Virginia Quiet Pavement Implementation Program

Kevin K. McGhee, PE
Assoc. Principal Scientist

2012 Virginia Concrete Conference
Richmond, Virginia
Quiet Pavement Task Force

Co-Chairs:
Andy Babish, PE, State Materials Engineer
Richard Schreck, Executive Vice President, VAA

Members:
Emmett Heltzel, PE, VDOT Maintenance Division Administrator
Trenton Clark, PE, VAA Director of Engineering
David Lee, PE, VDOT Salem District Materials Engineer and Chairman VTRC Asphalt Research Advisory Committee
Paul Kohler, VDOT Noise Abatement Section Manager
Michael Sprinkel, PE, VTRC Associate Director of Research
Kevin McGhee, PE, VTRC Associate Principal Scientist
Ed Dalrymple, Vice President, Chemung Contracting
David Helmick, Vice President, Superior Paving Corp.
Bob Long, American Concrete Pavement Association
Del. Jim Lemunyon, JCTA Subcommittee on Quiet Pavements
“expedite the development of quiet pavement technology such that applicable contract solicitations for paving shall include specifications for quiet pavement in any case in which sound mitigation is a consideration. To that end, the Department shall construct demonstration projects sufficient in number and scope to assess applicable technologies.”
“Quiet” Pavement

What it is:
• In General – a wearing surface that minimizes tire-pavement noise production and propagation
• Asphalt – “small-textured” porous mix (e.g., open-graded asphalt concrete)
• Concrete – negative-textured longitudinal grind and groove (e.g., “Next Generation Concrete Surface”)

What it isn’t:
• A universal substitute for noise barriers
“Quiet” Pavement

- Asphalt:

- Concrete:
Noise Measurement

Tire-Pavement (i.e., OBSI)

Wayside
Demonstration Projects (2011)

1. SR 7 By-Pass in Leesburg (A)
2. SR 199 west of Williamsburg (A)
3. SR 288 near Chester (A)
4. I-64 Virginia Beach (C)
5. SR 76 Richmond (C)
Demonstration Projects (Conc)

Plan View
State Route 76 (Richmond)

Section 1: NGCS

Section 2: Conv. Ground

Section 3: Control
I-64 (near VA Beach)
Next Generation Concrete Surface

• First Step – “pre-grind” with conventional diamond grinding process (1/8-inch blades and .110-inch spacers)

• Second Step – the “flush grind” process (4-ft head, 1/8-inch blades and .035-inch spaces) → smoothness requirements

• Final Step – longitudinal grooves (1/8-in wide x 1/8 or 3/16-in deep on ½ to 5/8-in centers)
Friction and Ride Quality

• SN40S greater than 25 (ASTM E274 with E524/bald tire) – waived for demos

• Ride Quality:
  1. VDOT’s “Special Provision for Rideability”
     • .01-mile paylot
     • IRI of 55 – 70 Interstate/65 to 80 non-Interstate)
  2. NGCS Smoothness
     • Lightweight profiler with RoLine™ ht. sensor
     • Mean Roughness Index (MRI) of 50 or less
Evaluation Plan

• Performance
  – Tire-pavement & wayside noise
  – Skid resistance, ride quality, and splash-spray
  – Material and structural stability

• Also Relevant
  – Constructability & cost
  – Winter function and maint. requirements
  – Federal Policy!!
Functional Evaluation

- Tire-Pavement Noise
- Skid Resistance
- Texture
- Ride Quality
- Surface Drain-ability
- Wayside Noise
NGCS site “pre-grind” - Richmond
Control site - Richmond
NGCS finished
Tire-Pavement Noise (initial)

- PFC 12.5
- AR-PFC 9.5
- NGCS
- PFC 9.5
- SMA 9.5
- CDG
- Trans. Tined PCCP

OBSI (dBA)

90.0 - 106.0
Overall Program Costs (so far)

• Demonstration Projects (2011): $20 to $24 million
• Research - Approximately $1.2 to $1.5 million:
  – NCAT Trials - $720,000 to $1 million
  – VTTI Contract - $250,000
  – VCTIR/VDOT In-house - $210,000
Remaining Activities

• Interim report - June 2012
• Additional demonstration projects – summer/fall 2012 (likely asphalt only)
• Quarterly/biannual monitoring
• Final Report - June 2013 - will include “…a plan for routine implementation of quiet pavement…”