

PAAMA Annual Conference

Early Pavement Preservations Strategies

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Something We Want to Believe in



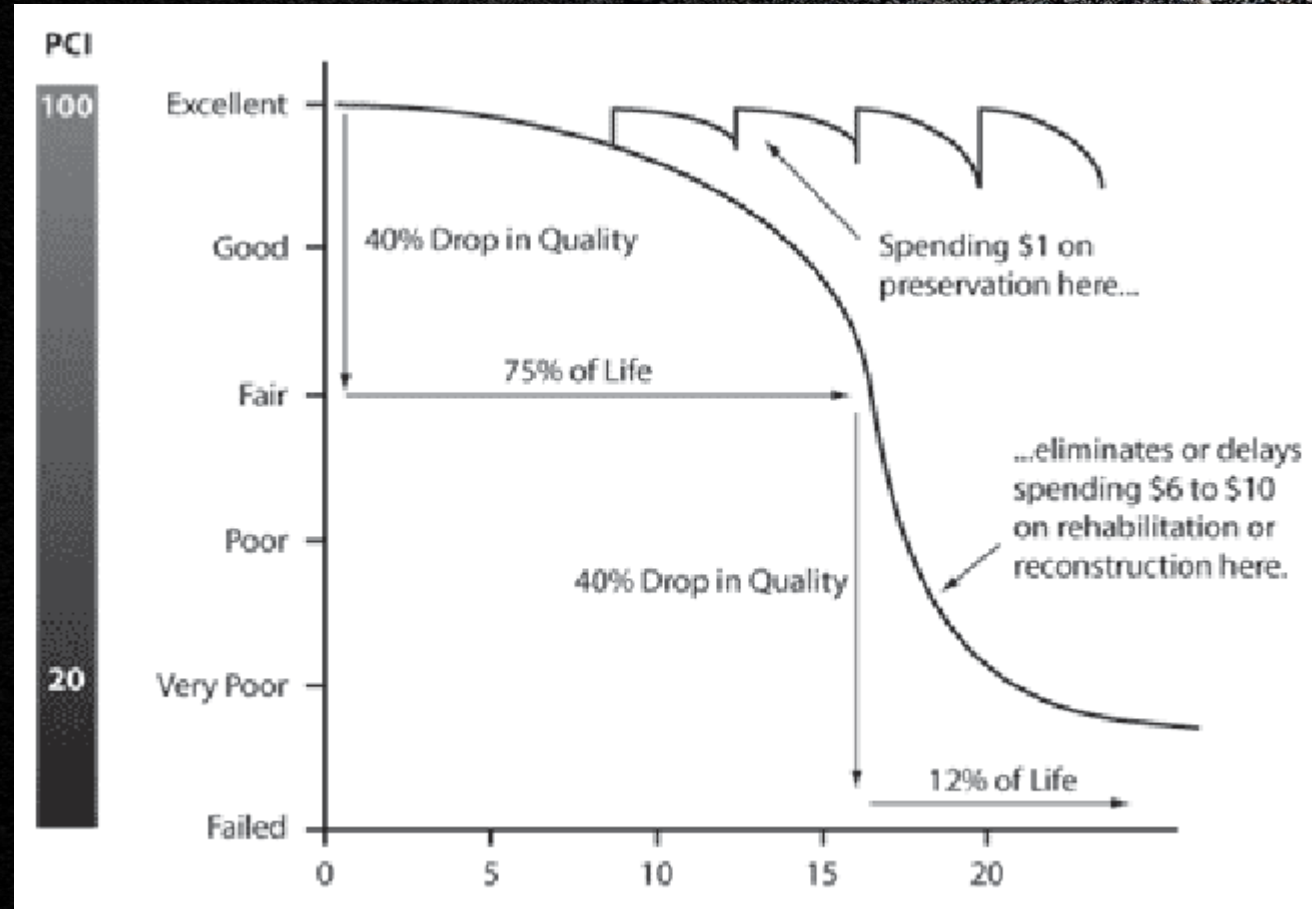


Topics for Discussion

1. Why Spray on Rejuvenators
2. Which Ones – Many choices
3. When to apply
4. New Technology
5. Questions?

Why Spray on Rejuvenators?

Pavement Deterioration Curve



The background of the image is black with two parallel yellow diagonal stripes running from the top right towards the bottom left. The stripes are thick and have a slightly textured appearance.

RoadResource.org

Optimize Your Network

[▶ How-To-Guide](#)

Life Cycle Cost *Get 40 years of life or more*

[▶ About](#)

[▶ Life Cycle Cost Calculator](#)

Equivalent Annualized Cost *Apples to apples cost comparisons*

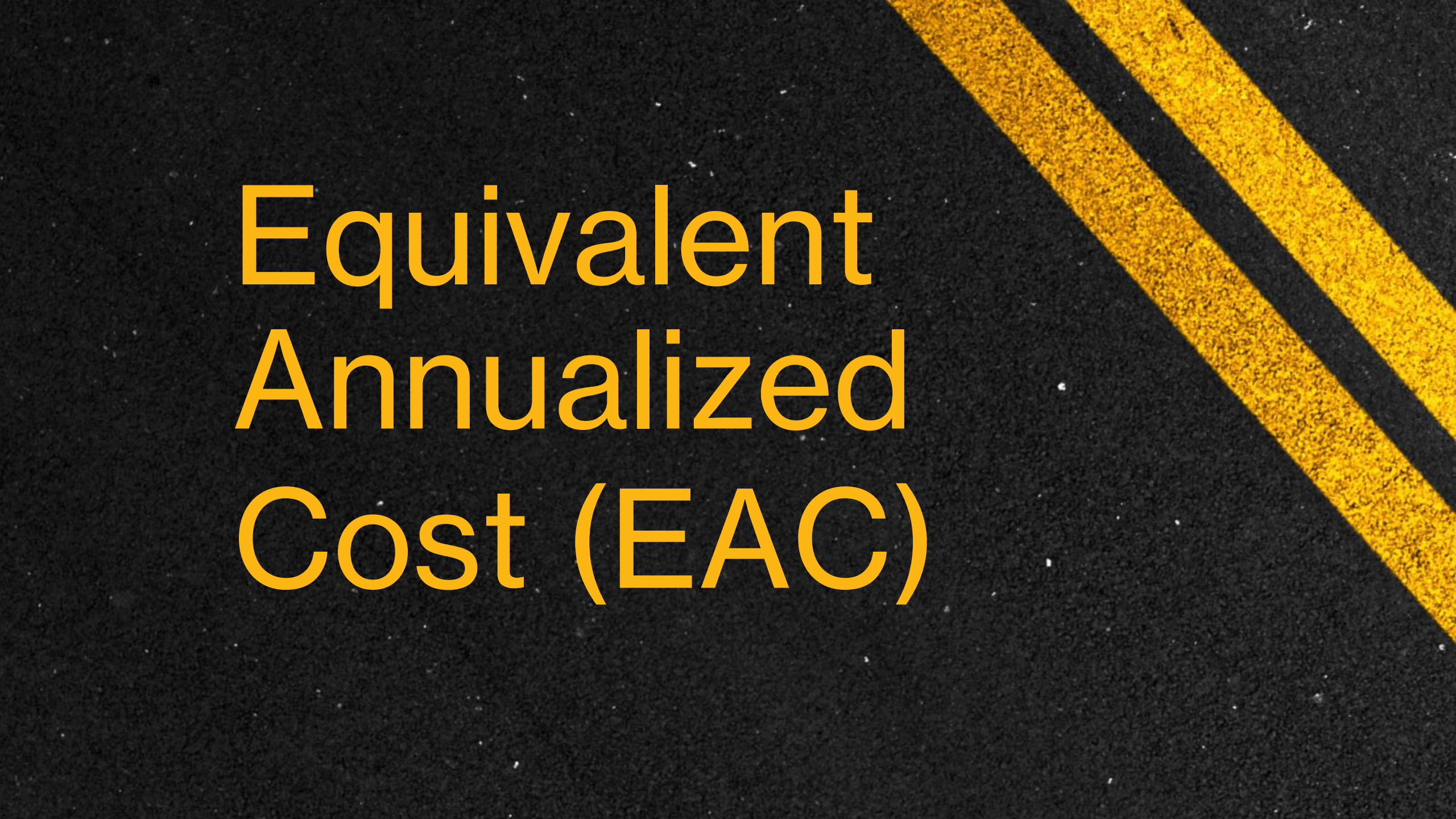
[▶ EAC: About & Calculator](#)

Remaining Service Life *Add maximum life to your network*

[▶ About](#) [▶ Remaining Service Life Calculator](#)

Cost Benefit Value *How-To Prioritize Projects*

[▶ About](#) [▶ Cost Benefit Value Calculator](#)



Equivalent Annualized Cost (EAC)

Simple Math

$$\frac{\text{Treatment Cost (\$/s.y.)}}{\text{Life Extension (years)}} = \text{EAC (\$/s.y./year)}$$

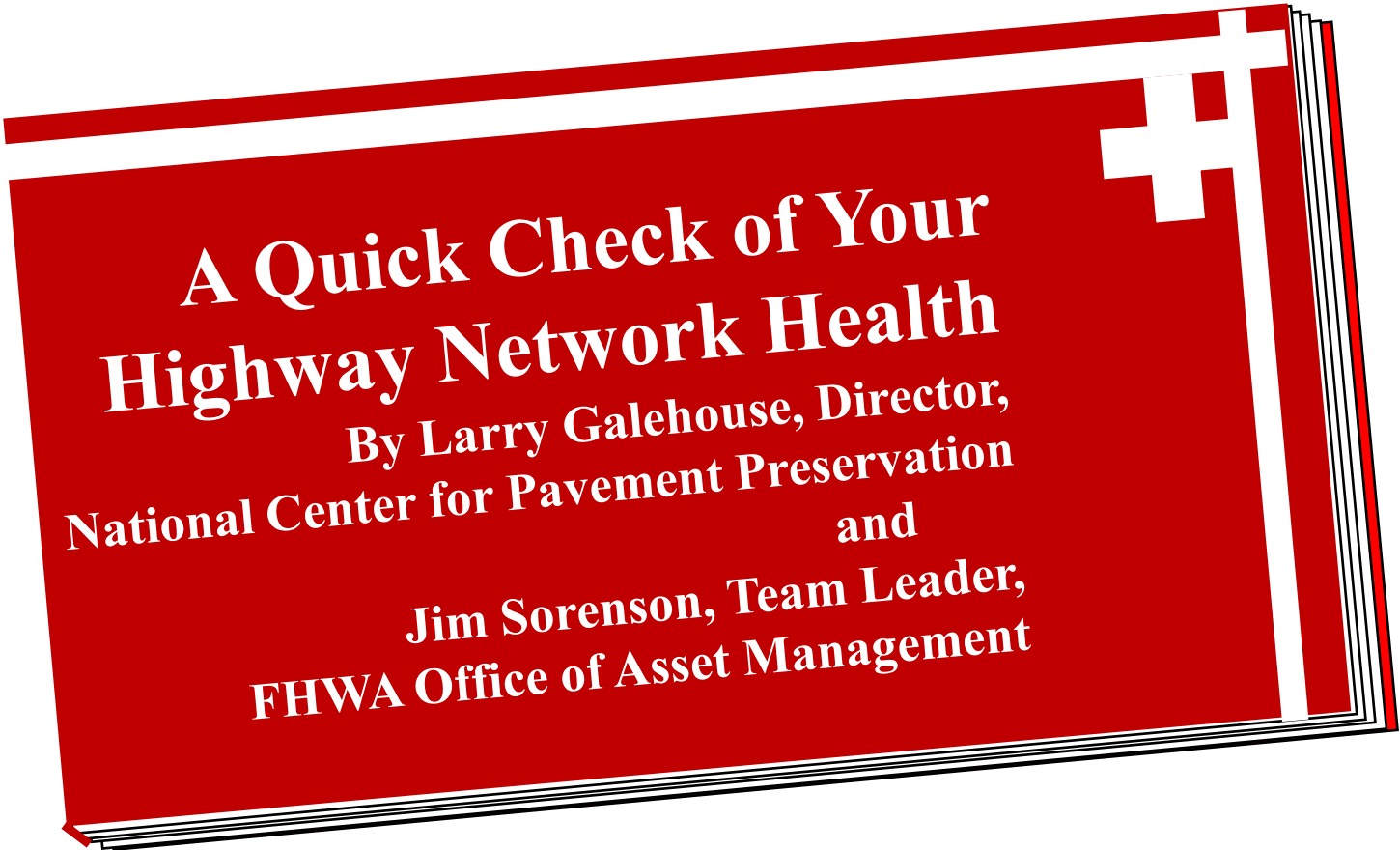
Treatment Type	Cost Per Sq Yard	Life Extension	EAC \$ SY/YEAR
Crack Seal	0.60	3.0	0.20
Rejuvenating Fog Seal	1.50	4.0	0.38
Chip Seal	3.00	5.0	0.60
Micro Surfacing- Double Lift	5.50	8.0	0.69
Minor Mill & Fill	11.00	10	1.10
Cold Recycling + 1.5" HMA	15.00	15.0	1.00
Full Depth Reclamation + 4"	30.00	20.00	1.50

[Clear Data / Chart Your Own](#)



Note: Typical Boston-metro area costs and life extensions. Create your own chart for your most accurate data set.

Remaining Service Life (RSL)



**A Quick Check of Your
Highway Network Health**
By Larry Galehouse, Director,
National Center for Pavement Preservation
and
Jim Sorenson, Team Leader,
FHWA Office of Asset Management

- Every mile of road loses 1 year of service life every year
- A 100-mile network loses 100 mile-years of service life each year
- To "break even", the annual work program needs to add 100 mile-years of new service life

Available at:

<http://www.fhwa.dot.gov/pavement>

Remaining Service Life (RSL)



Which Rejuvenators to Choose?
Many Choices....

Original List of Rejuvenators Considered

Spray-on Rejuvenator Products	Producer
BioMAG™	Iowa State University
BioRestor®	BioBased Spray Systems LLC
BioRestor® Low VOC	BioBased Spray Systems LLC
CRF®	Tricor Refining, LLC
Delta Mist®	Collaborative Aggregates LLC
GSB-88®	Asphalt Systems, Inc.
Invigorate™	Iowa State University
Reclamite®	Pavement Technology, Inc.
Reclamite® + Titanium dioxide (TiO₂)	Pavement Technology, Inc.
RPE-R	H. G. Meigs, LLC
RePlay™	BioSpan Technologies
Replenify™	Flint Hills Resources

Research on Rejuvenating Products



Surface Treatment Product
BioRestor®
RePlay™
Regen-X™
Delta Mist™
Reclamite®
CMS-1PF
RejuvaSeal

Research on Rejuvenating Products



NCAT/MnRoad 7th Cycle 2018

Mississippi DOT Sponsored Sections 2018 Test 7th Cycle

S3 A ReGenX - Blacklidge

S3 B Delta Mist - Collaborative Aggregates

Tennessee DOT Sponsored Sections 2018 Test 7th Cycle

S4A E-Fog - Ergon

S4B Reclamite – Pavement Technologies

NCAT/MnRoad 8th Cycle 2021

Mississippi DOT Sponsored Sections 2021 Test 8th Cycle

S3 A ReGenX - Blacklidge

S3 B Delta Mist - Collaborative Aggregates

Tennessee DOT Sponsored Sections 2021 Test 8th Cycle

S4A E-Fog - Ergon

S4B Reclamite – Pavement Technologies

Tanya Nash from ATS
Florida

Webinar on the 8 session
report-out on Spray on
Rejuvenators

December 5th at 11:00
Eastern Time

Call me if you would like
an invitation

NCAT Draft Report 24-01

May 2024



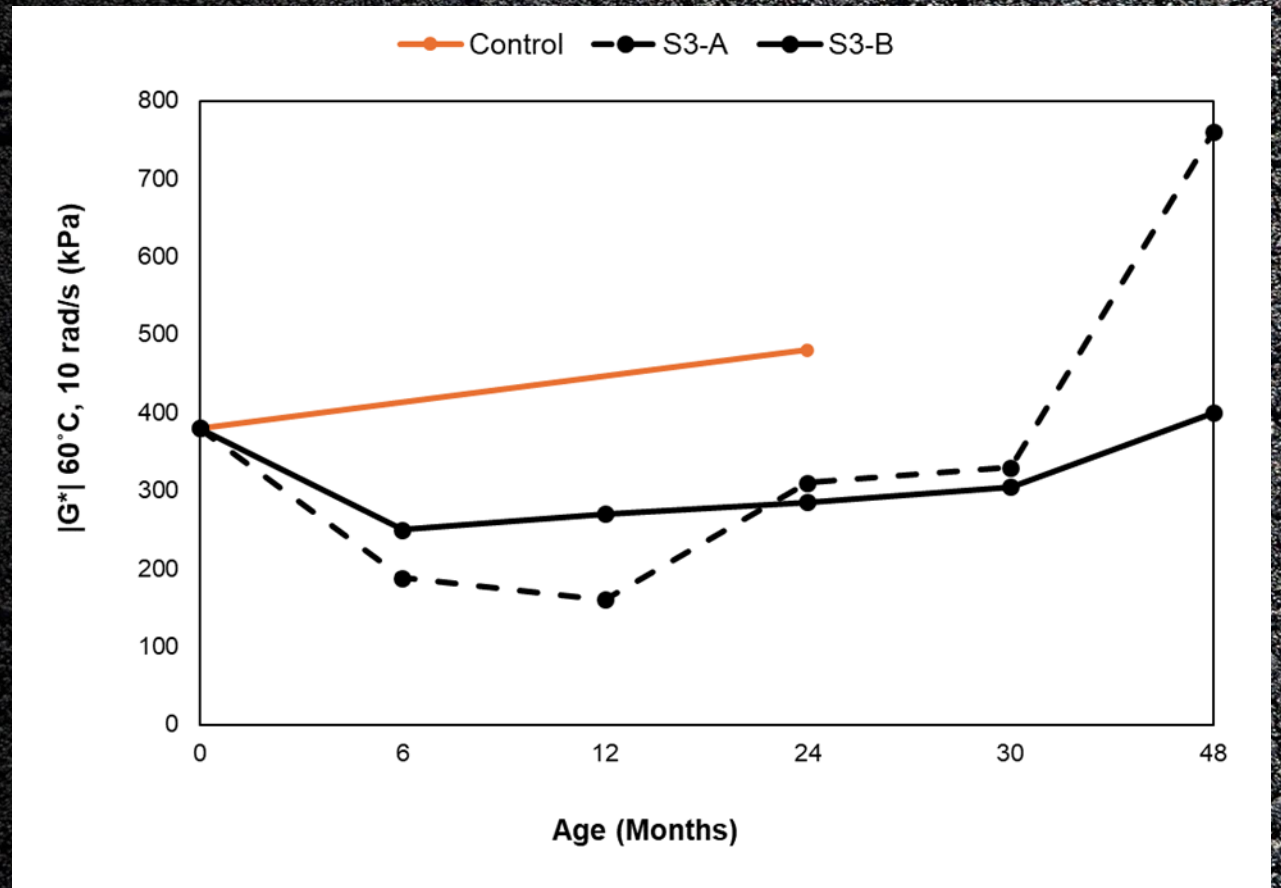
Phase VIII (2021-2024) NCAT Test Track Findings

Randy West, Raymond (Buzz) Powell, David Timm, Nam Tran, Fan Yin, Nathan Moore, Thomas Harman, Benjamin Bowers, Adriana Vargas, Carolina Rodezno, Raquel Moraes Puchalski, Chen Chen, Surendra Chowdari (Suri) Gatiganti, Jason Nelson, Grant Julian, Jason Moore, Adam Taylor, Pamela Turner, Matthew Kmetz, Elizabeth Turochy



Complex Modulus ($|G^*|$) 60 °C, 10 rad/s

- Maximum rejuvenating capability was between 6- and 12-months after treatment.
- S3-A was more effective up to 12-months.
- After 24-months, S3-B resulted in lower $|G^*|$



Continuing Research

- Dr. Racheal Moraes Puchalski is conducting a new test session this fall
- NCHRP 10-114 Developing Performance and Safety Specifications for Rejuvenating Seals
- Delta Mist and Reclamite - Pavement Technologies

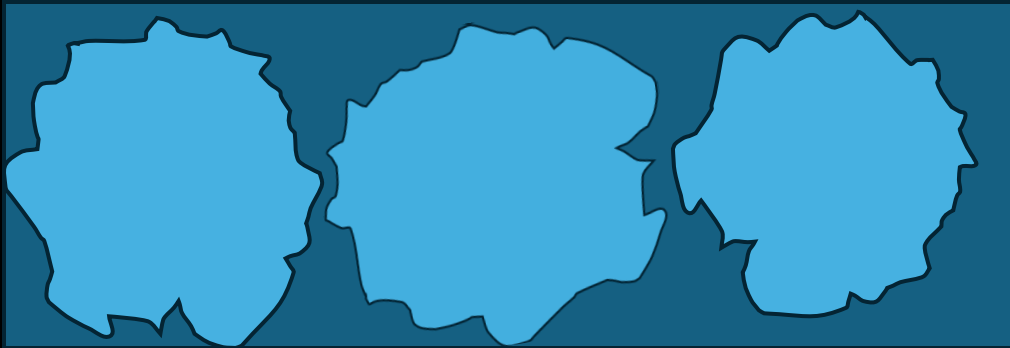


When to Apply?

Mark's Asphalt Film Theory

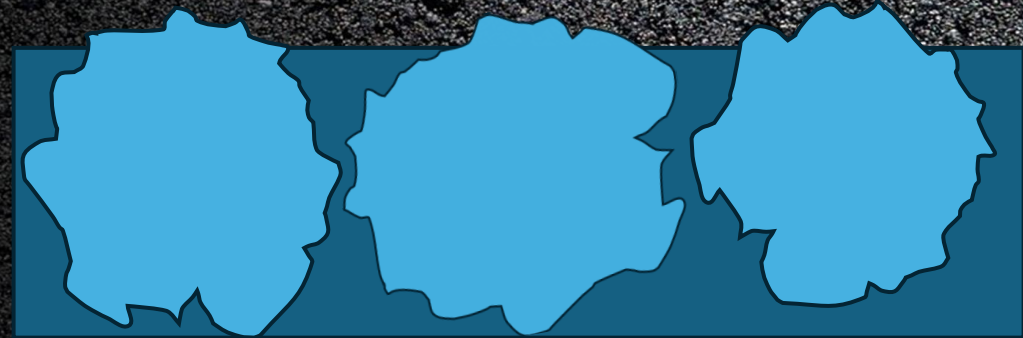
0 to 1 Years

Asphalt film still on the top of the aggregate



2 to 3 Years

Aggregate is even with or slightly elevated



Other Studies/Rumors

Optimum 2 to 3 Years???

- NYSDOT Route 11
 - Gregory Harder PE
- Minnesota TH 56
- NCAT - Lee Road Data

New Technology

- Quicker return to traffic
- Ability to do night work
- Work in congested urban areas
- Treatment for Open Graded Friction Course

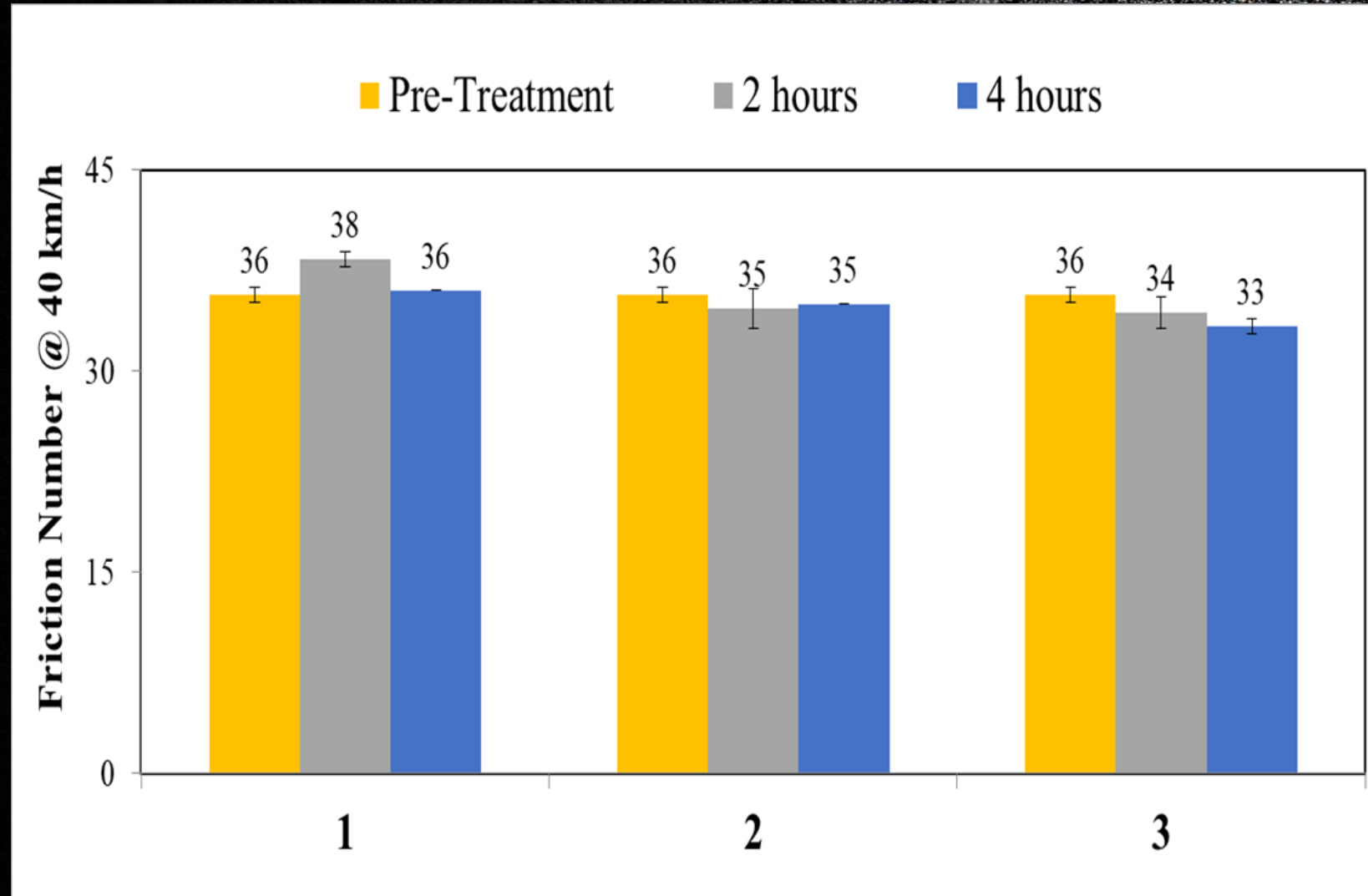
Two Spray Bar System



Two Spray Bar System



Tree Test Sections Friction Numbers – Pre, 2 Hours, 4 Hours



Summary

1. Cost Effective Life Extension Option
2. Extensively studied from NCAT and MnRoad
3. First 2 to 3 years optimal
4. New Technology - Faster Return to Traffic

Questions?



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