

National Center for Asphalt Technology

Test Track Update



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Mission

To provide innovative, relevant, and implementable research, technology deployment, and education that advances safe and sustainable asphalt pavements.

Quick Facts

- Established in 1986
- Largest research center at AU
- Funded through contracts
- Staff of 50 employees



NCAT Research Focus Areas

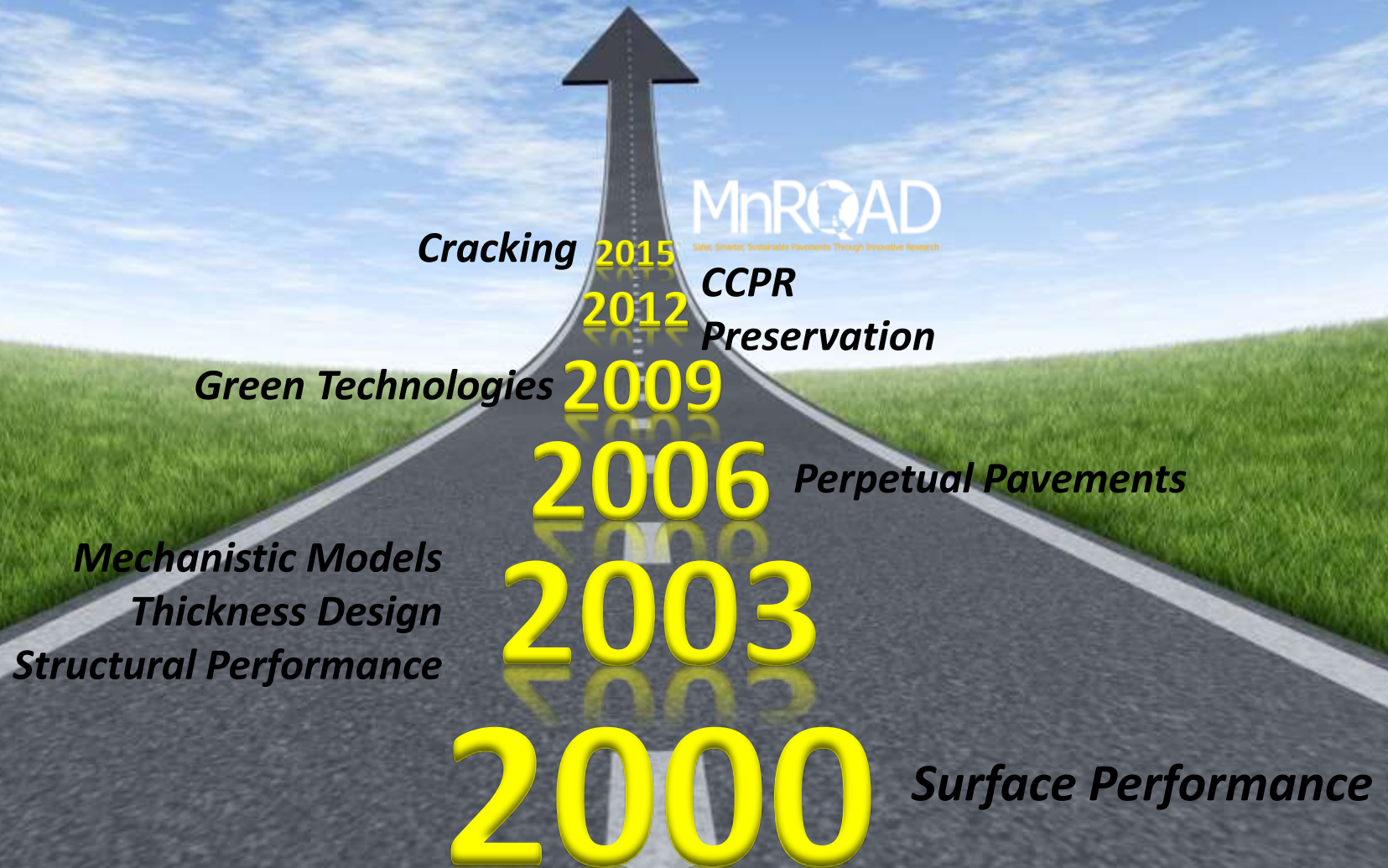
- Advancing Pavement Design
- Balanced Mix Design
- Sustainable Pavements
- Appropriate inputs for LCCA
- Pavement Preservation
- Safety and Pavement Friction

Test Track Overview



- Started operations in 2000
- 3-year Research Cycles
- 46 Test Sections, 200 ft. each
 - 26 sections in tangents
 - 20 sections in curves
- Test Sections are sponsored
- Increasing complexity over time

Test Track Timeline



2015 Test Track Sponsors



***With the current
volumetric mix design system***



Recycled Shingles



Fractionated RAP



Recycled Tire Rubber



***we have no way of knowing if
these materials help or hurt***



Recycling agents



Aramid & Polyolefin fibers



Sulfur pellets

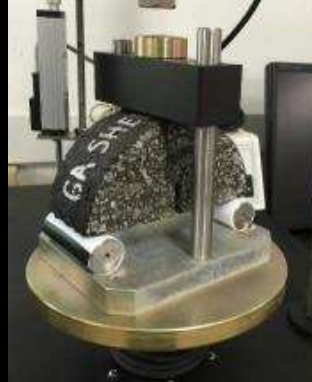
Top-Down Cracking Tests



Energy Ratio



SCB-LA



IFIT



OT-TX

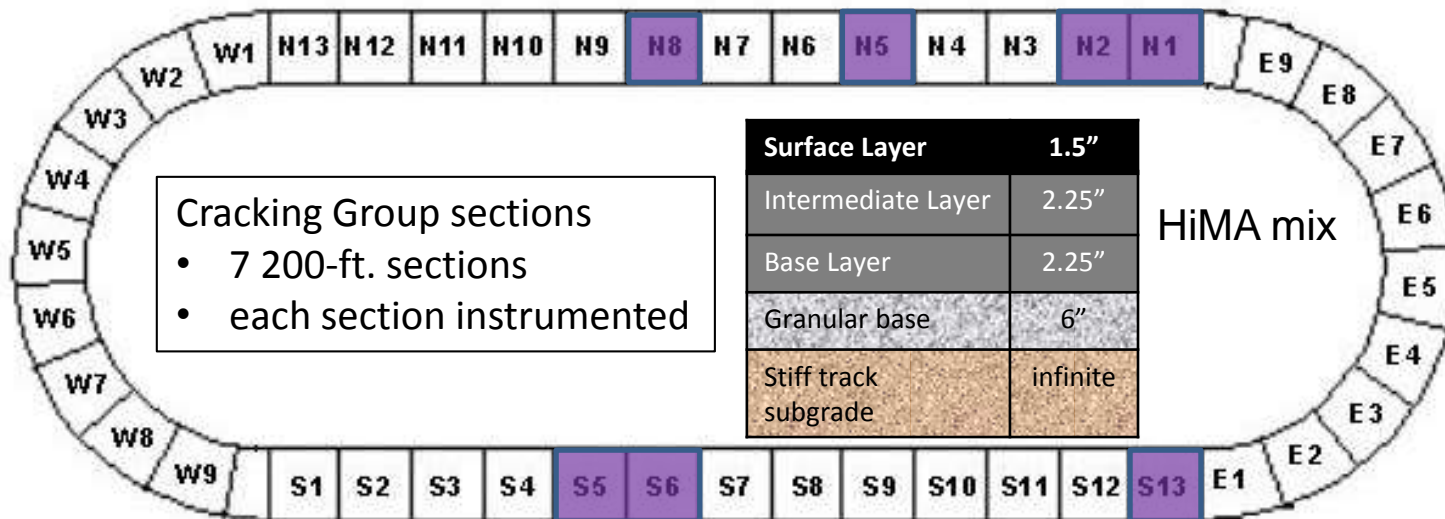


OT-NCAT



Nflex Factor

Top-Down Cracking Sections



CG Performance to Date

July 11, 2017

7.8 MESALs

Section	Description	Rutting (mm)	Δ IRI (in/mi.)	Δ MTD (mm)	Cracking (% of lane)
N1	20% RAP (Control)	3	3	0.7	0.2
N2	Control w/ High Density	3	6	0.9	0
N5	Low AC, Low Density	1	3	0.7	0.1
N8	20% RAP 5% RAS	2	12	1.0	0.2
S5	35% RAP PG 58-28	2	0	0.8	0
S6	Control w HiMA	2	4	0.9	0
S13	AZ Rubber Mix	4	6	0.4	0

Field Performance and Structural Characterization of Full-Scale Cold Central Plant Recycled Pavements



Cold Central Plant Recycling

Milling

Fractionation

CCPR Mixing (RAP+recycling agents)

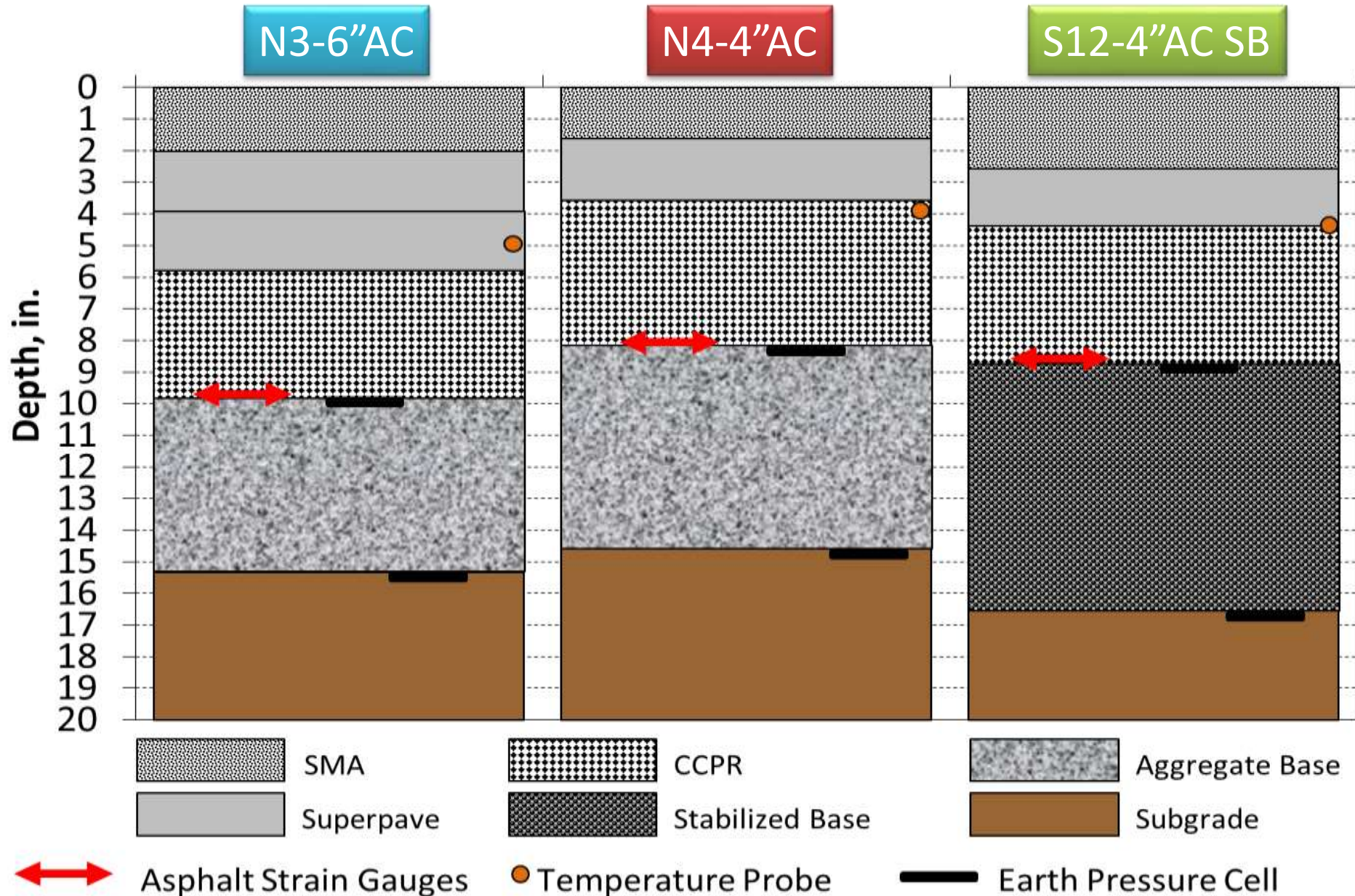
Conventional Paving




Structural Characterization of CCPR

- No current specific methodology for determining structural characteristics
 - Some studies evaluated fundamental characteristics
 - Very little study under heavy traffic conditions
- VDOT field project on I-81 began in 2011
 - Excellent performance through first 34 months
 - Desire to expand study to evaluate thickness effects and inclusion of recycled stabilized base layer on performance
 - Sponsored 3 sections during 2012 Test Track research cycle

VDOT Test Sections



Layer Parameters

Section	N3-6"AC	N4-4"AC	S12-4"AC SB
Layer Description	Lift 1-19 mm NMA SMA with 12.5% RAP and PG 76-22 binder		
Binder Content, %	6.1	6.0	6.1
Air Voids, %	4.3	4.7	4.2
Layer Description	Lift 2-19 mm NMA Superpave with 30% RAP and PG 67-22 binder		
Binder Content, %	4.6	4.6	4.7
Air Voids, %	7.1	7.4	6.7
Layer Description	Lift 3-19 mm NMA Superpave with 30% RAP and PG 67-22 binder		
Binder Content, %	4.4	NA	NA
Air Voids, %	6.4	NA	NA
Layer Description	CCPR-100% RAP with 2% Foamed 67-22 and 1% Type II Cement		
Layer Description	 <p>Crushed granite aggregate base</p>		6" Crushed granite aggregate base and 2" subgrade stabilized in-place with 4% Type II cement
Layer Description	Subgrade – AASHTO A-4 Soil		

N3-6"AC

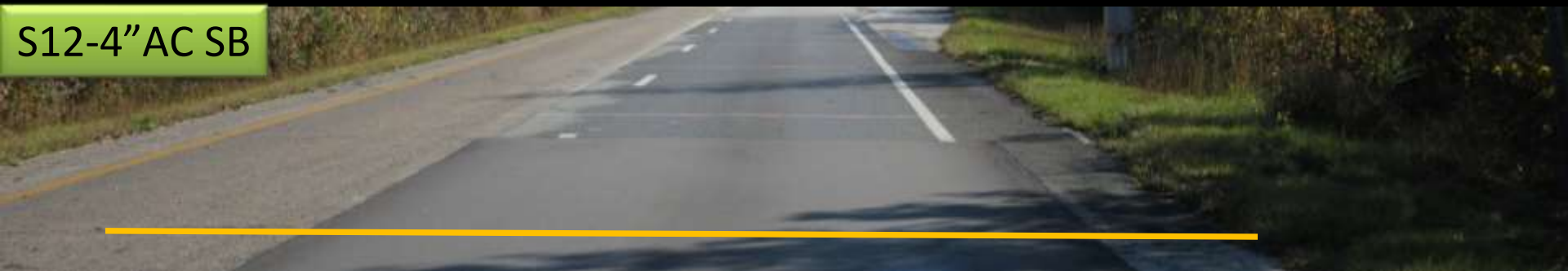


N4-4"AC

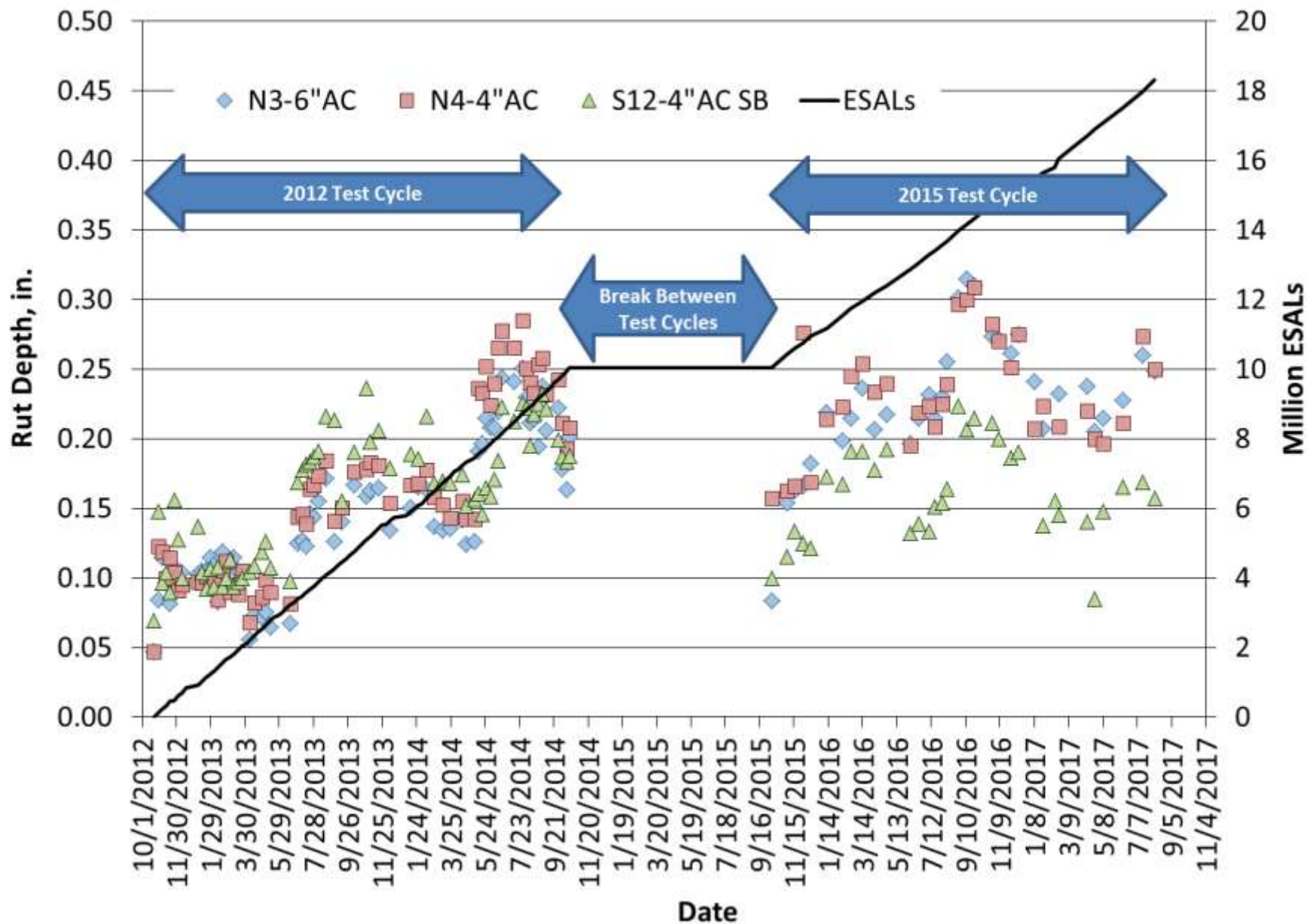


11/13/2017

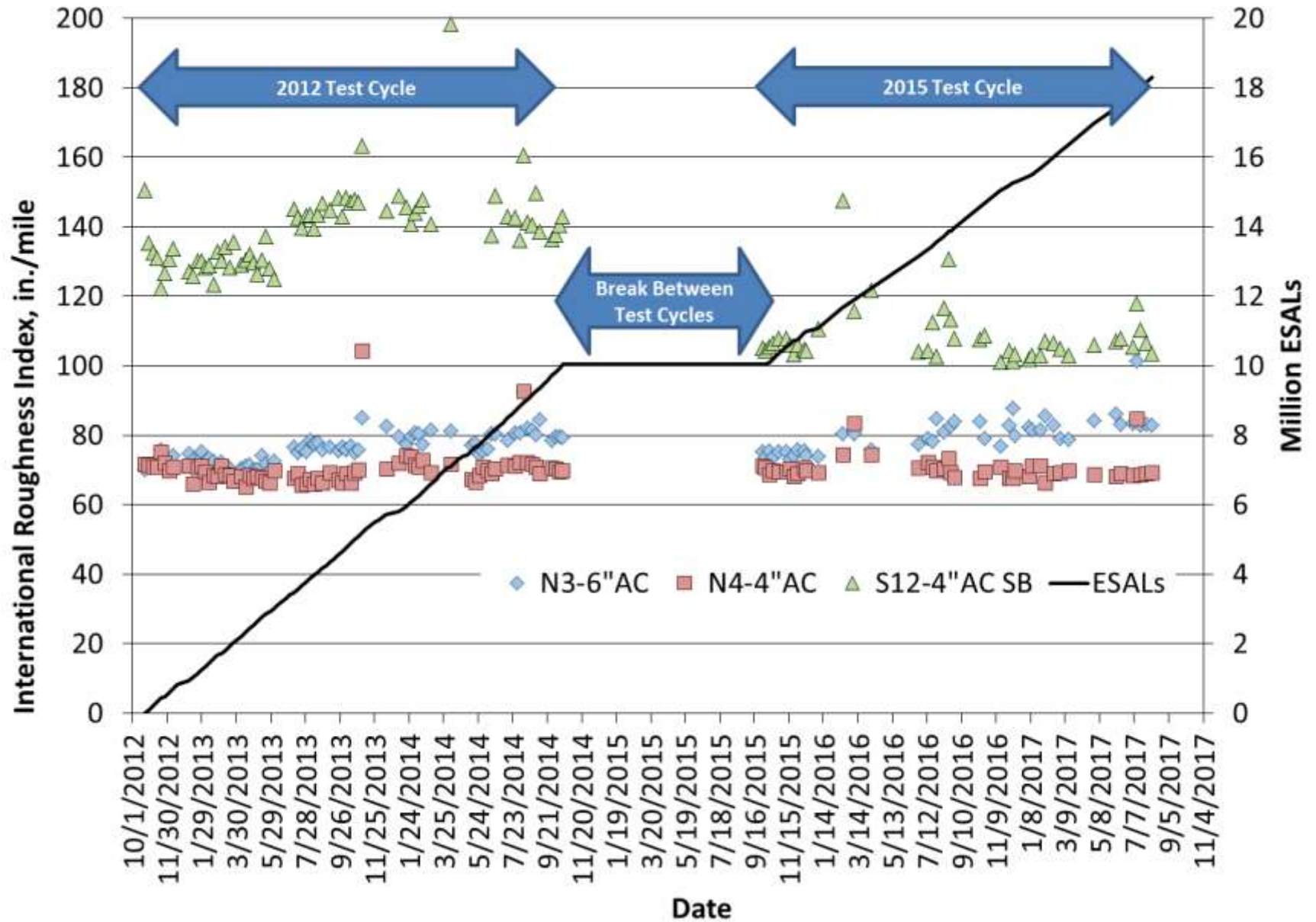
S12-4"AC SB



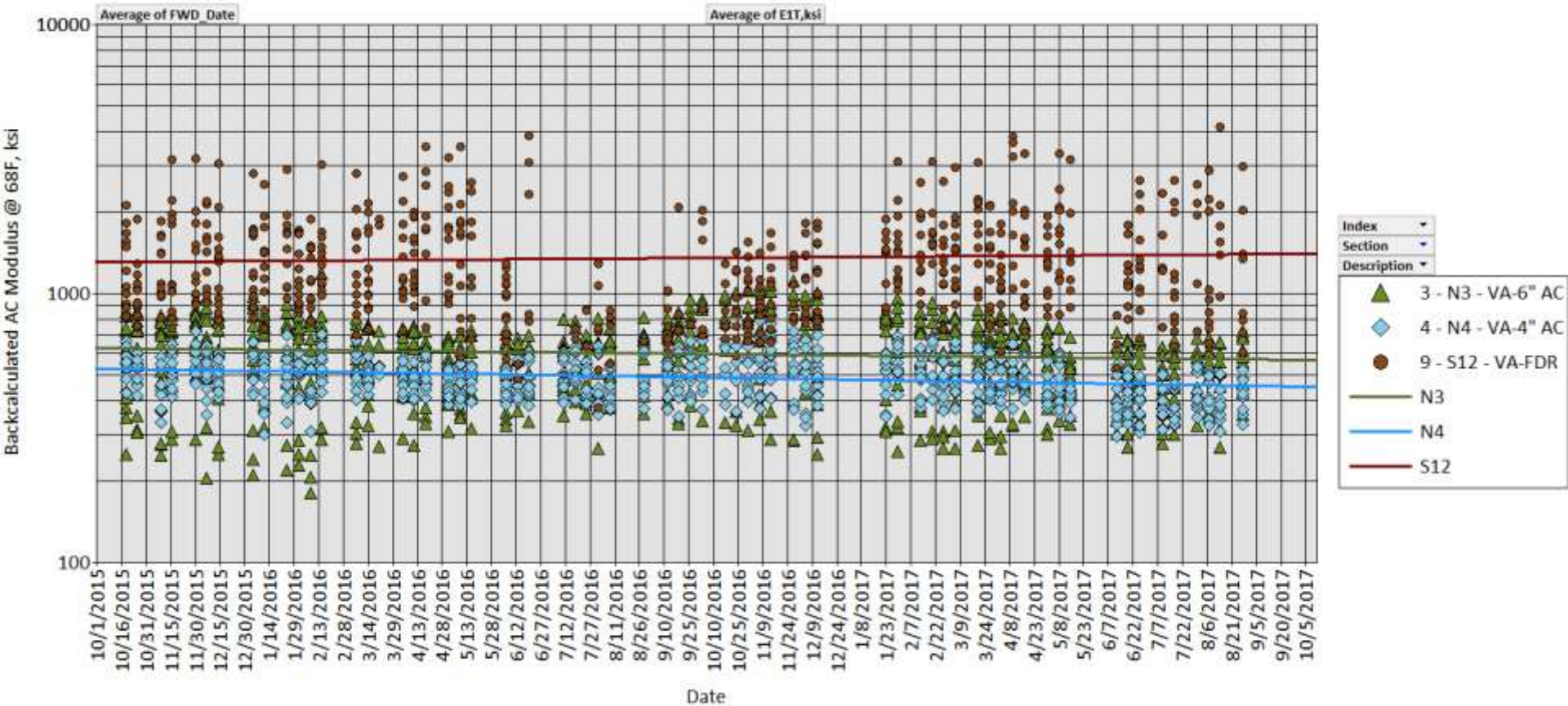
Rutting Performance



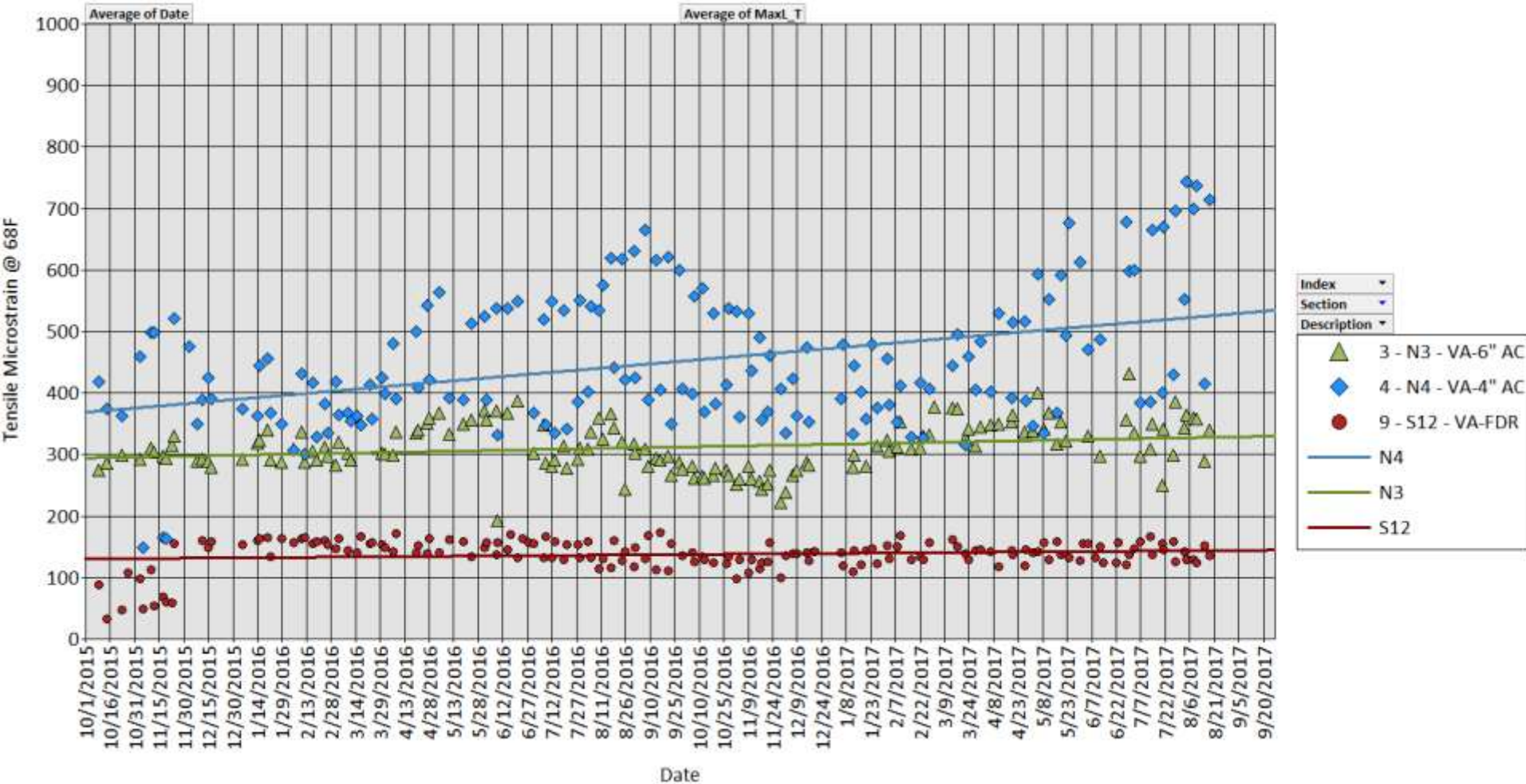
Ride Quality



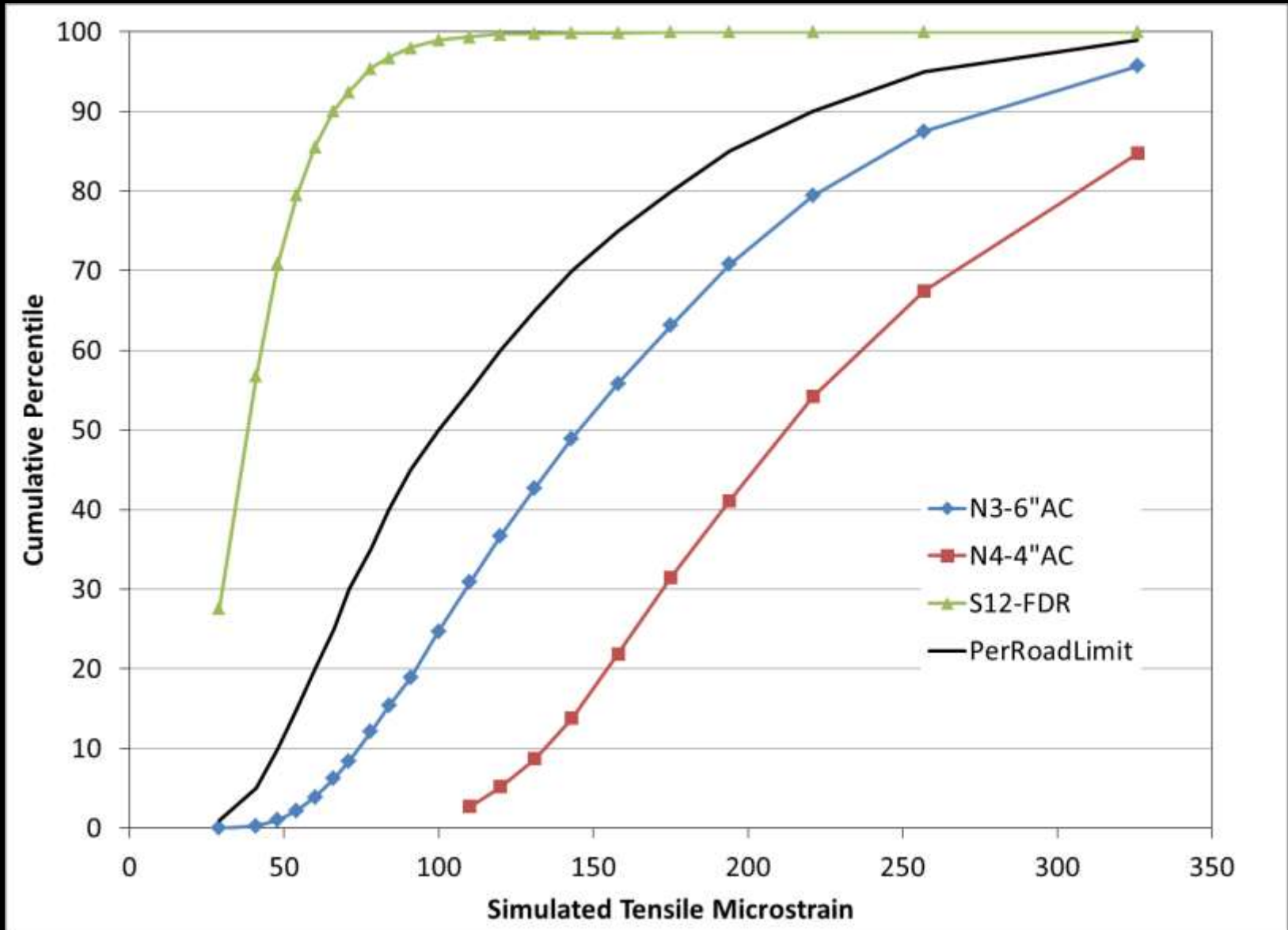
Asphalt Modulus vs Date @ 68F



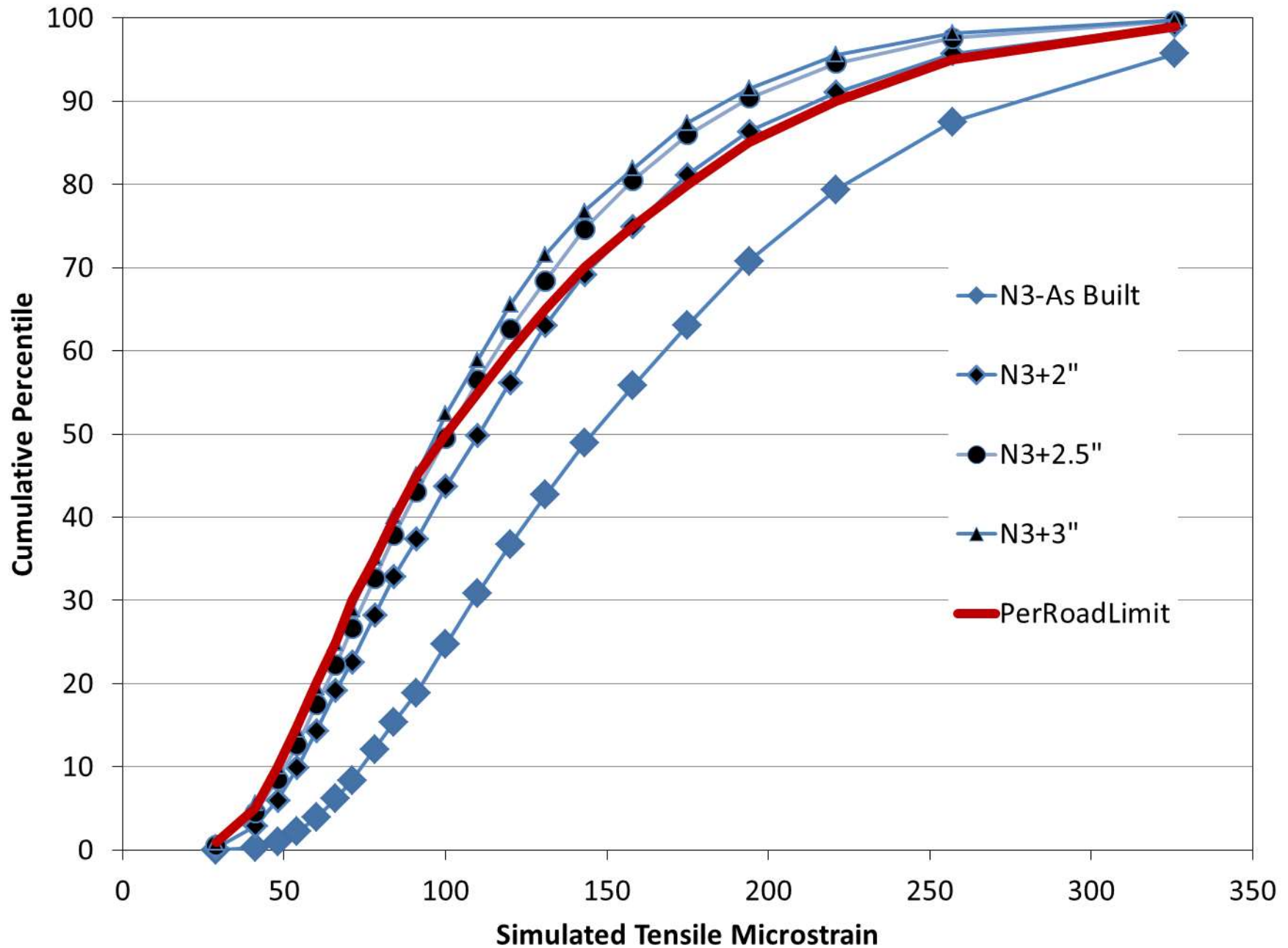
Asphalt Strain vs Date @ 68F



Perpetual Pavement Analysis – PerRoad Strain

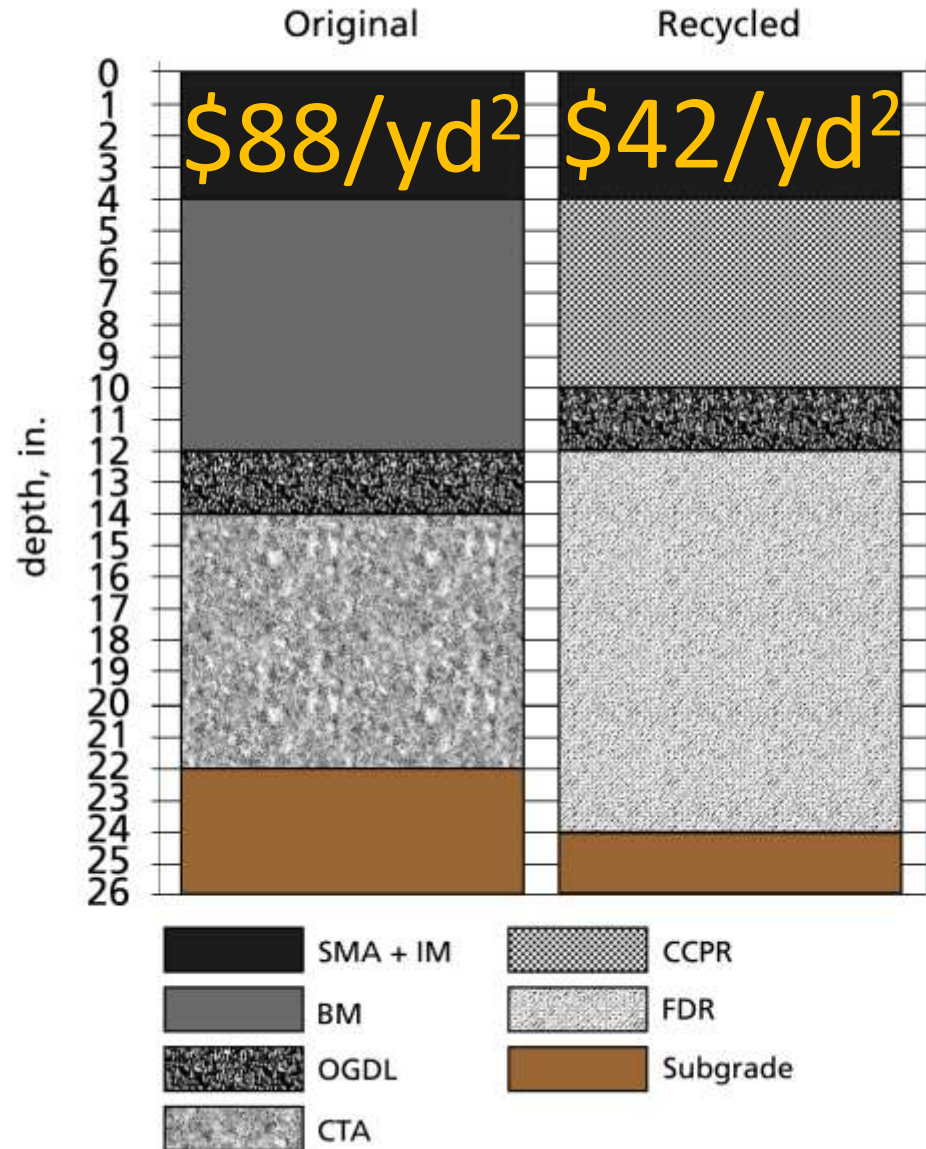


Additional PerRoad Analysis on N3



VDOT Implementation

- I-64 Williamsburg, VA
- 7.08 miles
- 200,000 tons of RAP
- \$10,000,000 savings



VDOT CCPR Summary

- Sections continue to perform extremely well
 - No signs of surface cracking
 - Minimal rutting ($< 0.3''$)
- Structural metrics indicate predominantly healthy sections
 - N4 may be experiencing minor damage
 - Slightly decreasing AC modulus with increasing AC strain
- Perpetual analysis shows 2 to 2.5" AC increase meets Test Track criteria on aggregate base sections
- Recommend leaving S12 and N4 in place for 2018

Test Track Future (2018)

- Continue emphasis on sustainable materials
 - CCPR, other green technologies
- New Innovation Group
 - Deep pavement reconstruction
 - Soil stabilization
- Cracking Group Study
 - Link lab/field performance – balanced mix design
- Pavement Preservation
- Continue Mn/ROAD Partnership



2018 TEST TRACK CONFERENCE

MARCH 27-29, 2018
AUBURN, AL