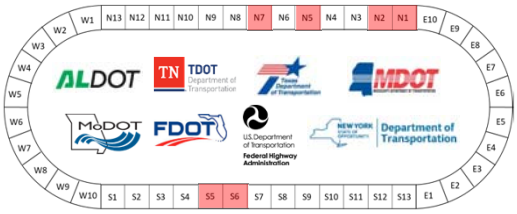
The Additive Group Experiment

- Multiple-section experiment
  - Rubber-modified asphalt sections
  - Plastic-modified asphalt sections
  - Fiber-modified asphalt section(s)
  - Control mix section(s)
- Sections built at NCAT Test Track in 2021 and at MnROAD in 2022

The Additive Group Experiment - Objectives

- Comprehensively evaluate the performance impact of multiple mix additives at the same time
- Establish a process to evaluate future additives without having to build test sections
- Support the goal of providing sustainable pavement technologies that outperform current materials

2024 Additive Group Sponsors



Selected Additives

Recycled Tire Rubber

entech — wet process

Liberty TIRE RECYCLING — dry process

Recycled Plastics

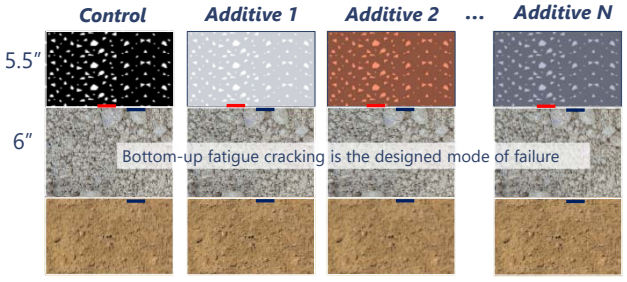
DOW — wet process

Generic LLDPE rich — dry process

Fibers

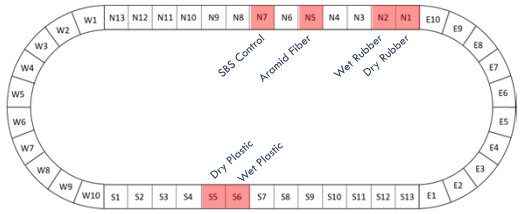
SURFACE TECH

Southern Additive Group Pavement Design



Additive Group Experimental Scope

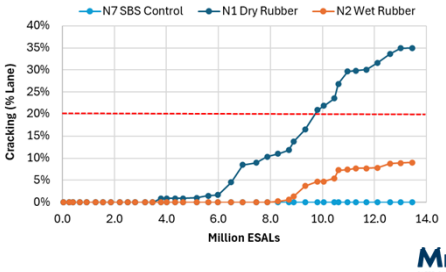
Additive Group Test Sections



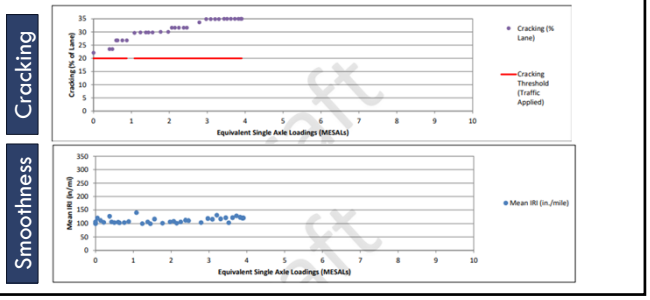
Lab Testing

- Volumetric Properties
- Stiffness: Dynamic Modulus
- Cracking Resistance:
  - IDEAL-CT (Reheated and Critical Aging)
  - Cyclic Fatigue
  - Bending Beam Fatigue
- Rutting Resistance: HWTT, IDEAL-RT, HT-IDT

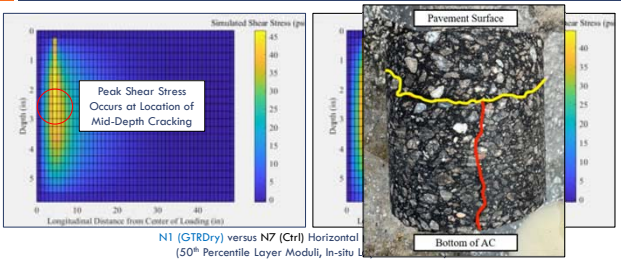
Pavement Performance to 13.5 MESALs - Rubber



Pavement Performance to 13.5 MESALs – N1



WESLEA – Horizontal Shear Stress Response Heat Map



N1 (GTRDry) versus N7 (Ctrl) Horizontal
(50th Percentile Layer Moduli, In-situ

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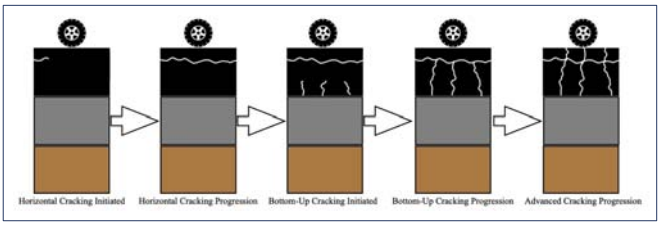
Proposed Mid-Depth Cracking Mechanism



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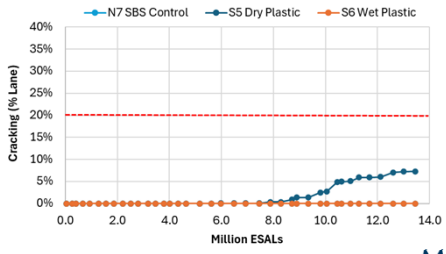
Rutting Performance

All of the AG sections are performing well with regard to rutting, with average rut depths between 0.11 and 0.21 inches.

Summary: GTR-modified mixtures

Comparison vs. SBS Control		Wet Rubber	Dry Rubber
Mix characterization (Plant Mix)	Stiffness	≤	≤
	Fatigue Resistance (CF)	↑	↑
	Fatigue Resistance (BBF)	↑	=
	Cracking resistance (IDEAL-CT)	↓	↓
	Rutting resistance (HWTT)	=	=
Field Performance	Rutting	=	=
	Cracking	↓	↓↓

Pavement Performance to 13.5 MESALs - Plastics



Summary: Recycled Plastic-Modified Mixtures

Comparison vs. SBS Control		Wet Plastic	Dry Plastic
Mix characterization	Stiffness	=	↑
	Rutting resistance	=	↑
	Cracking resistance	↓	↓↓
Field Performance (10 MESALs)	Rutting	=	=
	Cracking	=	↓

Summary: Aramid Fiber-Modified Mixtures

Comparison vs. SBS Control		Dry Fiber
Mix characterization	Stiffness	=
	Cracking resistance	↓
	Rutting resistance	↑
Field Performance	Rutting	=
	Cracking	=

Summary

Separation in additive mixes becoming clearer, but ≈5M ESALs left

Lab results don't always equal field results, especially for newer materials

Stay tuned!

the NextPAVE Challenge
Roads of Tomorrow

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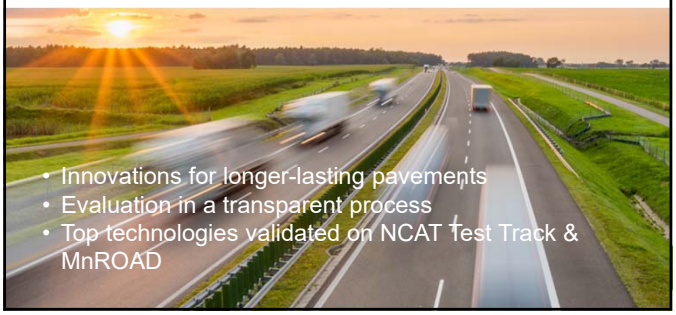
The NextPAVE Challenge



- Innovations for longer-lasting pavements
- Evaluation in a transparent process
- Top technologies validated on NCAT Test Track & MnROAD

Categories

1. On The Asphalt
   - spray on rejuvenators
   - friction treatments
2. In The Asphalt
   - mix additives
   - alternative binders
3. Below the Asphalt
   - stabilizing additives
   - geotextiles
4. Other

The NextPAVE Challenge

- Phase I: Lab & Modeling
  - $25,000 by technology provider
  - Pitch and presentation of results to Phase II sponsors
- Phase II: Test Track & MnROAD
  - construction 2027-2028

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NINETH (2024) RESEARCH CYCLE

SEAUPG 2025 – Charleston, WV