



**2016 VAA Fall Conference**

**FHWA High Density Initiative  
VDOT perspective**

October 4, 2016

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**Buzz Williams**



8 hrs · 

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.

# Credit



## Contact Info

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Much of this content is credited to:

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FHWA Density Demo – Virginia workshop July 13, 2016

# Title 23 Code of Federal Regulations CFR Subchapter G – Engineering and Traffic Operations



## 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!

# Asphalt Pavement Compaction

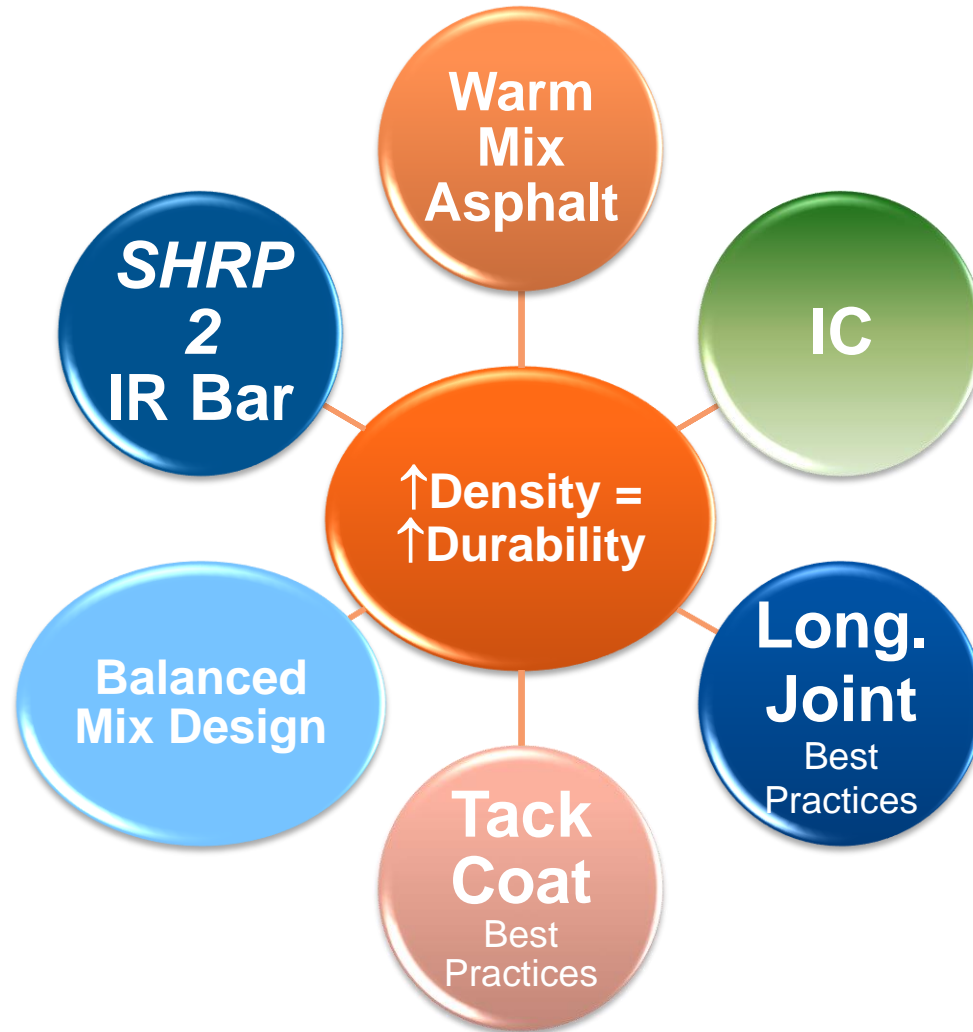
Typical Asphalt Pavement Density requirements are based on *what was achievable yesterday*.

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...





## Enhanced Durability through Increased In-Place Pavement Density

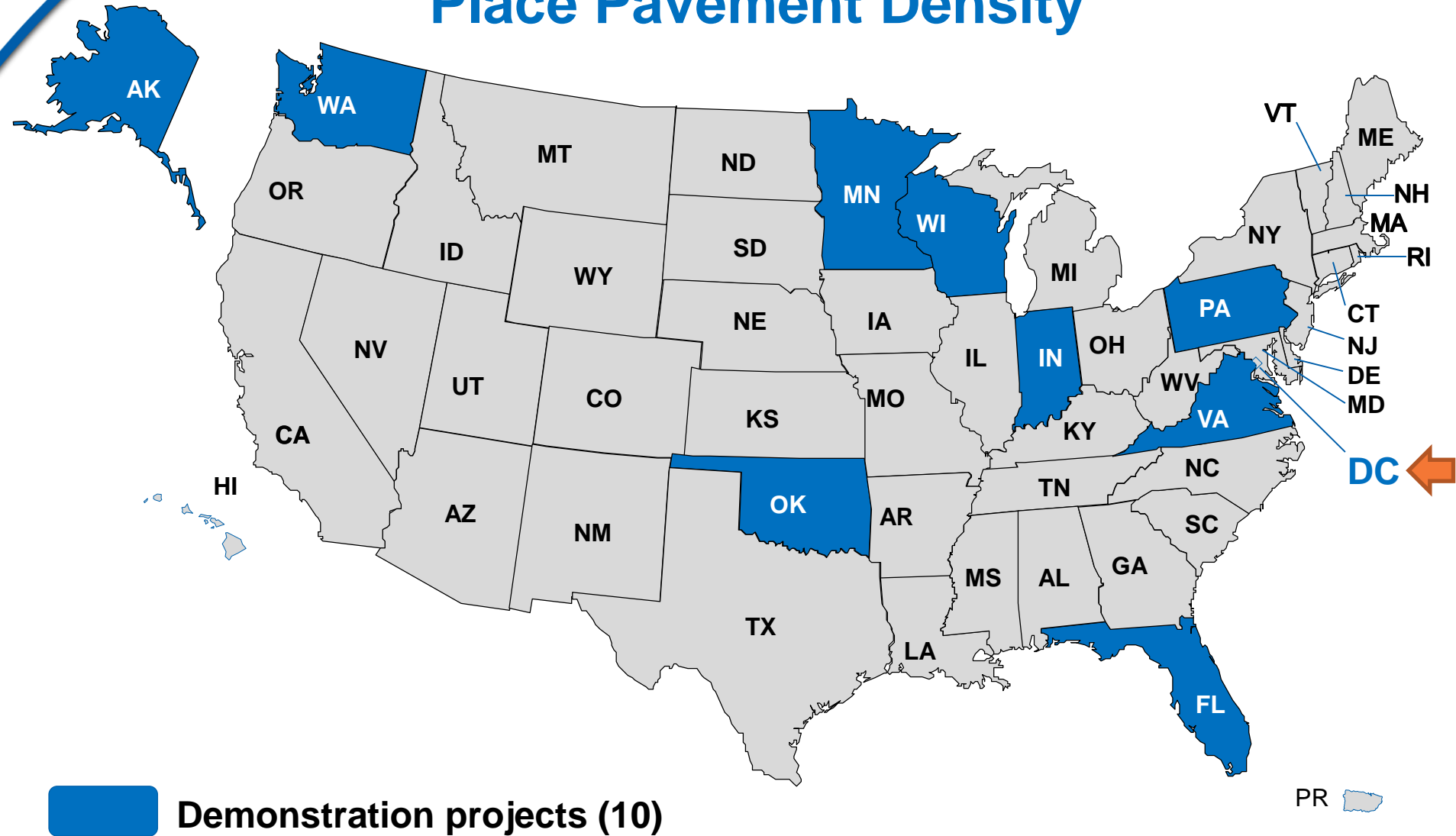
**Assumption – Pavement density can be increased in meaningful increments, with a minimum of additional cost**

**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



# Forming the team – a partnership



# Good folks, working together !!

## S.L. Williamson

- Blair Williamson
- Junior Eppard
- Dave Wyant
- Anthony Wynn & crew

President  
Vice president  
Quality Control manager  
Superintendent

## Cartery Machinery

- Frank Harris

IC roller & equipment support

## VDOT

- Mauris Mackenzie
- Haroon Shami
- Sungho Kim
- Bryan Smith
- Todd Rorrer
- Kevin McGhee
- Troy Deeds

ACE – Culpeper District  
Materials – Culpeper District  
Materials Division  
Materials Division  
Materials Division  
Research Council  
Research Council

## FHWA

- Vanna Lewis
- Ray Brown

Area Engineer, Virginia Division  
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

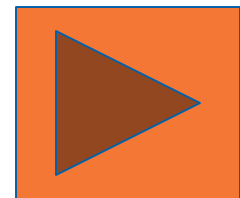
- Added an additional roller (total 3), maximizing density.
- Also used an Intelligent Compaction (IC) system.

### 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.

**And now.....**

**A contractor's experience with the  
FHWA density demo project**



**David Wyant – S.L. Williamson**