Measuring Friction Performance

Mike Heitzman PE, PhD

SEAUPG November 2019

NCAT Friction Studies

- FHWA Alternative Aggregates for HFST
- FHWA Asphalt Bound Friction Surfaces
- OK DOT Optimize OGFC Aggregate
- MI DOT Classify HFST Aggregates
- MS DOT Improving Thin Asphalt Surfaces
- WV DOT Use of Local Friction Aggregate

What is HFST?

- AASHTO PP 79-14
  - Polymer binder resin 25-32 ft²/gal
  - Calcined bauxite 12-15 lb/yd³ (Al₂O₃ 87%, LA Abr 20%)
  - SN40R of 65 minimum post construction
- Challenges
  - Bauxite gradation is fixed (passing No.6, retained No.16)
  - challenge-aggregate blending
  - Bauxite cost is high: ($300/ton)
  - challenge-aggregate surface exposure
HFST Alternative Studies

FHWA Alternative Aggregates for HFST
  - 8 aggregates, lab TWP/DFT & Test Track
  - Test Track W8 & W9, April-2011

W8-9 HFST Test Sections

W9F - Taconite, MN
W9E – Al-Fe Oxide, OR
W9D – Slag, PA
W9C – Silica, OH
W9B – Basalt, WA
W9A – Chert, OK
W8B – Bauxite, China
W8A – Granite, WI

W8-9 HFST Test Sections

Friction Ranking

- Field DFT
- Lab DFT
- Field SLU project
- Lab SLU tested (Slag Only)
HFST Alternative Studies

FHWA Asphalt Bound Friction Surfaces
- Micro-surfacing & SMA, 2 aggregates
- Calcined Bauxite & Limestone blend
- TX Sandstone
- Micro-surfacing placed Sep-2015, W7
- SMA placed Apr-2017, W3

W7 Split Test Sections

W7 Friction Performance

W7 Microsurfacing with Bauxite
W3 Friction and Texture Performance

FHWA Friction Summary

HFST Alternative Studies

- OK DOT Optimize OGFC Aggregate
  - 4 aggregates, lab selection, TT performance
  - Sandstone on TT, NB, Sep-2015
- MI DOT Classify HFST Aggregates
  - 11 aggregates, lab TWPD/DFT
  - 2016
OK DOT Aggregate Selection Using Accelerated Lab Friction

Other OK Pavement Surfaces

MI DOT HFST Aggregate Study
Friction Aggregate Studies

- MS DOT Improving Thin Asphalt Surfaces
  - Thin AC surfaces, 2 aggregates, lab TWPD/DFT
- WV DOT Use of Local Friction Aggregate
  - Aggregate proportion, Lab TWPD & TT
  - 50% dolomite std, study 70% and 90%
  - Placed Oct-2018

MS DOT – Lab Test 9.5 mm Mix

MS DOT – Lab Test Thin-lift Mix
Surface Selection

- Friction performance
- Macro-texture
- Binder cost
- Aggregate cost
- Surface life

What are acceptable surface criteria?

NCAT Three Wheel Polishing Device
THANKS!
Any questions? Reach me at mah0016@auburn.edu