NCAT Pavement Test Track

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US-280

Buzz Powell
Industry Progress and Future

NCAT Pavement Test Track

- Help state DOTs implement positive change
- Promote real innovation for the industry.

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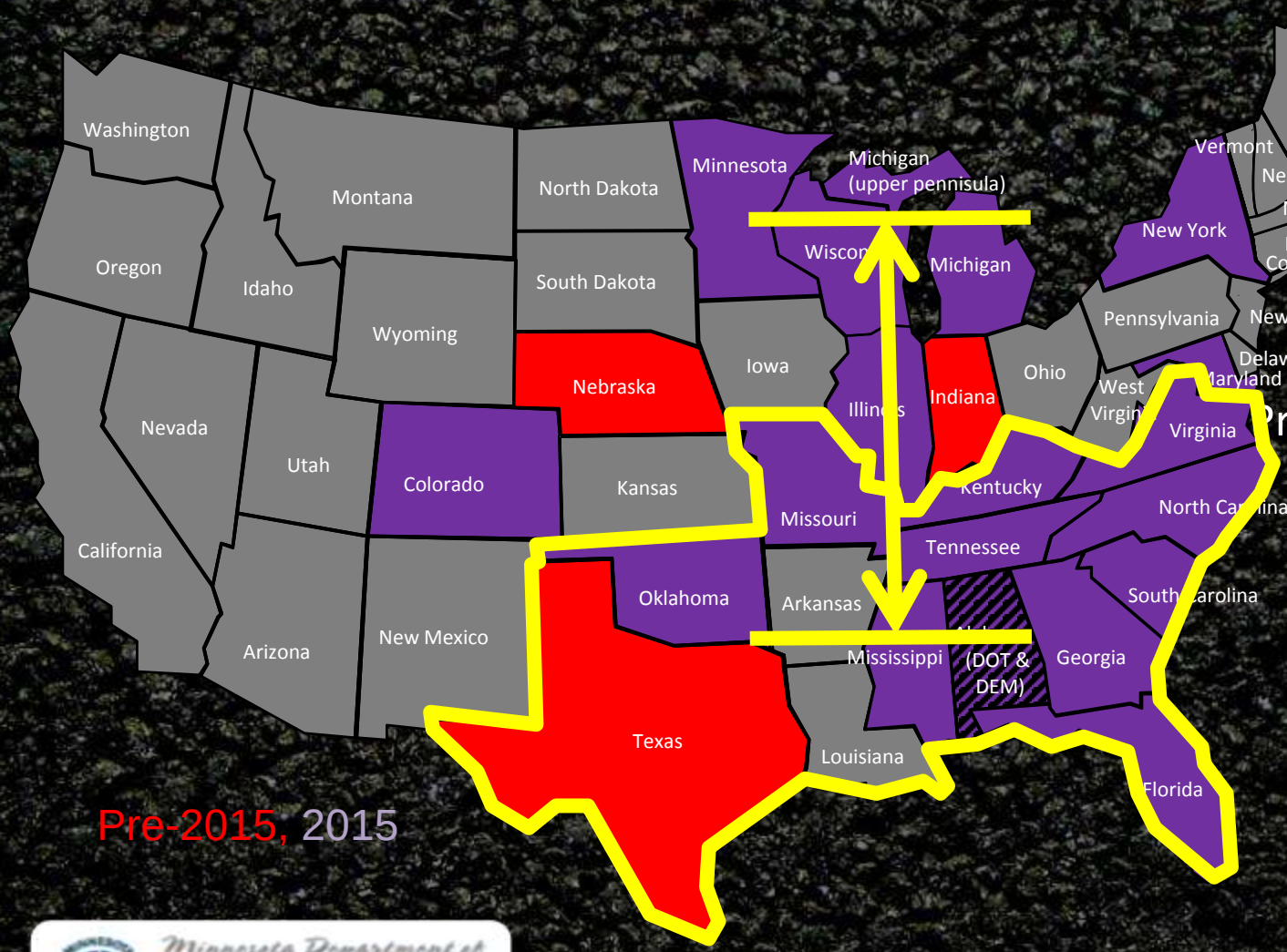

Pre-2015, 2015

FHWA

Private Sector Sponsors

Cargill Deicing Technology
Collaborative Aggregates
FP^2
Kraton Polymers
Modified Asphalt Solutions
Oldcastle Materials
Polycon Manufacturing
Seneca Petroleum
Shell Sulfur Solutions
Trinidad Lake Asphalt

Minnesota Department of Transportation

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Content

- Use of fine/small blends
- Reduced design gyration levels
- Healthy (balanced) binder content
- Reclaimed/recycled materials
- Need for a cracking test(s)

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Fine/Small Blends

- Similar rutting performance to coarse/large
- Longer path for crack propagation
- Higher effective binder content
- Better cracking/raveling performance.

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Fine/Small Blends

Fine/Small Blends

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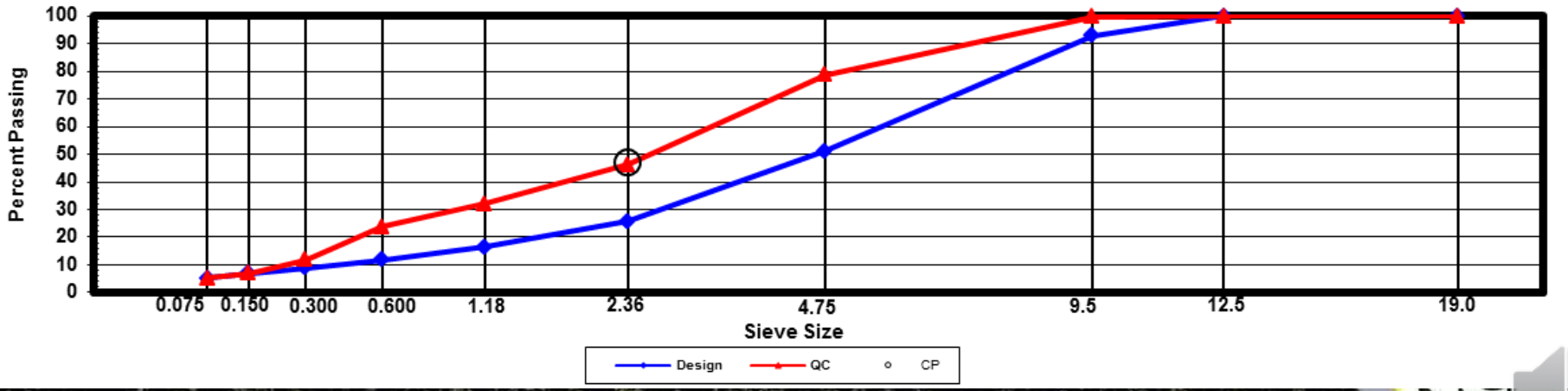
Preservation Group (PG15) Thinlays

Reduced Design Gyration Levels

- 139 to 125 to 100 to 80 to 60 gyrations…
- "Locking point" to prevent aggregate breakdown
- Often more gyrations for higher traffic mixes
- More gyrations produce lower binder contents
- Lowering gyrations alone is not enough
- Remember that VMA = V_a + V_{be} (G_{sb} is wildcard)
- Single gyration level (with performance testing)?

Finer Mixes with Lower N_{des}

Finer Mixes with Lower N_{des}



Healthy Binder Content

- “Reclaimed/recycled content” is not enough
- “Aged binder ratio” (ABR) is not enough
- Use “RAP binder ratio” and “RAS binder ratio”
- Ground tire rubber for sustainability
- Polymers, high polymers for cracking/fatigue.

Recycled Ground Tire Rubber

High Polymer for Preservation

Polymer Binders in Higher RAP Mixes

Reclaimed/Recycled Materials

- Best use of every ton of RAP from the roadway
- Fractionation to optimize RAP value & quality
- RAP in the past ≠ current RAP ≠ future RAP
- We must continue to use shingles, but…
- Soft asphalts, rejuvenators, richer mix designs
- Better methods to know true production VMA
- Discounting contribution of RAP/RAS binders
- 100% RAP mixes under lower ABR surface mixes.

ABR Thinlays on Cold Recycle$_{F,E}$

CCPR (KMA220)

CIR (3800CR)

ABR Thinlays on Cold Recycle$_{F,E}$

Aged Binder Ratio (from Both RAP and RAS)

Need for a Cracking Test (!)

- Academia breeds divergence and chaos
- Promotion of many different types of tests
- Must be fast, low cost, and meaningful
- Design verification for performance potential
- Construction for confidence in produced mix
- Innovation without negative performance impact.

Cracking Group (CG) Section Surfaces

- 20% RAP control$_{N1@20/0}$
- High density control$_{N2@20/0}$
- Low AC/density control$_{N5@21/0}$
- Control + 5% RAS$_{N8@20/14}$
- Control +15% RAP with PG58-28$_{S5@33/0}$
- Control with HiMA$_{S6@19/0}$
- 15% RAP AZ rubber with ARB20$_{S13@7/0}$.

Status Report

- High level of construction quality achieved
- >1½ million ESALs on Track with no early concerns
- ≈½ million ESALs on LR-159 with good results
- ≈1 million vehicles on US-280 with good results
- Weekly data collection on Track, 159, & 280
- Planning for MnROAD treatments summer 2016.

Minnesota Department of Transportation

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End-of-Cycle Track Conference

- High RAP/RAS balanced mix designs
- Nationwide pavement preservation
- Preventing reflective distresses
- Optimized structural design
- Implementation

Pavement Test Track Conference

March 6-8, 2018

The Hotel at Auburn University
and Dixon Conference Center

www.ncat.us

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Track Mission Statement

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