National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Beyond MAP-21 Benefits of Preservation Treatments

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SEVENTH RESEARCH CYCLE

NCAT TEST TRACK CONFERENCE

MAP-21 Criteria Defined in Title 23 CFR 490

- Lots of confusion over what this means and how it's enforced
- Many thanks to Tom Van (Pavement Preservation Program Manager for FHWA)!
- Applies to entire National Highway System (NHS_2), but only penalty for $Interstate_1$
- AASHTO R56-57 for roughness, R87-88 for rutting, and R85-86 for cracking
- MEPDG/Pavement ME derived threshold values for poor, fair, and good

Category	% Cracking	Rutting, mm	IRI, in/mi
Good	< 5	< 5	< 95
Fair	5 – 20	5 – 10	95 – 170
Poor	> 20	> 10	> 170

MAP-21 Criteria Defined in Title 23 CFR 490

- Percent cracking is the area in wheelpaths divided by total lane width (59% max)
- Classifies as “poor” if 2 metrics in “poor” range for cracking, roughness, rutting
- Forced to spend more money on interstates for a year if more than 5% is “poor”
- A few states have exceeded the 5% threshold in the last couple of years, but…
- Typically states only show 1 to 2 percent in the “poor” range

Category	% Cracking	Rutting, mm	IRI, in/mi
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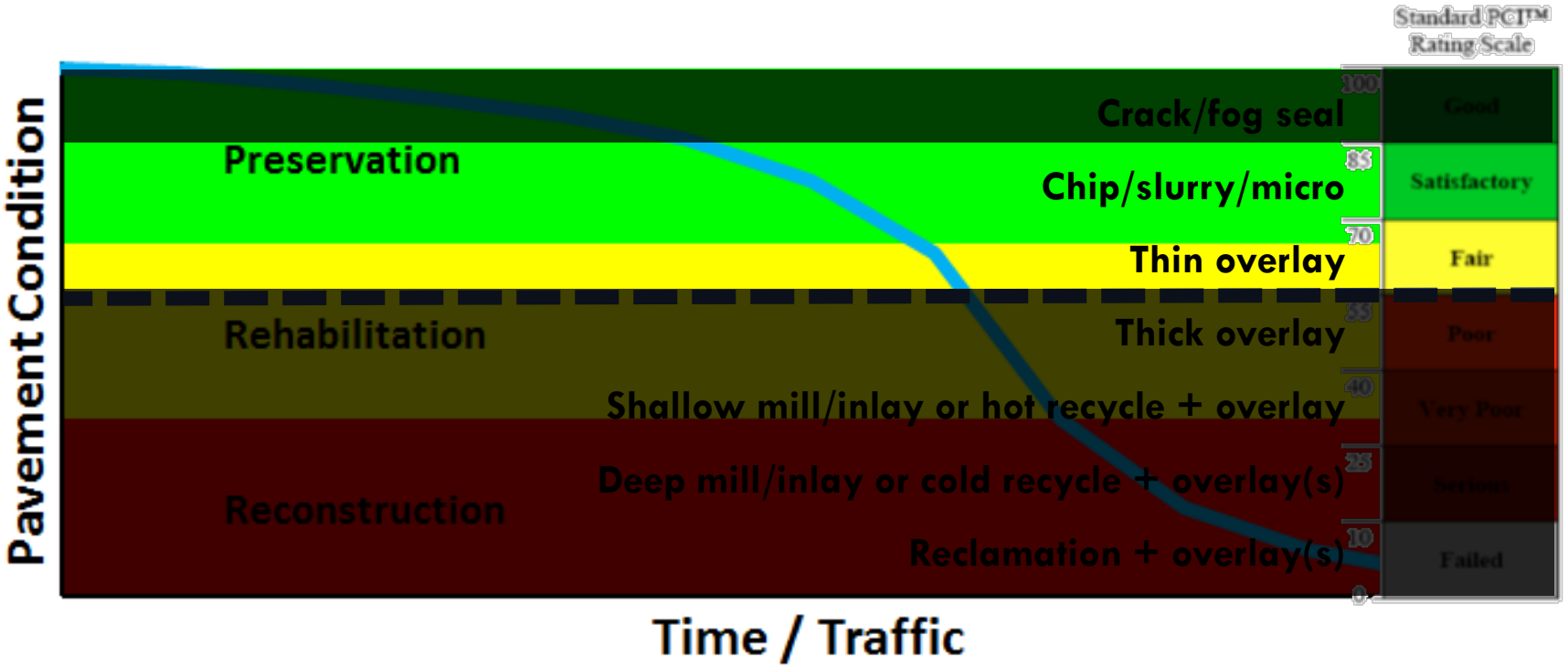
Fair	5 – 20	5 – 10	95 – 170
Poor	> 20	> 10	> 170

MAP-21 Criteria Defined in Title 23 CFR 490

- Goal was to have a unified system that states would use for entire network
- "Good" needs nothing, "poor" needs rebuilding, "fair" is everything in between
- Low resolution and missing equipment certifications are biggest challenges
- More resolution required for pavement management (e.g., crack width, raveling, etc.)
- FHWA is studying ways to improve the data collection and reporting process

Category	% Cracking	Rutting, mm	IRI, in/mi
Good	< 5	< 5	< 95
Fair	5 – 20	5 – 10	95 – 170
Poor	> 20	> 10	> 170

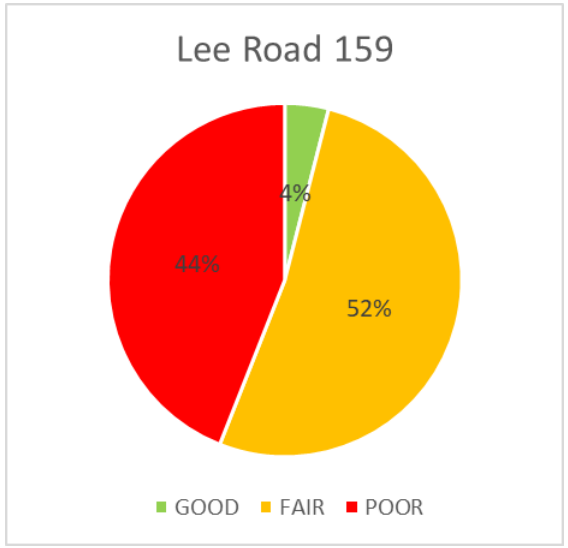
Preservation Emphasis on “Fair” Pavements



Cracking Drives Performance in the Southern Sections

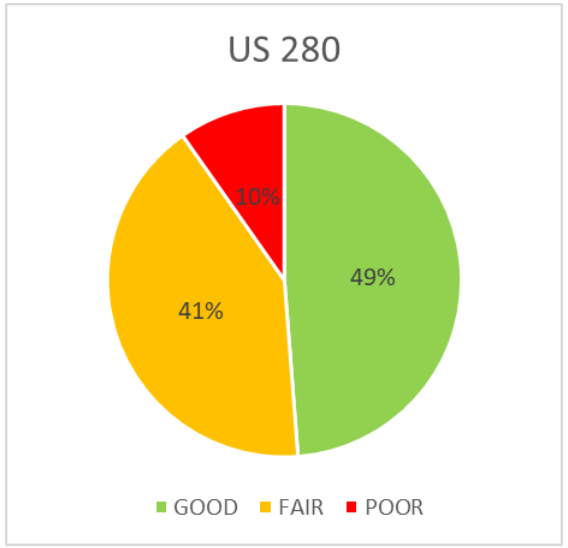
WARM CLIMATE

LOW TRAFFIC



8 YEARS

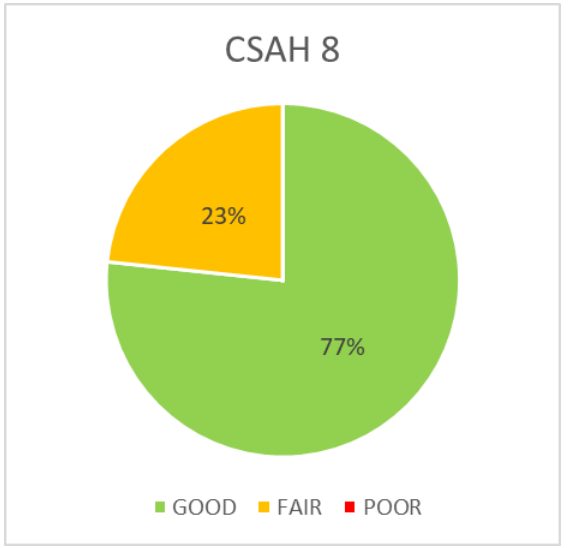
HIGH TRAFFIC



5 YEARS

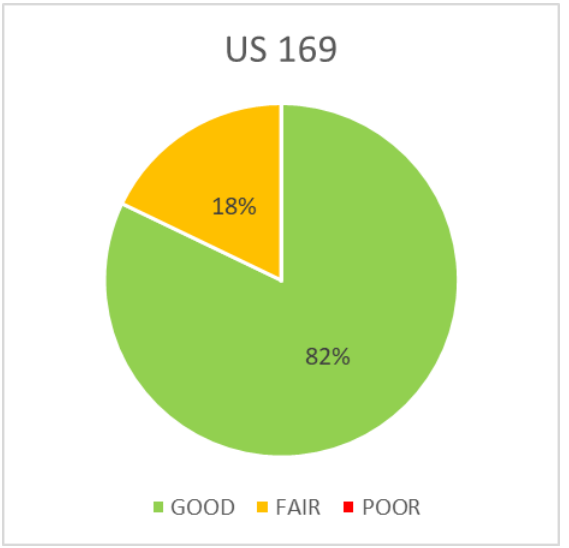
COLD CLIMATE

LOW TRAFFIC



4 YEARS

HIGH TRAFFIC

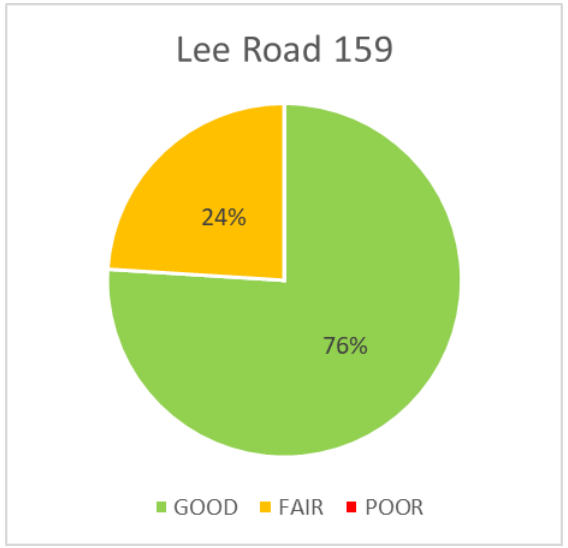


4 YEARS

Roughness Drives Performance in the Northern Sections

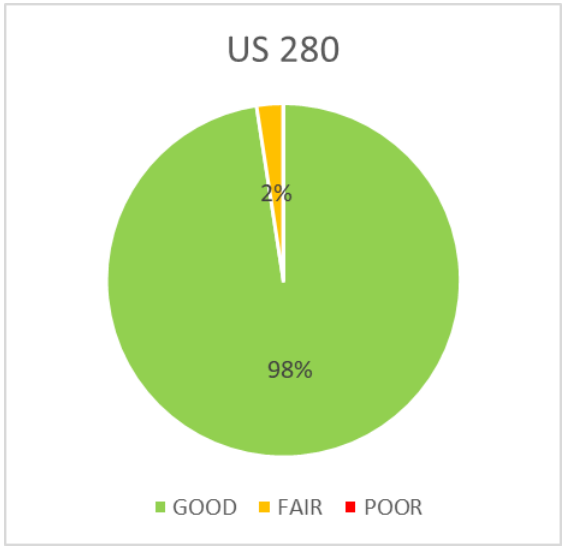
WARM CLIMATE

LOW TRAFFIC



8 YEARS

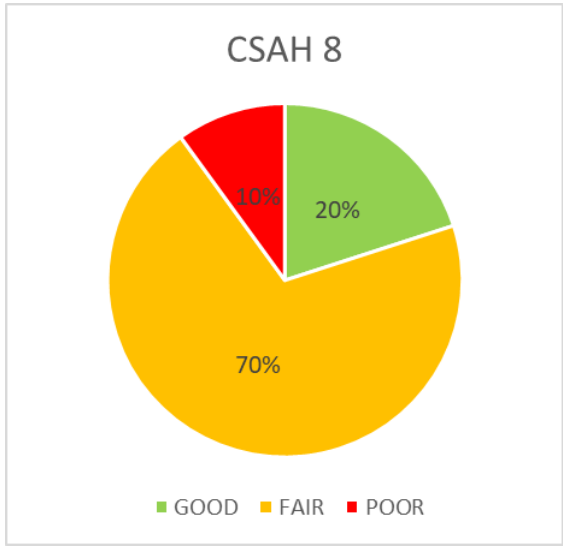
HIGH TRAFFIC



5 YEARS

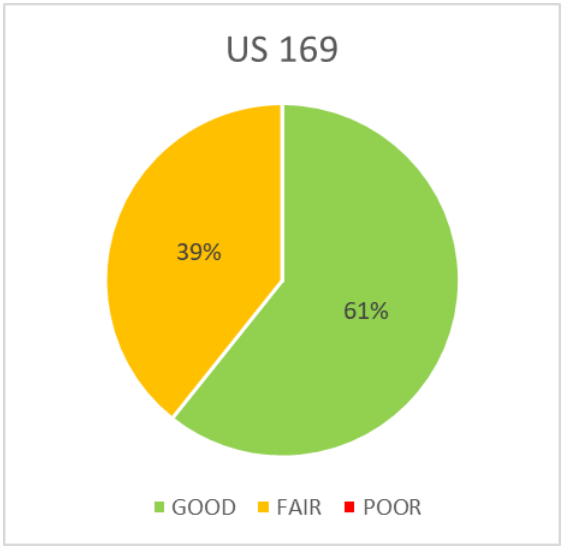
COLD CLIMATE

LOW TRAFFIC



4 YEARS

HIGH TRAFFIC



4 YEARS

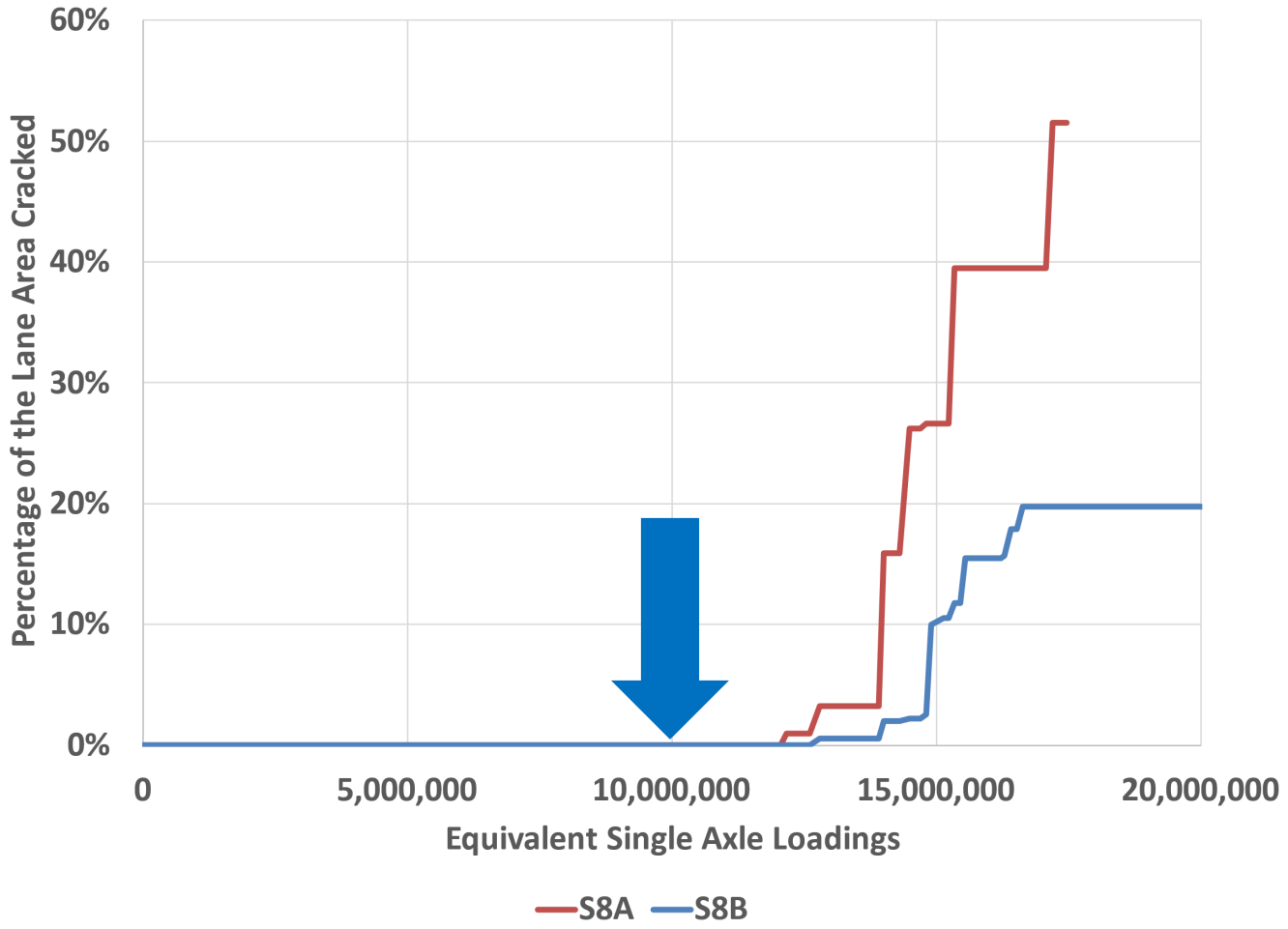
Non MAP-21 Measures that Matter

- Wet weather safety via surface friction and/or spray reduction
- Flushing or bleeding through the pavement surface
- Noise generated by pavement-tire interaction
- Raveling (macrotexture change) as indicator of future cracking
- Severity level of measured cracking (currently no differentiation)
- Shoulder drop-off at the edge of the pavement
- Evidence of water moving in and out of the pavement structure
- Maintenance or enhancement of structural integrity
- Evidence of early stages of slippage failure (i.e., dilation).

Examples of Preservation for “Good” Pavements

- Rejuvenating fog seal to extend the performance life of OGFC surfaces
- Thin mill/inlay to limit extent and severity of top-down cracking
- Chip seal, Type II or III micro surface, or OGFC thinlay for wet weather safety
- Sealing smaller percentage of cracking to slow growth to larger percentage
- Micro surface on older uncracked pavement to prevent top-down cracking
- Chip seals on 1 or 2 year old asphalt pavement surfaces to extend overall life.

CMS-1P (QB) Fog Seal on Bottom-Up Cracking in OGFC

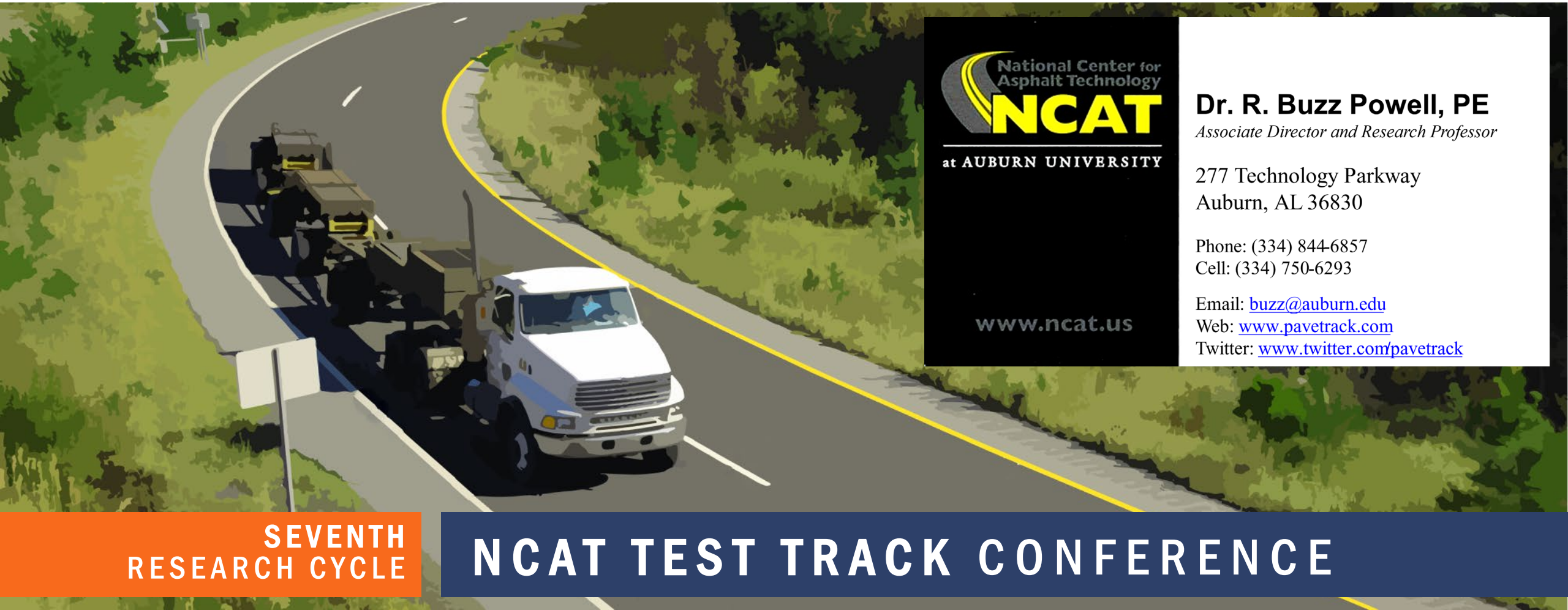


Type III Tennessee Granite CSS-1HP Micro Surface

Beyond MAP-21 Preservation Benefit Takeaways

- Intentional focus on the “fair” range for cracking, roughness, rutting
- Cracking is driving change in south, roughness is driving change in north
- Rutting is the main safety measure in MAP-21, but not driving change
- Other safety measures like surface friction and road spray reduction
- Proactive preservation actions are not incentivized (S8, N6, etc.)
- Some important features are not captured for MAP-21 (e.g., edge cracking)
- Not enough resolution in existing data for pavement management.

Questions and Answers



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