Longitudinal Joint Seal

Development & Implementation

Ohio Asphalt Paving Conference

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Illinois Department of Transportation

HMA Quiz

1. What is the leading HMA distress driving pavement rehabilitation in Illinois?
   a. Loss of Friction
   b. Wheel Path Rutting
   c. Raveling
   d. Premature Cracking
   e. Raveling & Cracking at the Centerline Joint


DAMON'S


CREST MOTOR SALES
RPM
CAR COMPANY
MICHELIN
SPEED
LIMIT
40

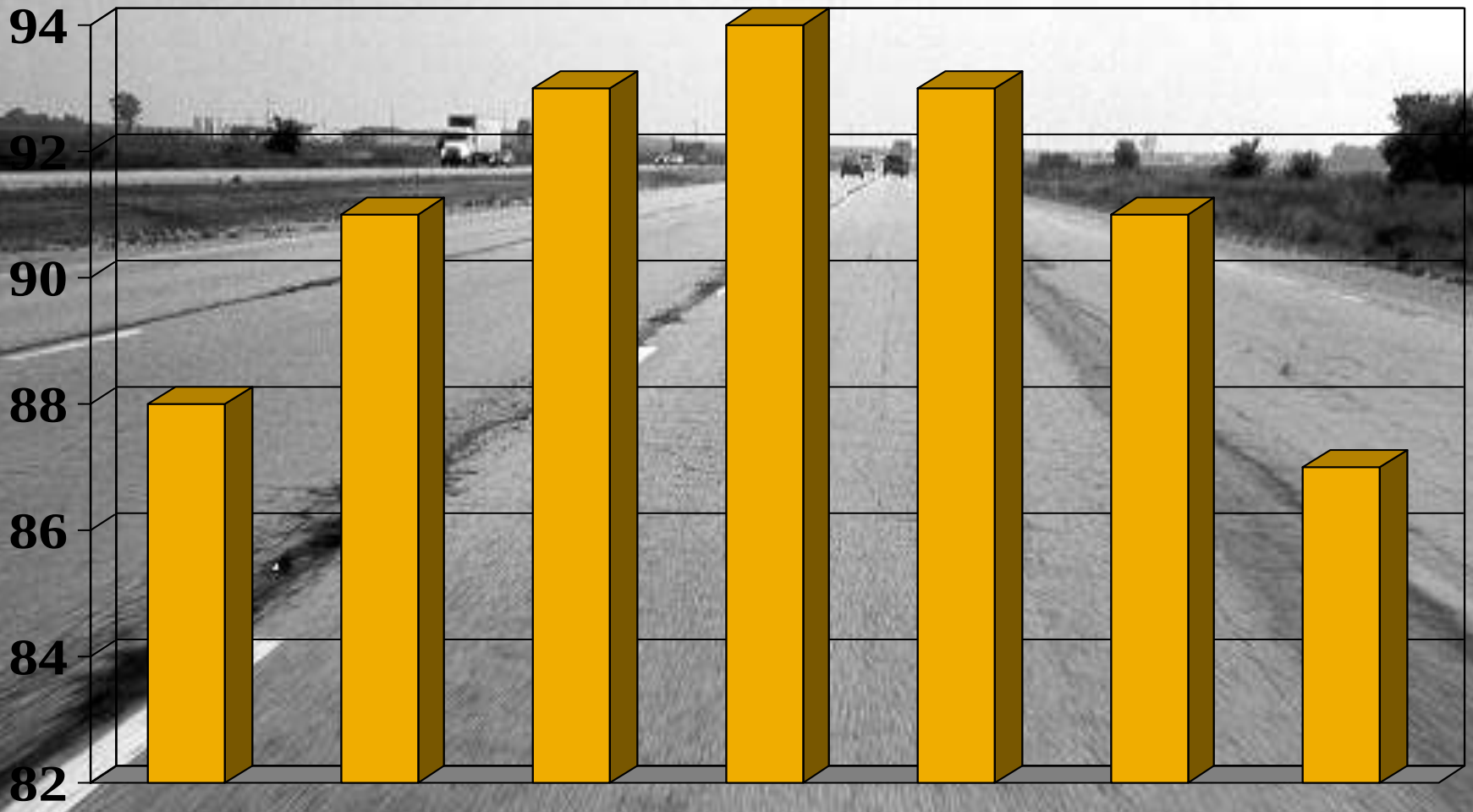

110


fex

Answer

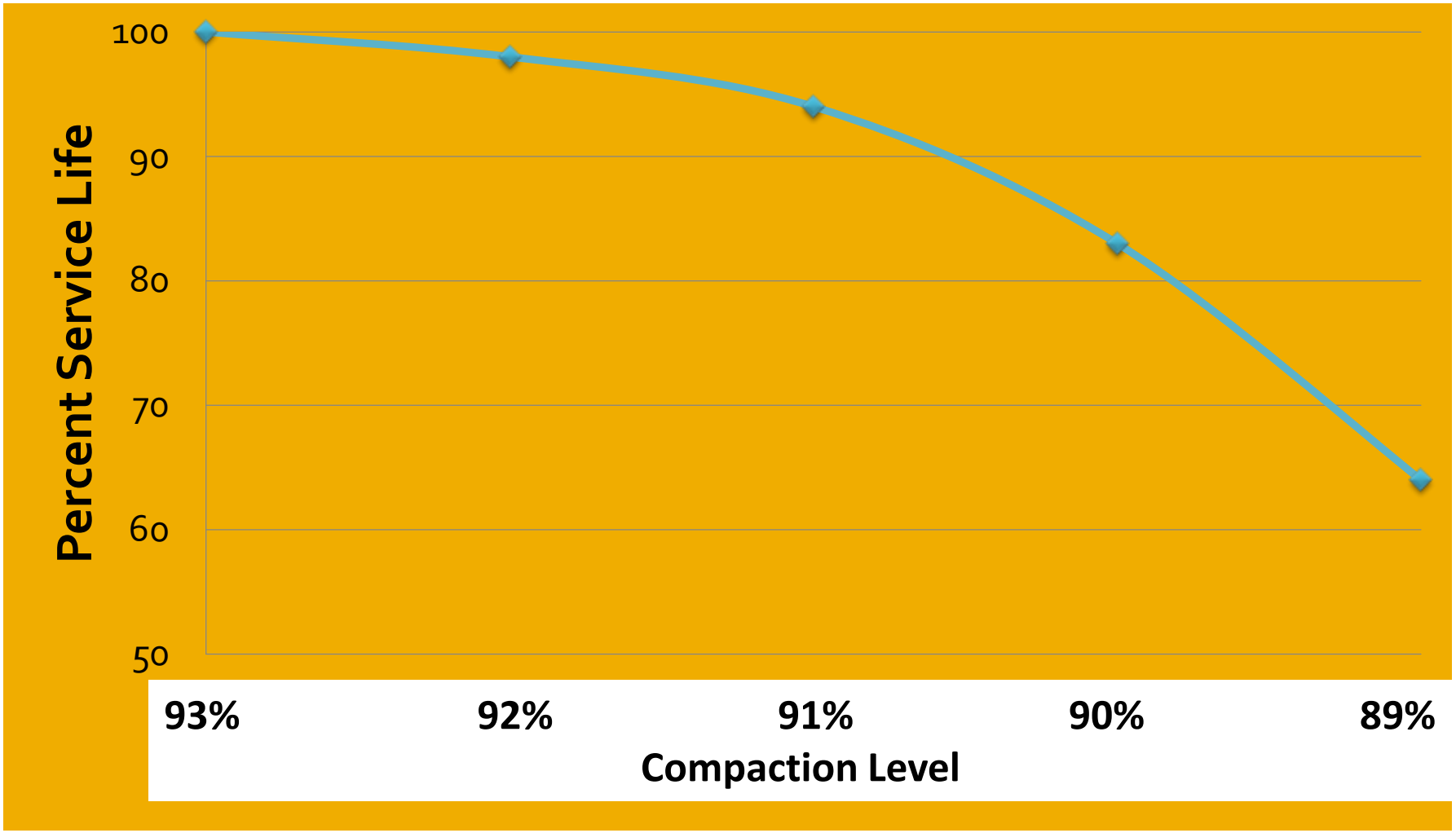
1. What is the leading HMA distress driving pavement rehabilitation?
   a. Loss of Friction
   b. Wheel Path Rutting
   c. Raveling
   d. Premature Cracking
   e. Raveling & Cracking at the Centerline Joint

Why the Poor Performance?



Effect of In-Place Voids on Life

Washington State DOT Study




How many years?

How many years?

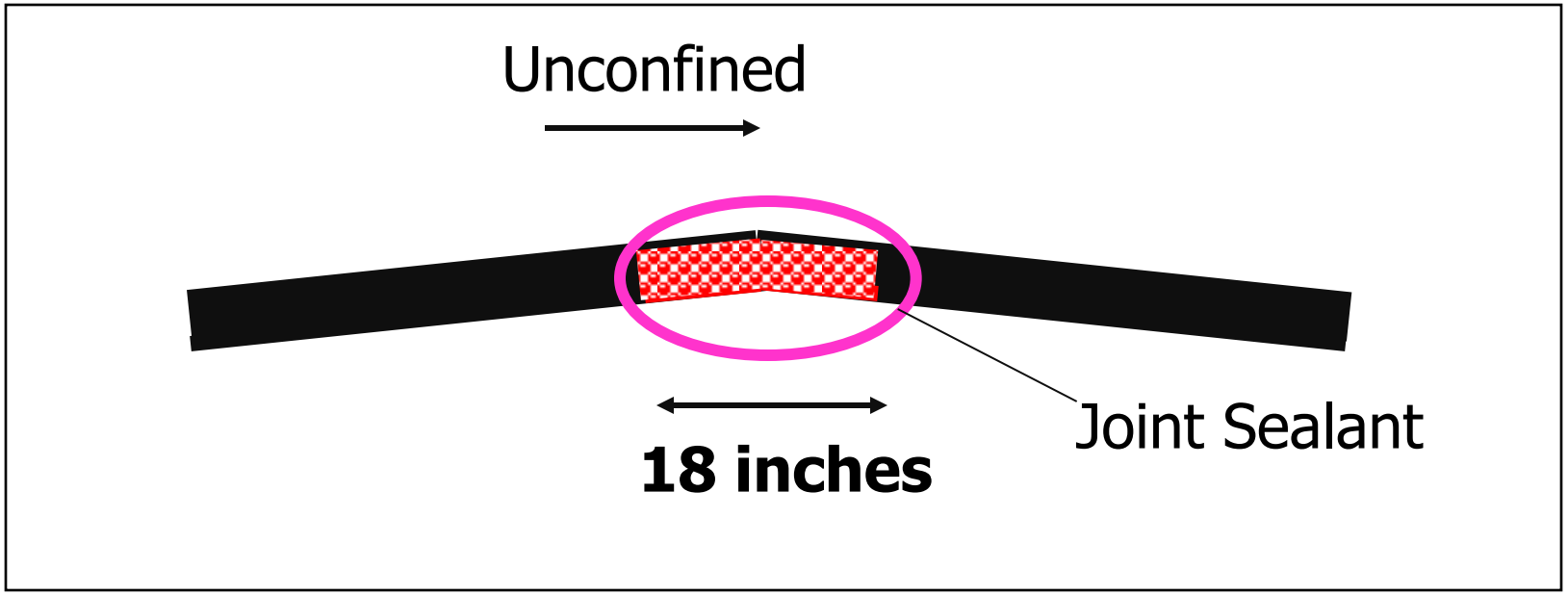
Maintenance - Disruptive and Dangerous

Efforts to Minimize Permeability along Longitudinal Joints

- 2001/2002 Longitudinal Joint Sealants
  - IDOT worked w/ 2 companies to Develop a Longitudinal Joint Sealant (LJS)
  - LJS is a Band of Asphalt Binder that Seals a lift of HMA from the Bottom Up.
  - Here is How it Works:

Joint Sealant Concept

- Band melts up into the joint thus:
  - Increasing density
  - Decreasing permeability
  - Increasing joint life

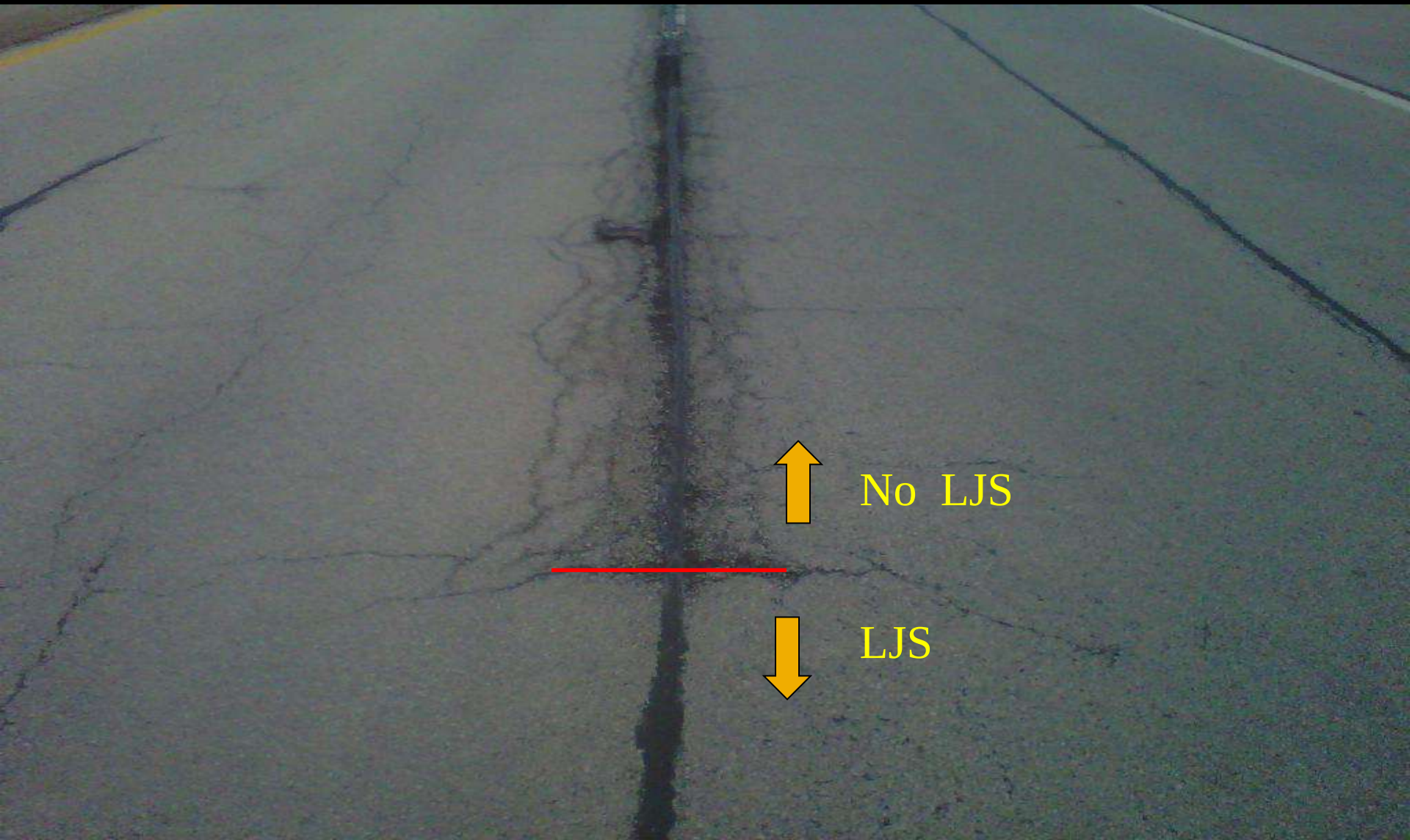


Asphalt Materials/Hendy Quickseam

Longitudinal Joint Seal

Longitudinal Joint Seal 12 Yrs Later

Longitudinal Joint Seal 12 Yrs Later




Shear Tears

Heavy Duty Pressure Distributor for Applying LJS

Heavy Duty Pressure Distributor for Applying LJS

Five Minutes After Placement

Paving over LJS

Licensed Subcontractor ≈ 11 Trucks

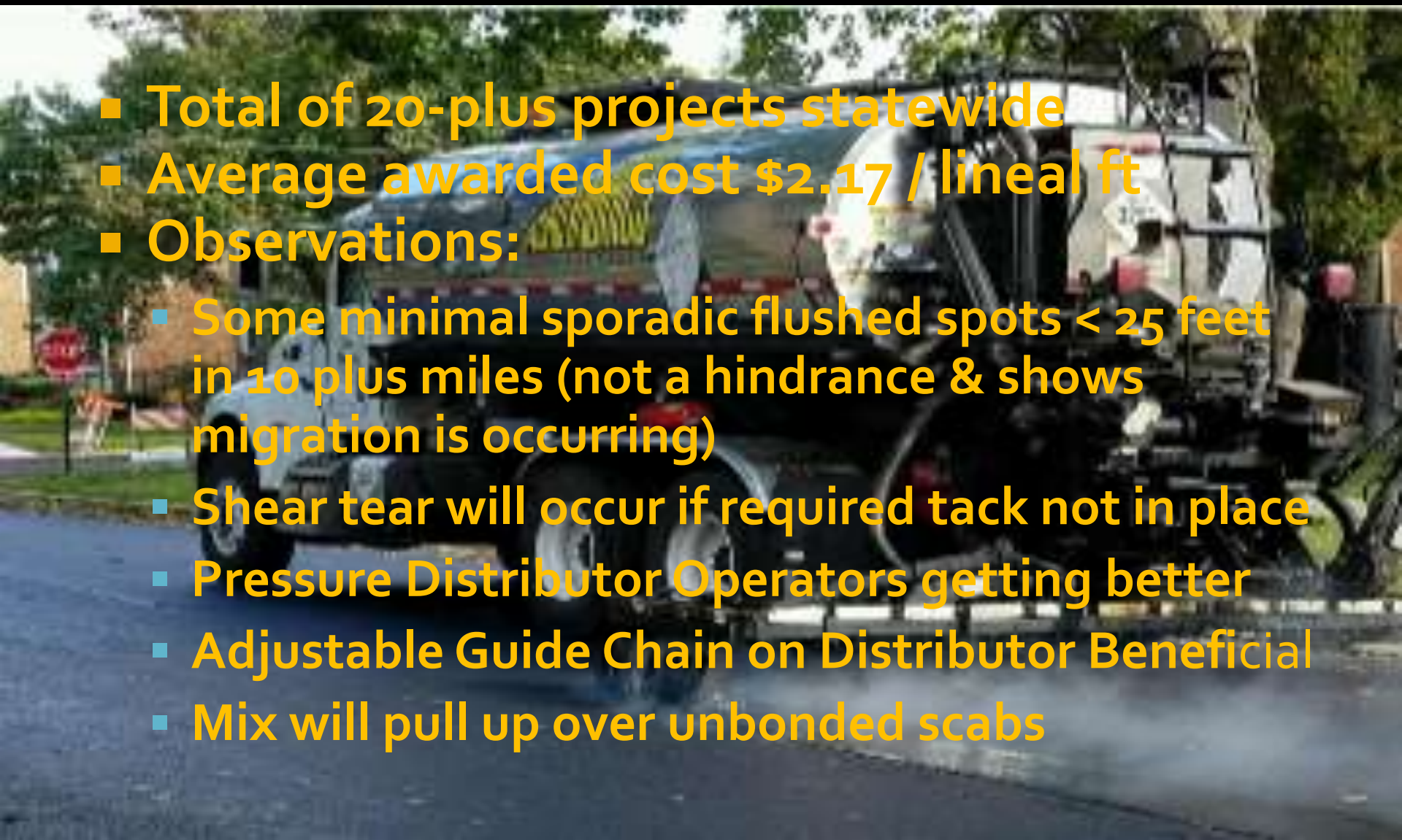
LJS Material Spec

Test	Test Requirement	Test Method
Dynamic shear @ 88°C (unaged), G*/sin δ, kPa	1.00 min.	AASHTO T 315
Creep stiffness @ -18°C (unaged), Stiffness (S), MPa m-value	300 max. 0.300 min.	AASHTO T 313
Ash, %	1.0 - 4.0	AASHTO T 111
Elastic Recovery, 100 mm elongation, cut immediately, 25°C, %	65min.	ASTM D 6084 (Procedure A)
Separation of Polymer, Difference in °C of the softening point (ring and ball)	3 max.	ITP Separation of Polymer from Asphalt Binder”

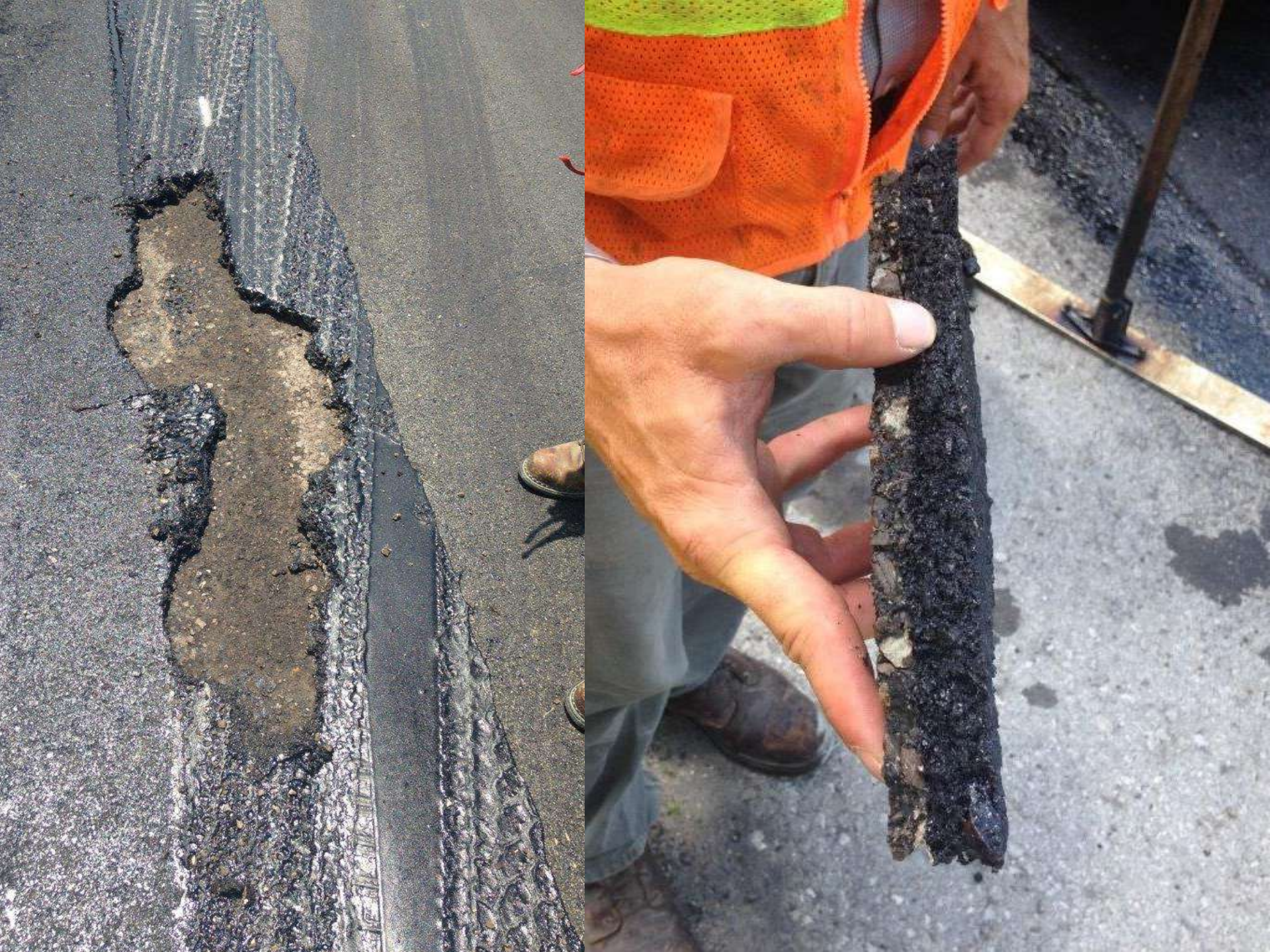
Longitudinal Joint Spec

- Implementation Goals:
  - 2016 – 2 Projects per District
  - 2017 – 50% of Projects per District
  - 2018 – Full Implementation

2016 - LJS Projects



- Total of 20-plus projects statewide
- Average awarded cost $2.17 / lineal ft
- Observations:
  - Some minimal sporadic flushed spots < 25 feet in 10 plus miles (not a hindrance & shows migration is occurring)
  - Shear tear will occur if required tack not in place
  - Pressure Distributor Operators getting better
  - Adjustable Guide Chain on Distributor Beneficial
  - Mix will pull up over unbonded scabs



Cost Comparison

- Inlay: $8.00 / lineal ft
  - Includes: traffic control, mobilization, milling, priming, paving, pavement marking

Cost Comparison

- Microsurfacing: $4.81 / lineal ft
  - Includes: crack seal, traffic control, pavement marking/removal

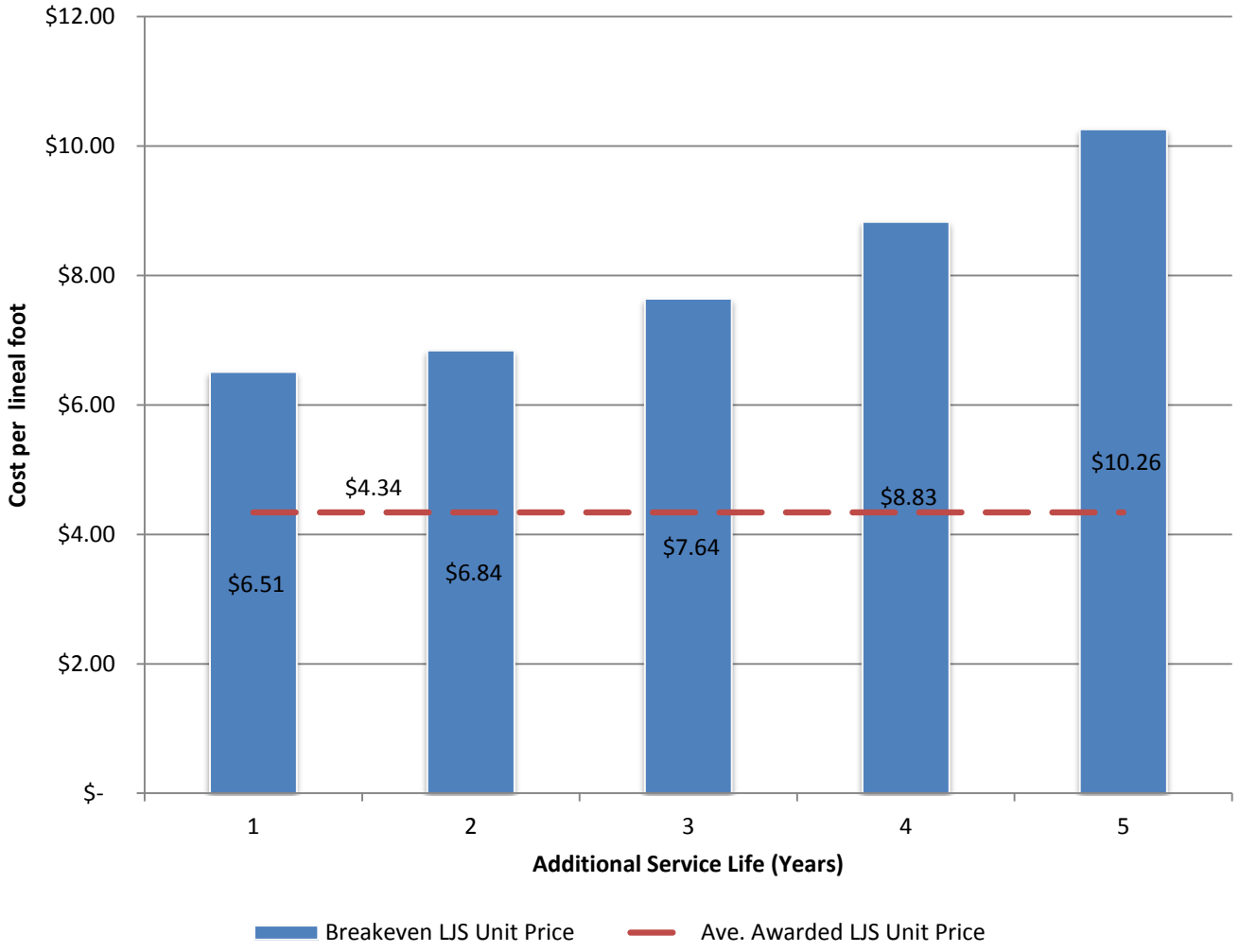
Cost Comparison

- Route and Seal: $2.00 / lineal ft
  - Includes: crack seal, traffic control

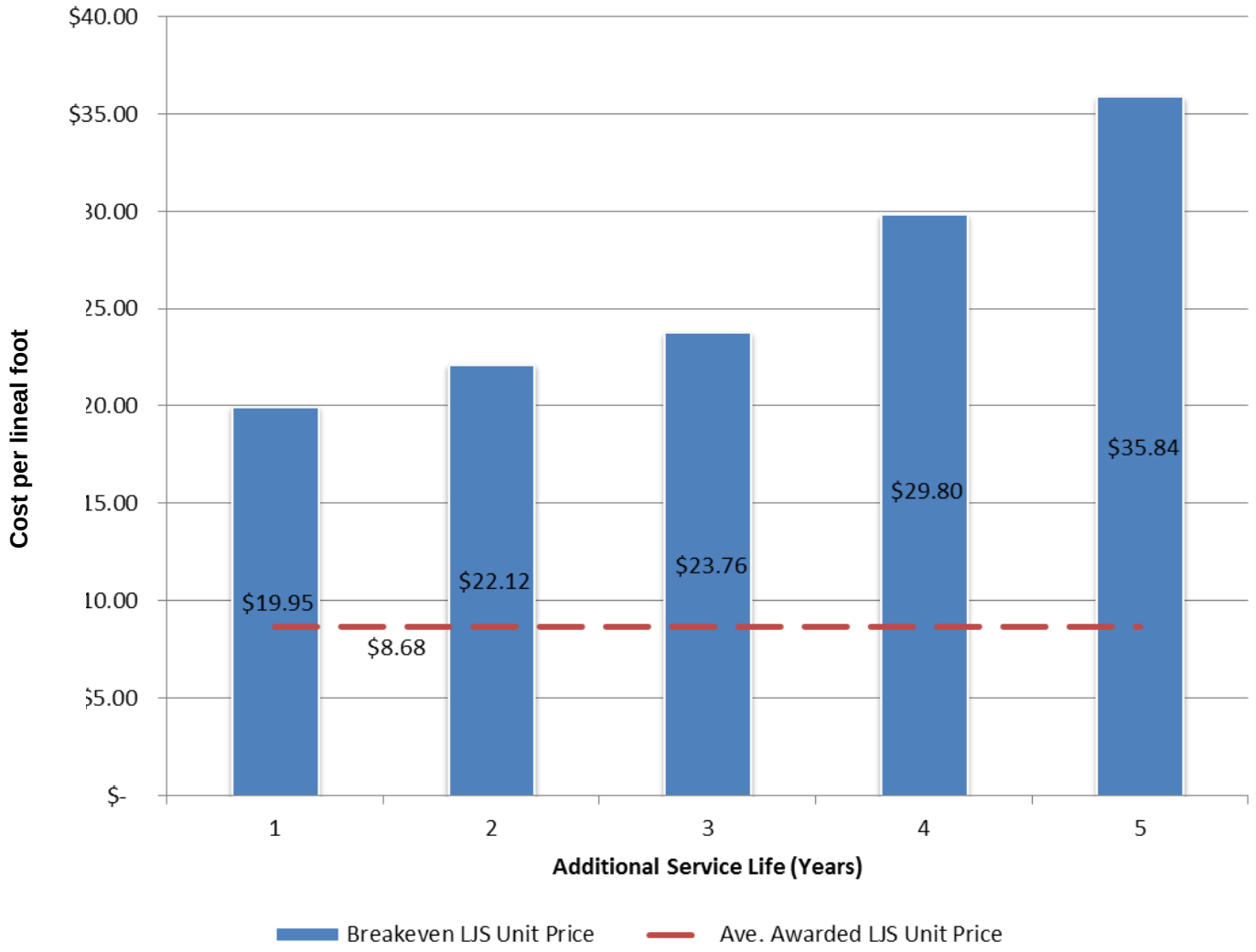
Cost Comparison

- Longitudinal Joint Seal: $2.00 lineal ft

LJS - Life Cycle Cost Analysis
Two Lane Road



LJS – Life Cycle Cost Analysis
4 Lane - Divided Highway



Also Works as a Tack Coat

LJS Spec Application Rates

The width and minimum application rate shall be according to the following table:

LJS Application Rate Table		
Overlay Thickness in. (mm)	LJS Width "W" in. (mm)	Application Rate [1/] lb/ft (kg/m)
HMA Mixtures [2/]		
3/4 (19)	18 (450)	0.88 (1.31)
1 (25)	18 (450)	1.15 (1.71)
1 1/4 (32)	18 (450)	1.31 (1.95)
1 1/2 (38)	18 (450)	1.47 (2.19)
1 3/4 (44)	18 (450)	1.63 (2.43)
2 (50)	18 (450)	1.80 (2.68)
2 1/4 (60)	18 (450)	1.96 (2.92)
2 1/2 (63)	18 (450)	2.12 (3.16)
2 3/4 (70)	18 (450)	2.29 (3.41)
3 (75)	18 (450)	2.45 (3.65)
3 1/4 (83)	18 (450)	2.61 (3.89)
3 1/2 (90)	18 (450)	2.78 (4.14)
3 3/4 (95)	18 (450)	2.94 (4.38)
4 (100)	18 (450)	3.10 (4.62)

Longitudinal Joint Spec

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Thank You

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