Update on VDOT’s Asphalt Research Activities

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Virginia Asphalt Association Fall Meeting
October 8, 2013
NCHRP Project 9-51

“Material Properties of Cold In-Place Recycled and Full-Depth Reclamation Asphalt Concrete for Pavement Design”

• Current work:
  – Receiving cored samples from agencies in Canada and the US for dynamic modulus (stiffness) and repeated-load permanent deformation (rutting) testing.
  – Work is expected to continue through 2014 with cores from an anticipated 25 projects
Alternate Uses of RAP

VCTIR asked to explore alternate uses of RAP beyond HMA/WMA blends

• Meeting of Elko, VCTIR, and District folks
• Proposed Unbound applications:
  – Blends for unbound aggregate base for pavements
  – Use for unpaved road stabilization/shoulders
  – Use as embankment fill
Alternate Uses of RAP

**RAP in unbound aggregate pavement base**

- Establish a research project to evaluate impacts on:
  - Compaction
  - Drainage
  - Stability
- Determine acceptance criteria
Alternate Uses of RAP

Unpaved Road and shoulder stabilization

• Trial maintenance applications to be performed using either in-house or contract forces.
• Monitor impacts on compaction and stabilization.
• Assess whether any environmental concerns exist.
Alternate Uses of RAP

**RAP as embankment fill**

- Conduct field trials and monitor
  - Compaction
  - Necessary cover
  - Maximum heights (stability)
  - Waterflow and environmental influence
  - Viscoelastic (creep) settlement
Full-Scale Accelerated Pavement Testing

• A means to study pavement performance
  – under more controlled conditions
  – more rapidly
  – with less risk to the traveling public / agency

• Heavy Vehicle Simulator (HVS)
  – Dynatest
  – 5 units operating in the US
  – $3 million
Tradeoffs in Pavement Testing

- **Cost ($ and time):**
  - Computer modeling (days)
  - Laboratory testing (weeks)
  - Full-scale accelerated testing (months)
  - Long-term monitoring (10-30 years)
VDOT APT Program

• Address strategic issues
  – Materials & designs, rehabilitation alternatives, vehicle characteristics, etc.
  – Better quantify results by testing under controlled conditions
  – Educate future agency pavement staff

• Costs
  – Significant cost to startup and operate
    • However, a small % of VDOT’s total pavement maintenance budget (~ $500 million per year)
Benjamin F. Bowers

- Ph.D., Civil Engineering / Geotechnical and Materials Engineering Engineering
  University of Tennessee, Knoxville
  - Dissertation: Investigation of Blending Efficiency and Some Special Problems in Asphalt Paving Mixtures Utilizing Analytical Chemistry Techniques
  - Advisor: Dr. Baoshan Huang

- M.S., Civil Engineering / Geotechnical Engineering (2010)
  University of North Carolina at Charlotte
  - Thesis: Effect of Calcium Chloride on Cement Stabilization of Soils
  - Advisor: Dr. John L. Daniels

- B.S., Civil and Environmental Engineering (2009)
  University of North Carolina at Charlotte
Pavement Research Scientist

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FUNDED RESEARCH EXPERIENCE

• NCDOT - research on cold weather cement stabilization of soils. Featured cement, lime, sodium chloride and calcium chloride additives in laboratory and field applications.

• National Natural Science Foundation of China (NSFC) - research on the erosion characteristics of fly ash treated with organo-silane solutions while abroad in Xuzhou, Jiangsu, China.

• TennDOT - field collection and lab testing of asphalt pavement with low to high Reclaimed Asphalt Pavement (RAP) contents.

• TennDOT - field collection and lab testing of Warm Mix Asphalt (WMA) pavements using foaming and chemical additives.
For more information:

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