2016 VAA Fall Conference

FHWA High Density Initiative
VDOT perspective

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If you're on a paved road, it's because somebody paved it for you. If it's not paved, it's your responsibility to pave it for someone else.
Much of this content is credited to:

Vanna Lewis, PE
Regional Field Engineer – FHWA Virginia Division Office
FHWA Density Demo – Virginia workshop July 13, 2016
Part 626.3 Policy:

“Pavement shall be designed to accommodate current and predicted traffic needs in a safe, durable, and cost effective manner.”
Effect of In-Place Air Voids on Life Cycle Cost

From past studies, 1% increase in air voids would decrease the service life by a conservative estimate of 10%.

This means …

• An asphalt overlay constructed to 93% density might be expected to last 20 years, while

• The exact same asphalt overlay constructed to 92% density would only be expected to last 18 years
Today’s Environment

2011 FHWA Division Office Assessment

About ½ of SHA’s are not satisfied with overall performance of longitudinal joints

2013 NAPA Industry Survey

More than 30% of asphalt materials are produced using WMA technology, RAP use has increased to 20+%, and there is a significant interest in other recycled materials.

Significant Advancements

Many State Target Density requirements have not changed since the 1980s!
Typical Asphalt Pavement Density requirements are based on what was achievable yesterday.

Today we have made significant advancements in material and construction technology and techniques.

Today we are also placing more and more materials containing higher levels of recycled, reclaimed, and reuse (RRR) products.

Challenge: Can we use today’s technology and techniques to raise-the-bar on in-place density to improve durability and thus extend pavement service-life?
Current Technologies that Influence Compaction...

- SHRP 2 IR Bar
- Balanced Mix Design
- Warm Mix Asphalt
- IC
- Long. Joint Best Practices
- Tack Coat Best Practices

Density = Durability
Enhanced Durability through Increased In-Place Pavement Density

**Assumption** – Pavement density can be increased in meaningful increments, with a minimum of additional cost

**Long-Term Objective** – States will increase their in-place asphalt pavement density requirements resulting in increased pavement life
Increased Density Pavements

**Planned Schedule**

- **By March 2016**, 10 State projects were selected to participate
- **By December 2016**, 10+ State highway agencies will host an “Increased Density” Asphalt Construction Workshop
- **By December 2016**, 10 State highway agencies will place an “Increased Density” Pavement Section
- **2017** - FHWA will monitor & document the number of states that decide to modify existing density standards
Enhanced Durability of Asphalt Pavements through Increased In-Place Pavement Density

Demonstration projects (10)
Forming the team – a partnership
Good folks, working together!!

S.L. Williamson
• Blair Williamson  President
• Junior Eppard   Vice president
• Dave Wyant   Quality Control manager
• Anthony Wynn & crew   Superintendent

Cartery Machinery
• Frank Harris  IC roller & equipment support

VDOT
• Mauris Mackenzie  ACE – Culpeper District
• Haroon Shami  Materials – Culpeper District
• Sungho Kim  Materials Division
• Bryan Smith  Materials Division
• Todd Rorrer  Materials Division
• Kevin McGhee  Research Council
• Troy Deeds  Research Council

FHWA
• Vanna Lewis  Area Engineer, Virginia Division
• Ray Brown  Consultant to FHWA
Increased Density Pavements

**Location & contract details**

- **PM7C-967-F16, P401**

- **US 522 in Louisa County (~ 3.3 miles)**
  - from Rt. 770 (MP 22.04)
  - to Rt. 208 (MP 25.3)

- **8,568 tons of SM-12.5A - straight overlay @ 230 #/sy.**
  (~ 4,550 tons / 2.2 miles of this section placed on the demo work)

- **Mix shipped out of their Ruckersville plant** – about a 45 minute haul.

- **This plant uses a warm-mix (foaming) for this mix.**

- **The paving for this section was performed during the week of September 12 – 16.**
Increased Density Pavements

**Test section details**

**Control section**: Wednesday production
- Normal contractor’s practice with roller pattern/control strip
- Two rollers without using any oscillatory action (they were used simply as vibratory breakdown rollers)

**Test section 1**: Thursday production
- Using an oscillatory roller & the oscillatory features, but targeting a higher density of 94% MTD density.

**Test section 2**: Friday production
- Added an additional roller (total 3), maximizing density.
- Also used an Intelligent Compaction (IC) system.

**General**:
- The paver used an IR camera system for all three sections.
- VTRC collected 10 top layer cores and 6 additional full depth cores to check density from each section.
A contractor’s experience with the FHWA density demo project

David Wyant – S.L. Williamson