Chip Seal

Best Practices

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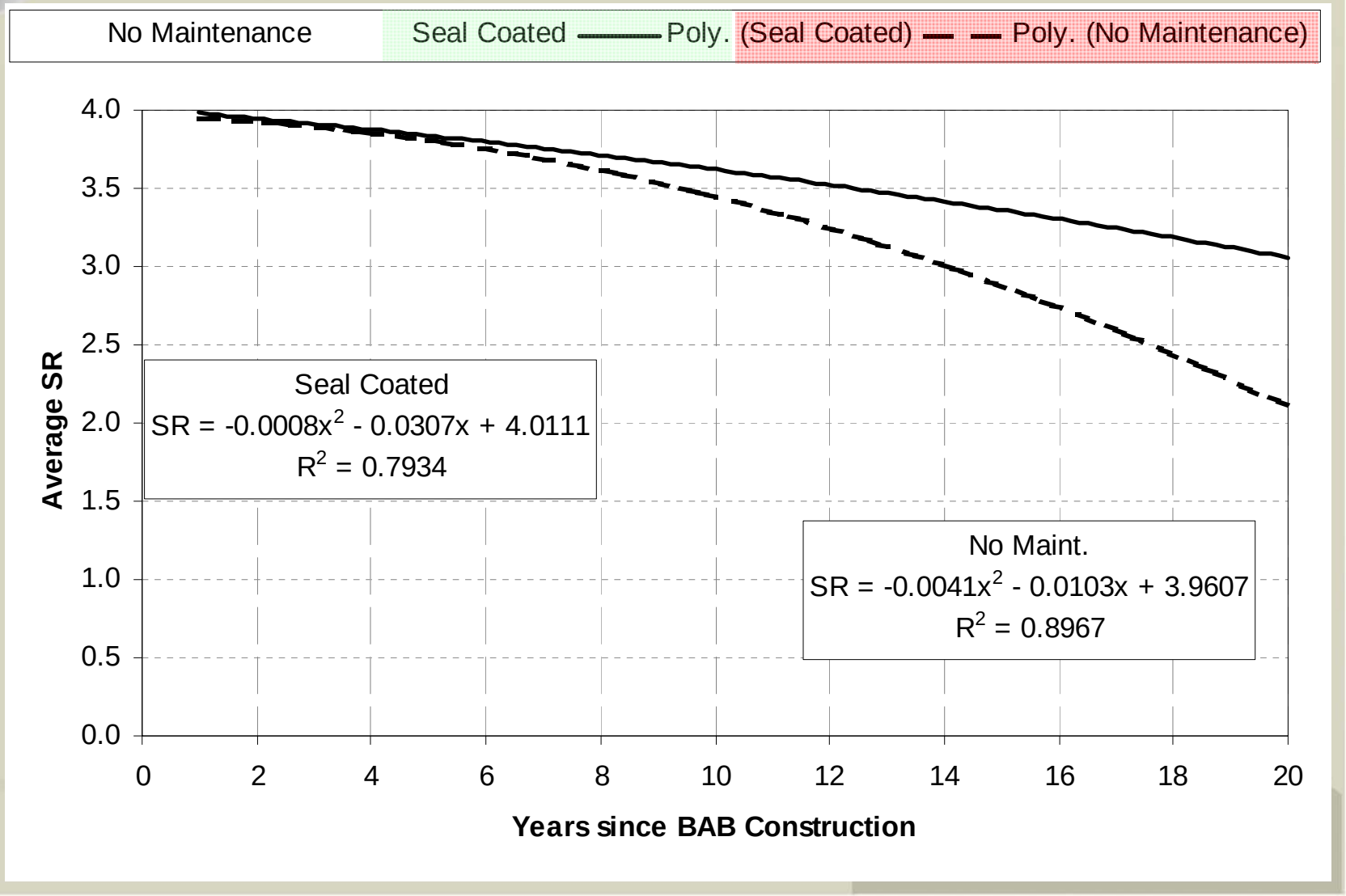
Pavement Preservation is needed because:

- **it keeps good pavements lasting longer**
- **it costs less than traditional approaches**
- **it is cost effective**
  - *anecdotal evidence*
  - *pavement management data*


No Maintenance
Seal Coated
Poly. (Seal Coated)
Poly. (No Maintenance)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Average SR
Seal Coated
SR = -0.0008x2 - 0.0307x + 4.0111
R2 = 0.7934
No Maint.
SR = -0.0041x2 - 0.0103x + 3.9607
R2 = 0.8967
0
2
4
6
8
10
12
14
16
18
20
Years since BAB Construction

Web Resources

Australia

- ✓ Roads and Traffic Authority (RTA, NSW)
  www.rta.nsw.gov.au
- ✓ Road Corporation (VicRoads, Victoria)
  www.vicroads.vic.gov.au

New Zealand

- ✓ Transit New Zealand (TNZ)
  www.transit.govt.nz

Web Resources

United States

- ✓ National Center for Pavement Preservation
  www.pavementpreservation.org
- ✓ Minnesota DOT
  www.dot.state.mn.us
- ✓ Texas DOT
  www.dot.state.tx.us

Introduction

Chapter 1

Chip Seal - 5 months old

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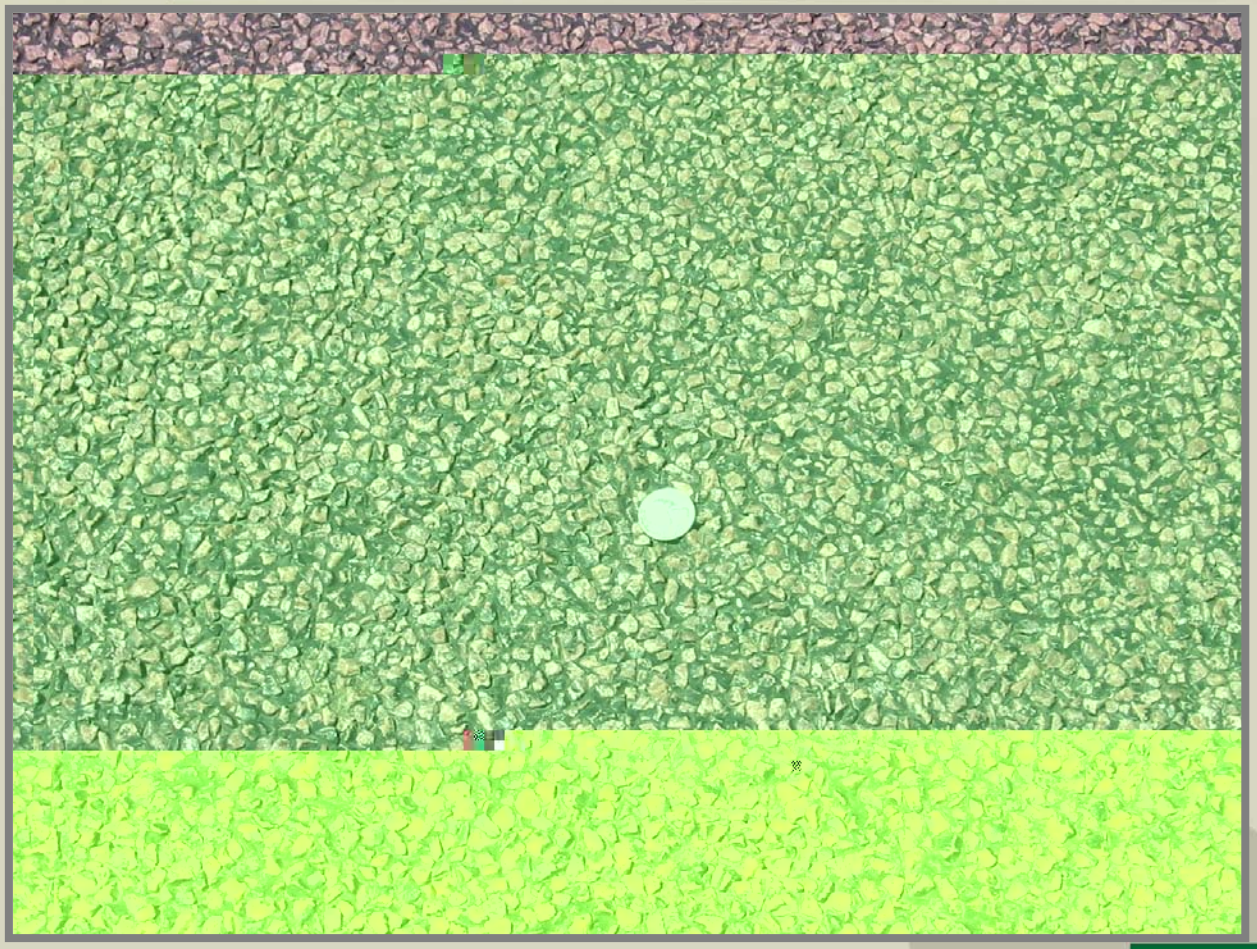
Chip Seal – 2 years old

Chip Seal – 2 years old



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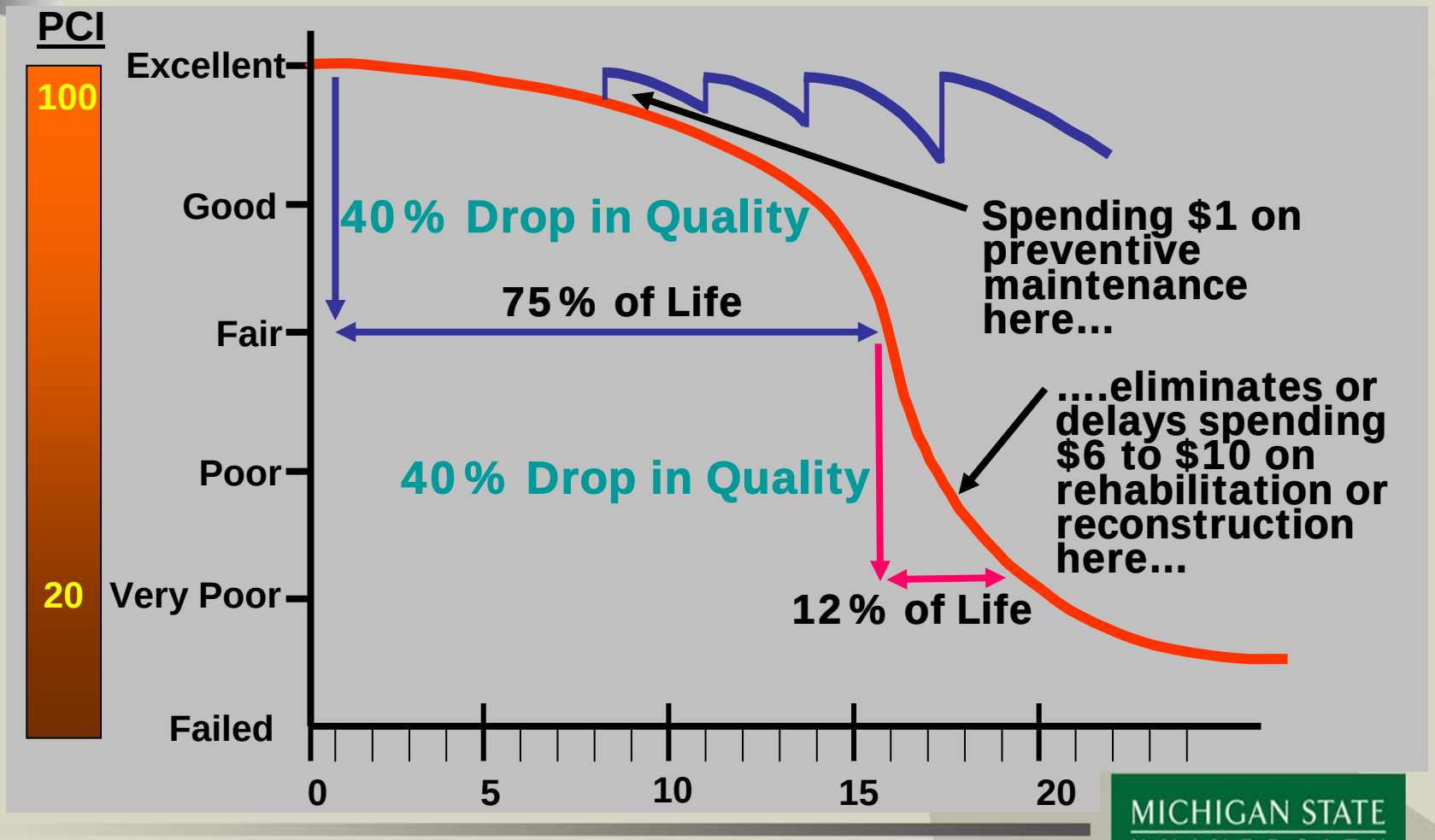
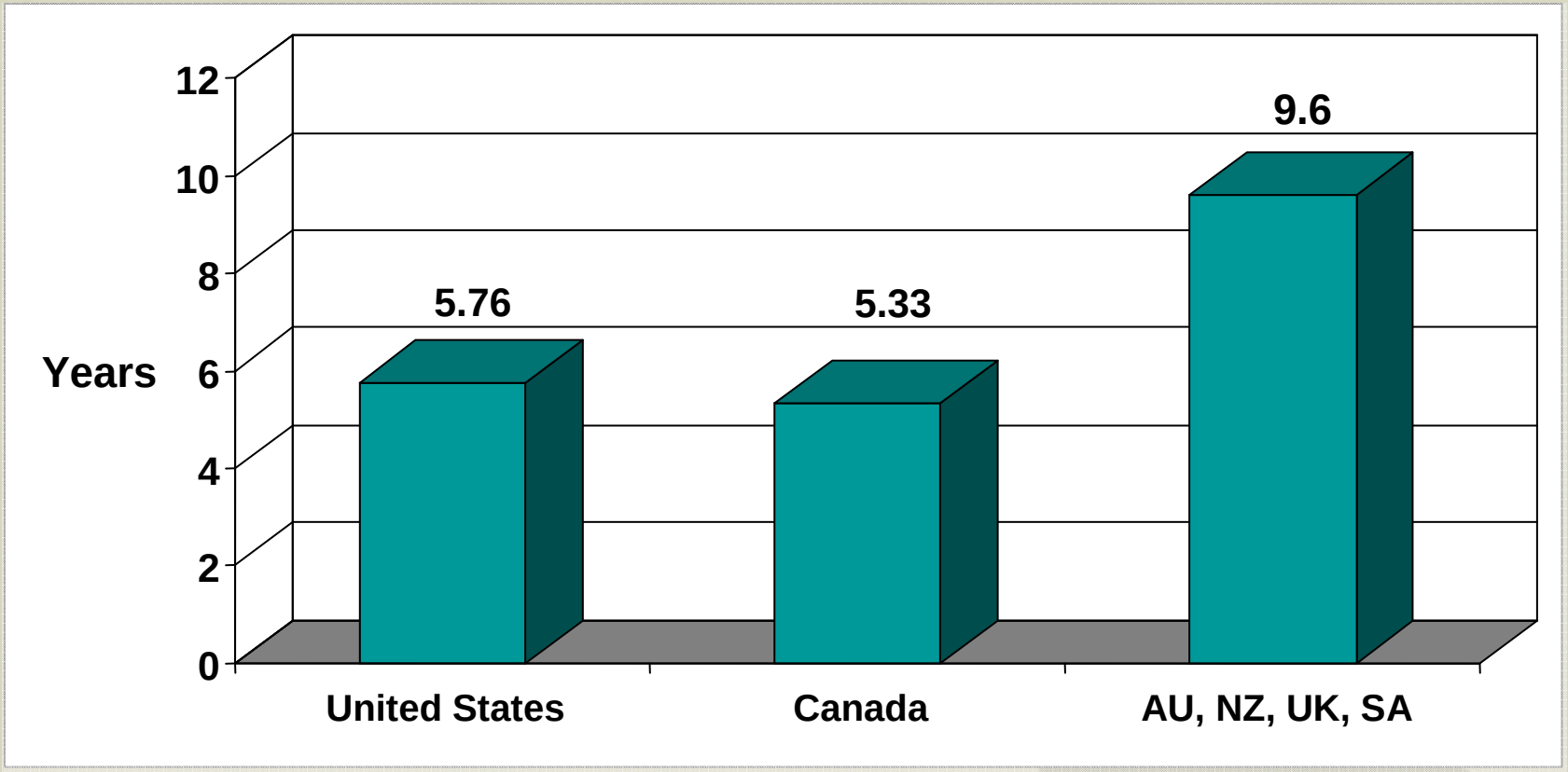
Preventive Maintenance Concept



Chip Seals - Development

- ✓ Date from the 1920's
- ✓ Originally designed as wearing courses for low volume gravel roads
- ✓ Evolved into maintenance treatments for low and high volume roads
- ✓ Protect asphalt layer from damage
- ✓ Skid resistant surface

Chip Seal Service Life



Pavement Preservation

Definition:

"A program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations."

Source: FHWA Pavement Preservation Expert Task Group

Chip Seal Advantages

- ✓ Cost Effective Treatments
- ✓ Good Durability
- ✓ Ease of Construction
- ✓ Improved Skid Resistance

Chip Seal Disadvantages

- ✓ Cure Time
- ✓ Flying Chips
- ✓ Noise Considerations
- ✓ Weather Consideration
- ✓ Performance
- ✓ Ride Quality (will not improve)

Chip Seal Limitations

- ✓ Adding Structural Capacity
- ✓ Unsuitable for Bad Roads

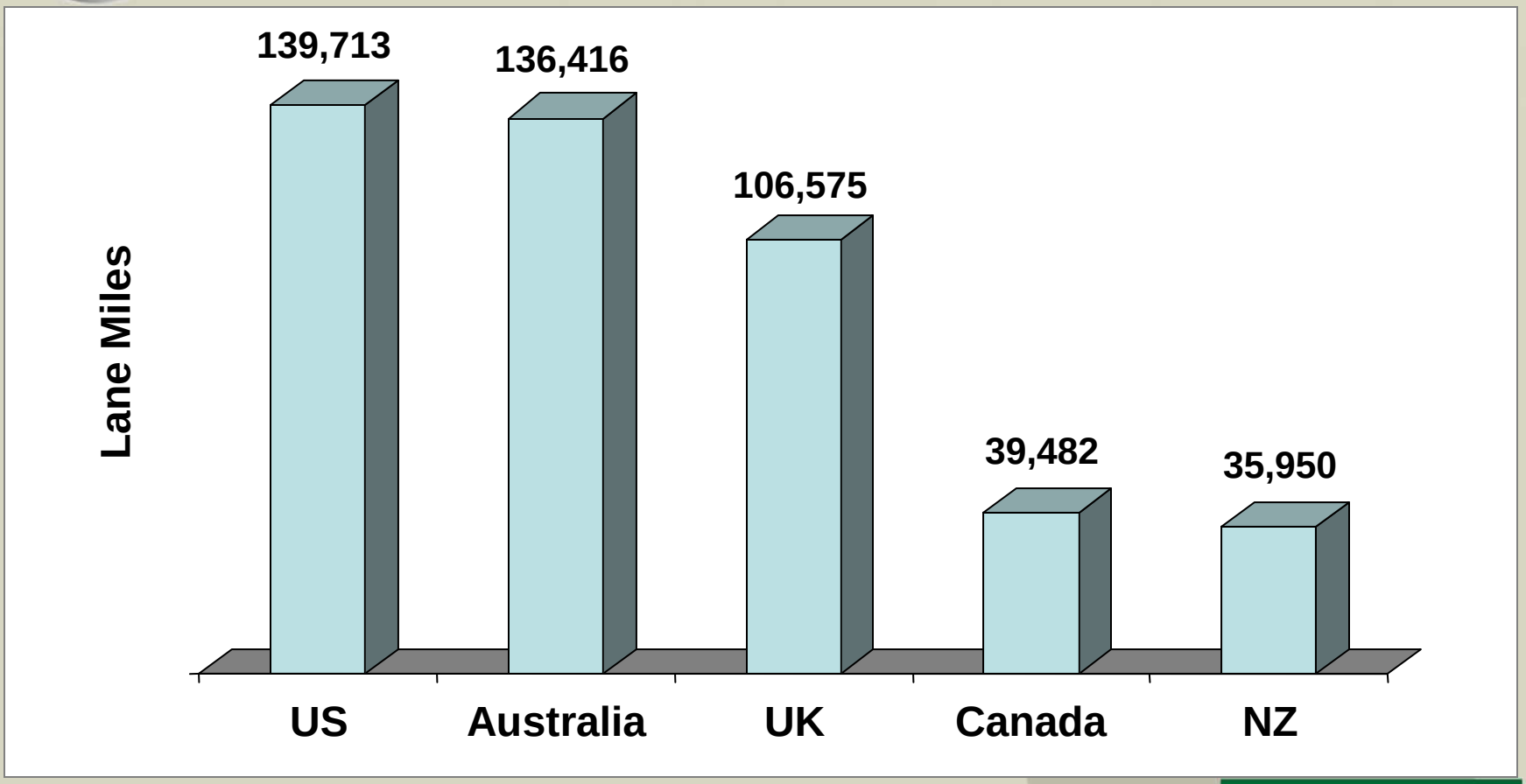
NCHRP User Survey

- ✓ Conducted 2003-2004
- ✓ Review of Best Practices
- ✓ State, Federal, and Local Agencies [54]
- ✓ Internationally: Canada, Europe, Africa, Pacific Nations [22]

NCHRP Findings

- ✓ Overseas experience much different than North America experience
- ✓ Rely on emulsion binders in the U.S.
- ✓ Climate most critical
- ✓ Emulsions better in hot weather and asphalt cement better in cool weather
- ✓ Aggregate choice and transportation costs
- ✓ Electrostatic compatibility of aggregates and binders

Where are Chip Seals Used?



Art or Science?

Art	•Variable Conditions •Judgmental Adjustments •Experienced Personnel •Variable Results
Science	•Uniform Conditions •Few Adjustments •Flexible Personnel •Predictable Results

Differing Philosophies

North America	Overseas
✓ Distress ✓ Prevention of water infiltration	✓ Low skid numbers ✓ Need for wearing surface

Evolution of Chip Seals

Characteristic	North America	Overseas
Philosophy	Art	Science
Agency Realm	Maintenance	Construction
Forces	In-House	Contractor
Design	Recipe	Engineering Principles
Risk	Agency	Contractor
Pavement Selection	Variable	Textured (Sand Circle)
Surface Hardness	No	Yes
Outcome	Uncertain	Predictable

Chip Seal Terminology

- ✓ Flushing, bleeding, raveling, shelling?
- ✓ Variations between regions, within agencies, and from practitioner to practitioner.
- ✓ Terminology variations impact decision making, evaluation, and corrective actions.

Flushing!

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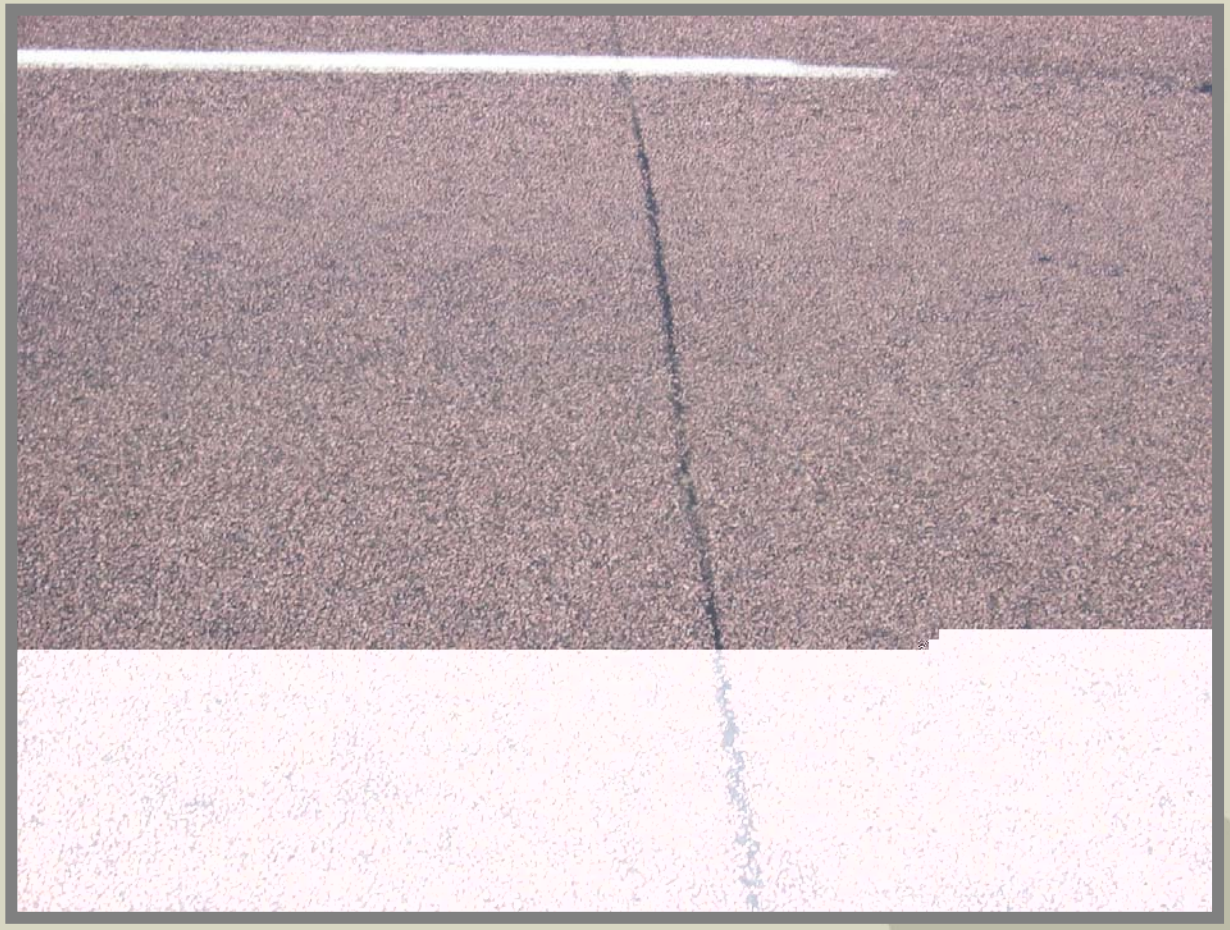
Shelling/Raveling!

Proper Embedment!



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Questions?

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