mill & Overlay

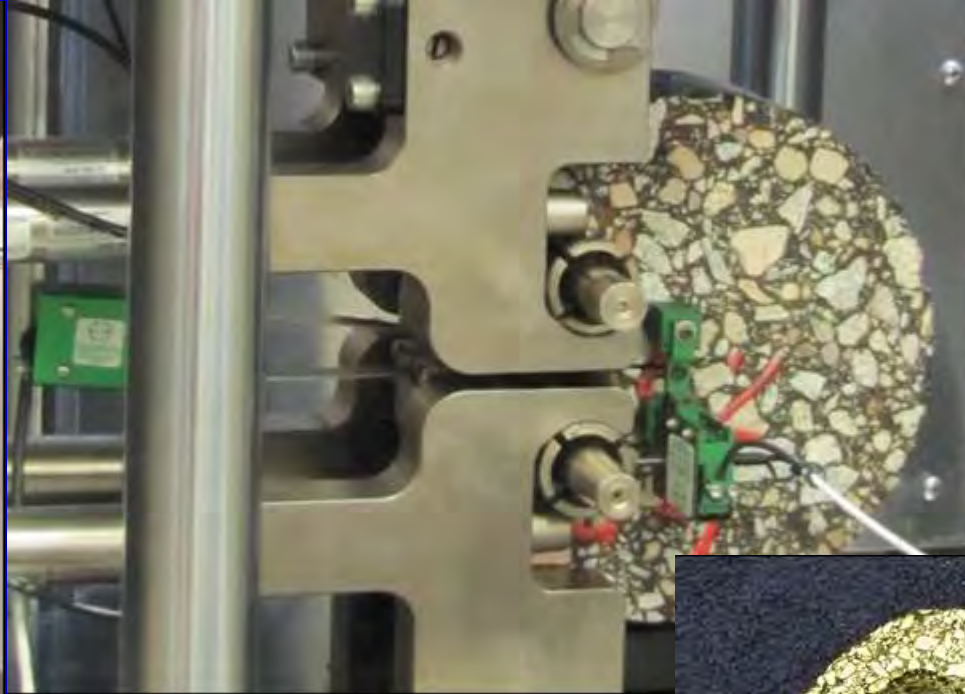
| MINNESOTA TH 56 SITE LAYOUT | | | | |
|------------------------------------|-----------------|-----------------|-----------------|-----------------------------|
| 14 TO 15 | 13 TO 14 | 12 TO 13 | 11 TO 12 | 10 TO 11 |
| 2000 | 2001 | 2002 | 2003 | CONTROL |
| 1 YEAR | 2 YEAR | 3 YEAR | 4 YEAR | Age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

TH56 Cores

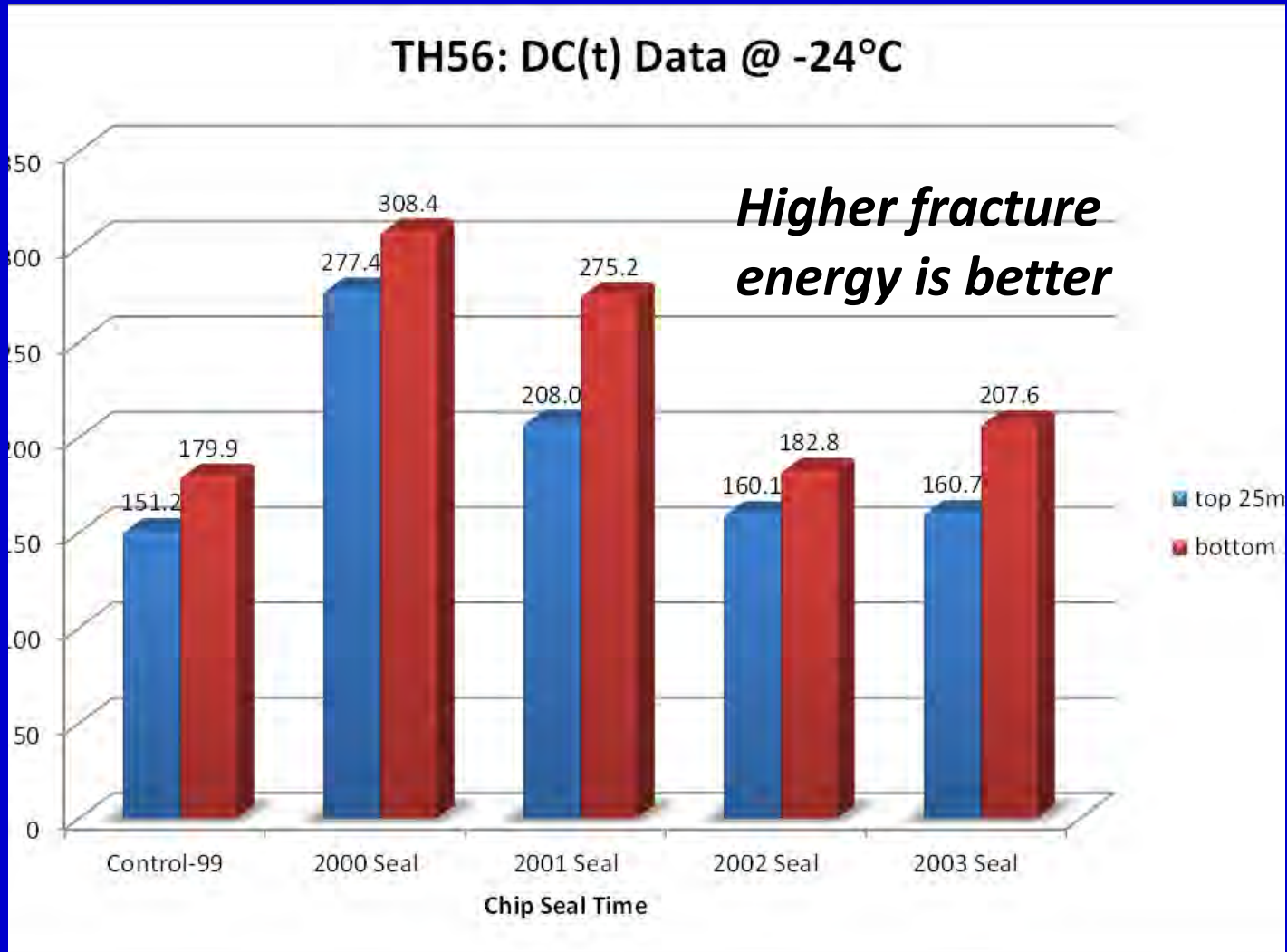


- Cores
 - Remove chip seal (if any)
 - Cut into two 25-mm layers
 - Test for fracture energy (cracking potential)
 - Recover component asphalt to check aging

Disk-Shaped Compact Tension Test: DC(T)



DC(T) Results: TH-56



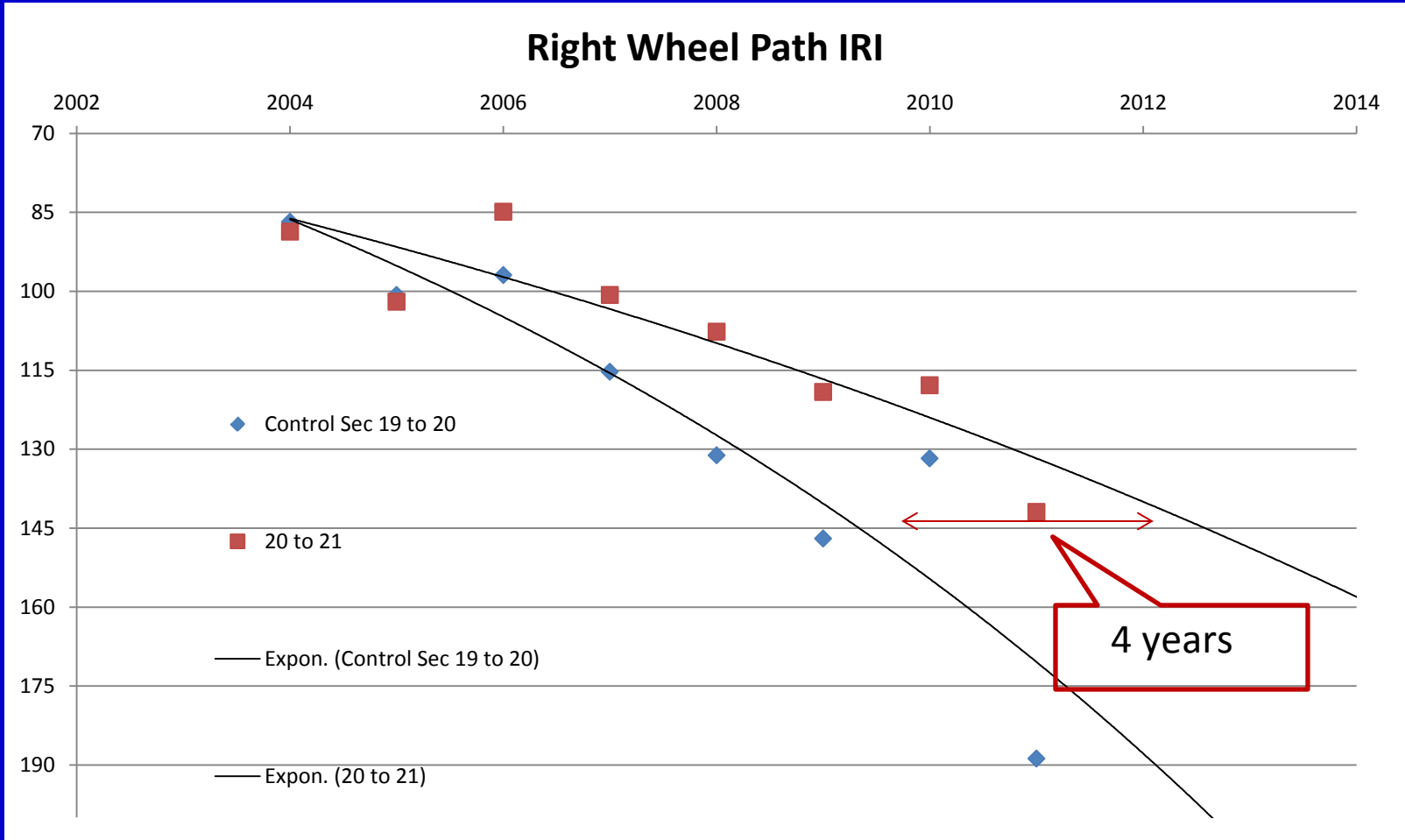
TH56 Findings

- 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)

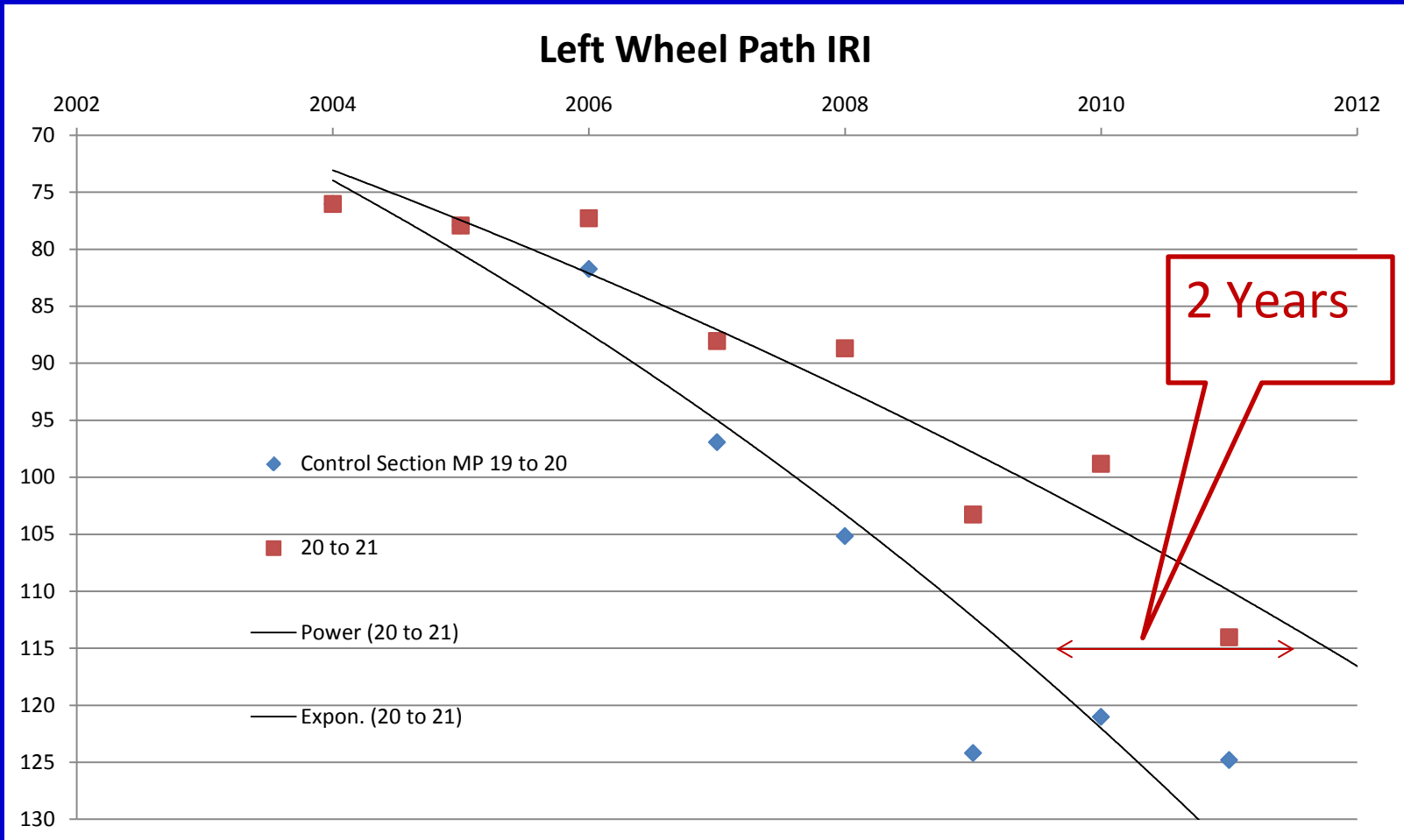
CIR & 3" Overlay

- Control Section & MP 20 to 21
- 1995 CIR 4.5" 3" overlaid 120/150 pen binder
- Saw & Seal 80'
- Transverse Cracks Slurry Leveled 2004
- MP 20 to 21 Chip Sealed 2004

1995 Paved Section



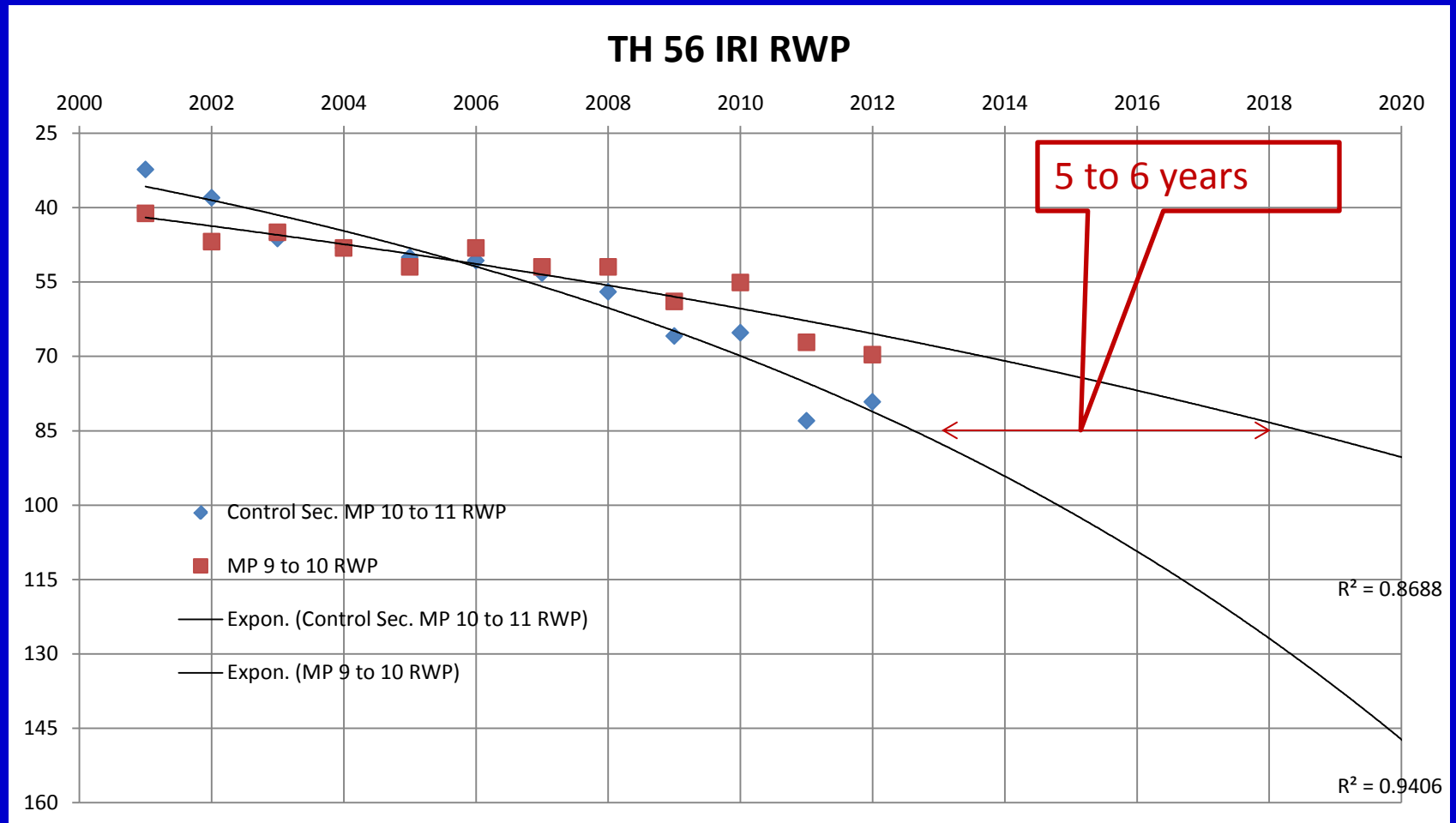
1995 Paved Section



Why?

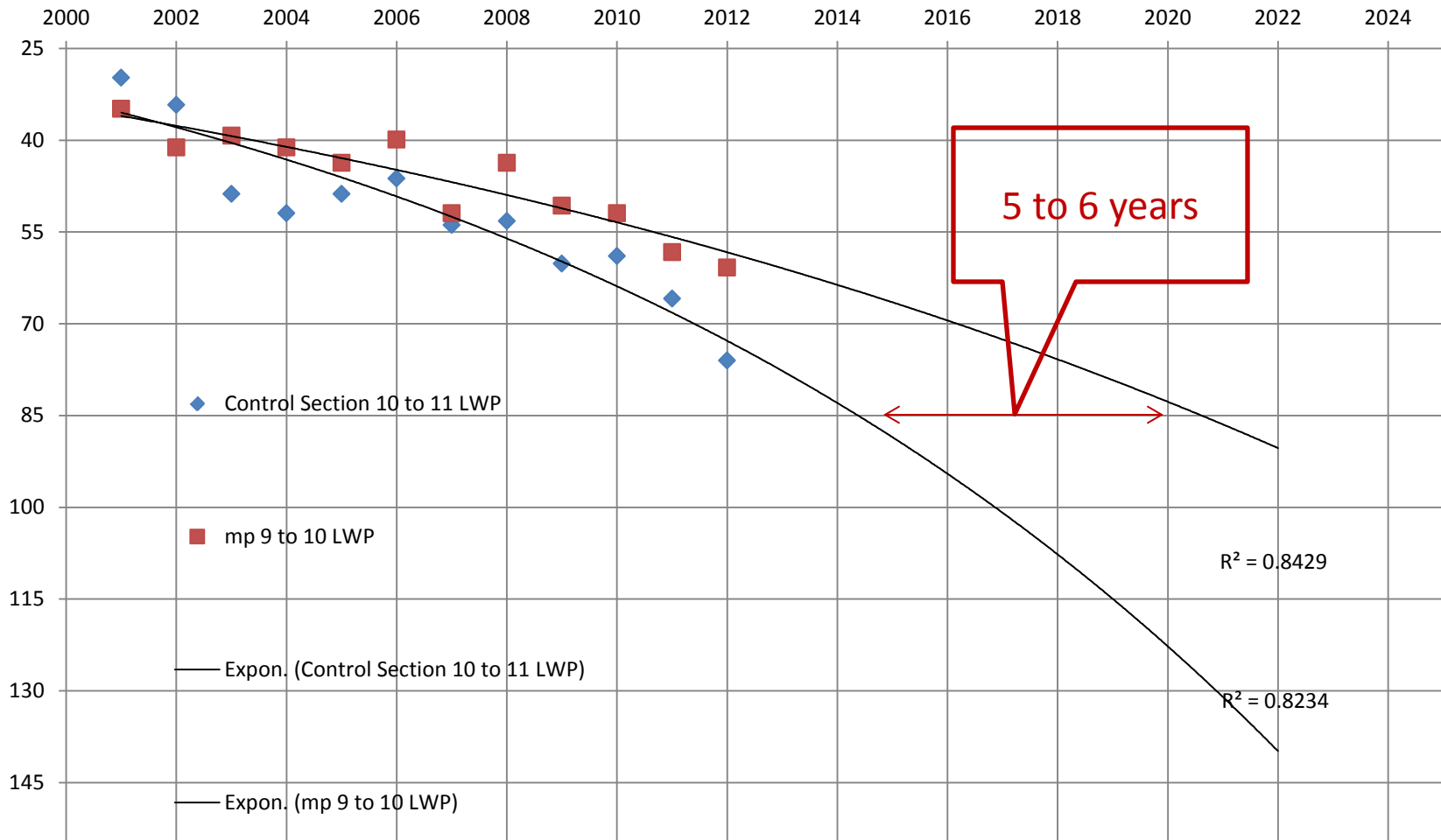
- Chip Seal applied 2004
 - 9 years after paving
 - Both section received patching & slurry leveling before chip sealing
- 2012 RQI for RWP of 2.0 for Control Section
 - 2011 was ribbon paved wheel paths
 - \$12,000 per mile
- 2012 RQI for RWP of 2.5 for MP 20 to 21
 - Not ribbon paved

1999 Paved Section



1999 Paved Section

IRI LWP TH 56



1999 Section Control Section MP 11 to 10



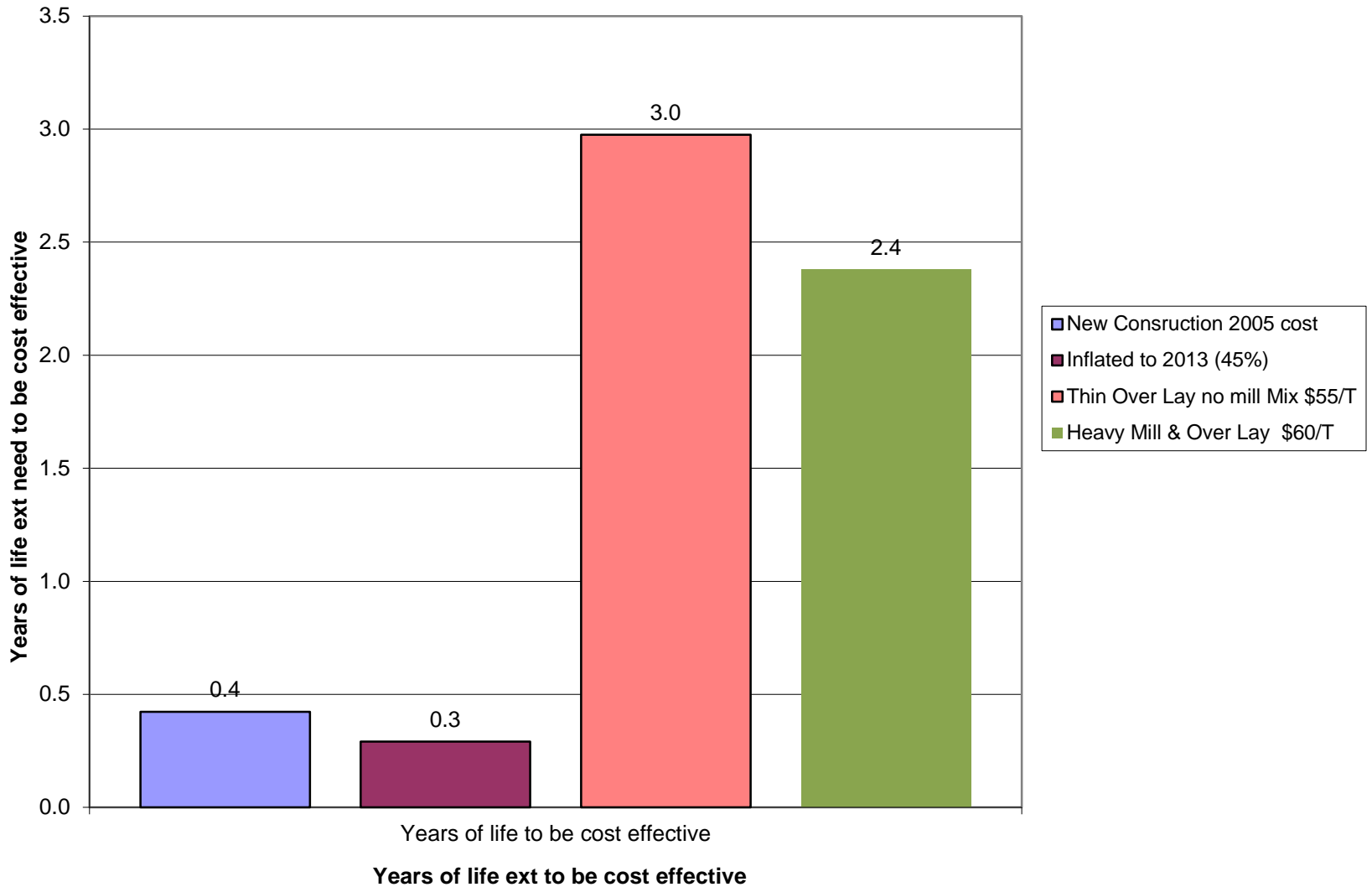
MP 10 to 9



History

- Control Section MP 10 to 11
 - RQI RWP 3.3
- MP 9 to 10
 - Chip Sealed 2004
 - 5 year old when chip sealed
 - RQI RWP 3.5

Years of Life Ext. Needed for Chip Seal to be Cost Effective.



Question?



Thank You

