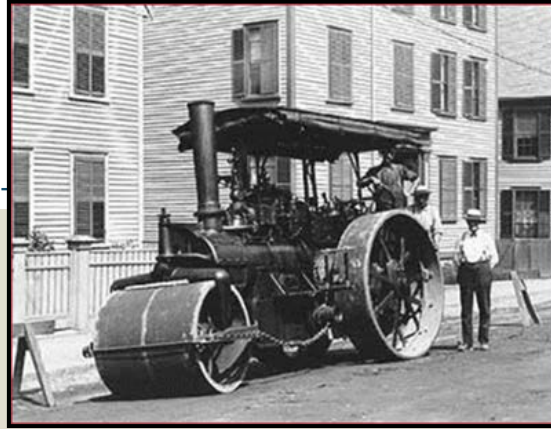


# Enhanced Durability Through Increased Density

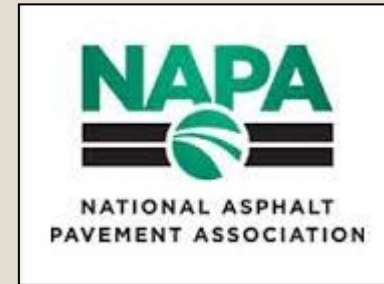


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ASPHALT MIXTURE AND CONSTRUCTION EXPERT TASK GROUP  
SEPTEMBER 21, 2017

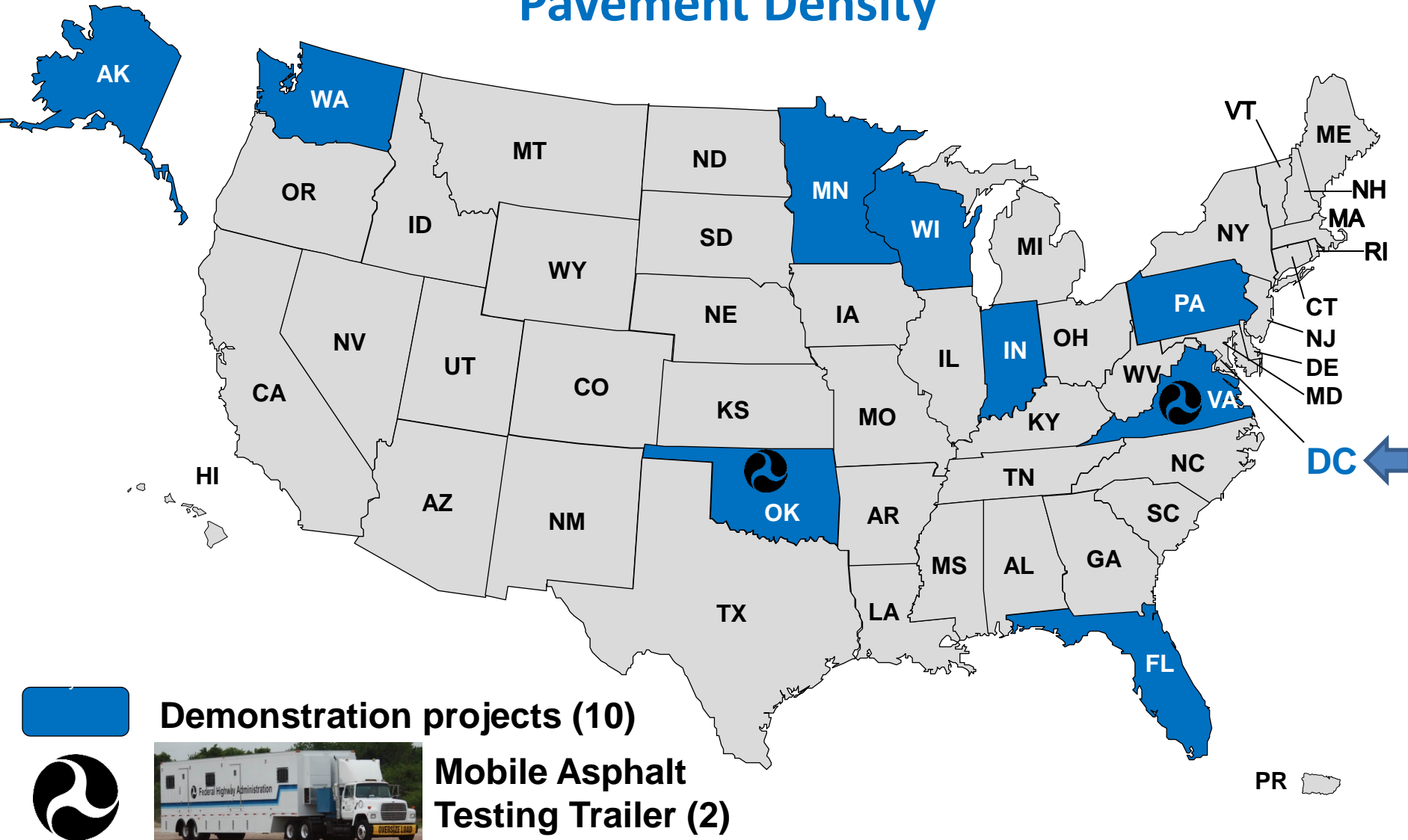
# Overall Objective



Ultimately,  
achieving increased in-  
place asphalt pavement  
density that results in the  
highest asphalt pavement  
performance.



# Enhanced Durability of Asphalt Pavements through Increased In-Place Pavement Density

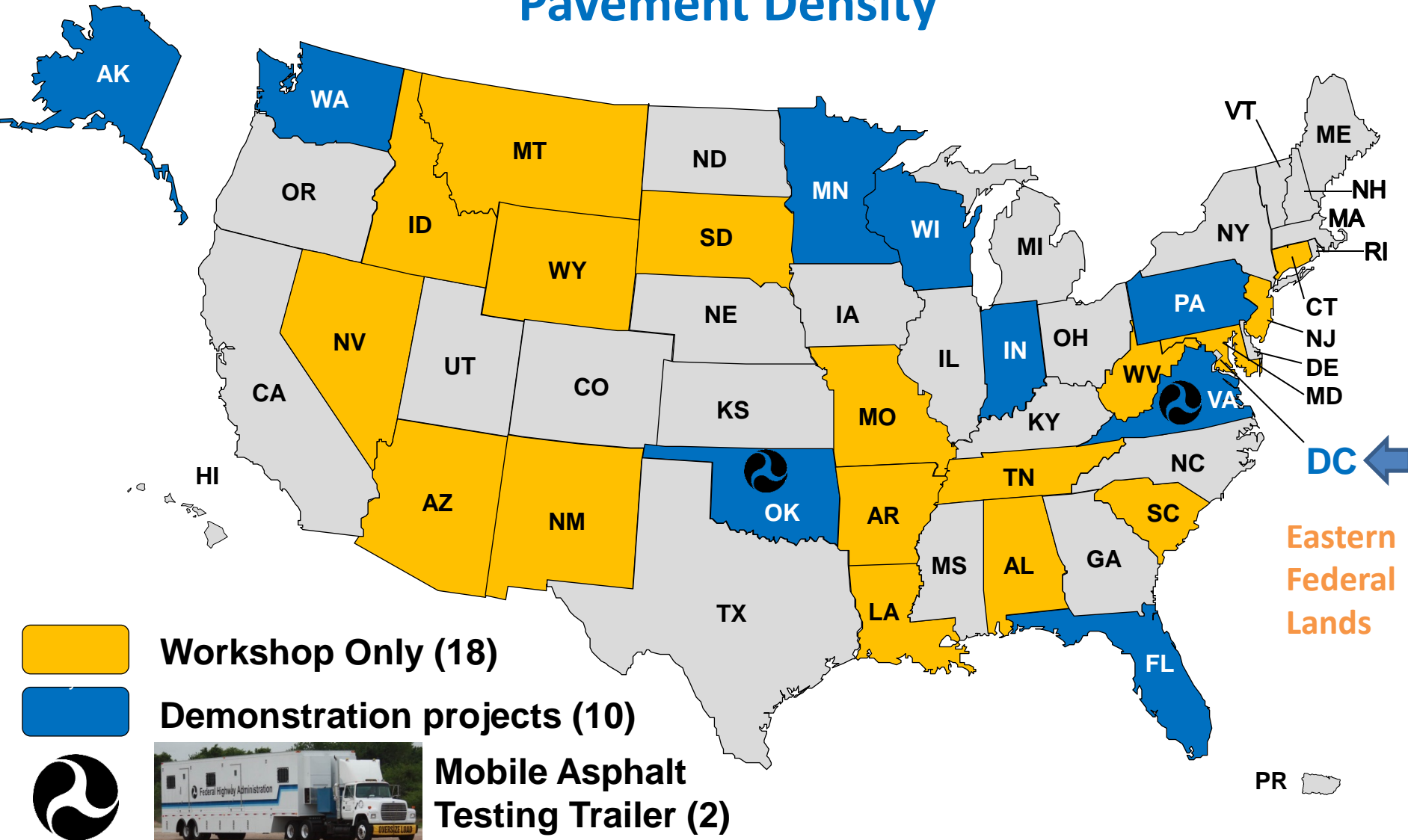


**Demonstration projects (10)**



**Mobile Asphalt Testing Trailer (2)**

# Enhanced Durability of Asphalt Pavements through Increased In-Place Pavement Density

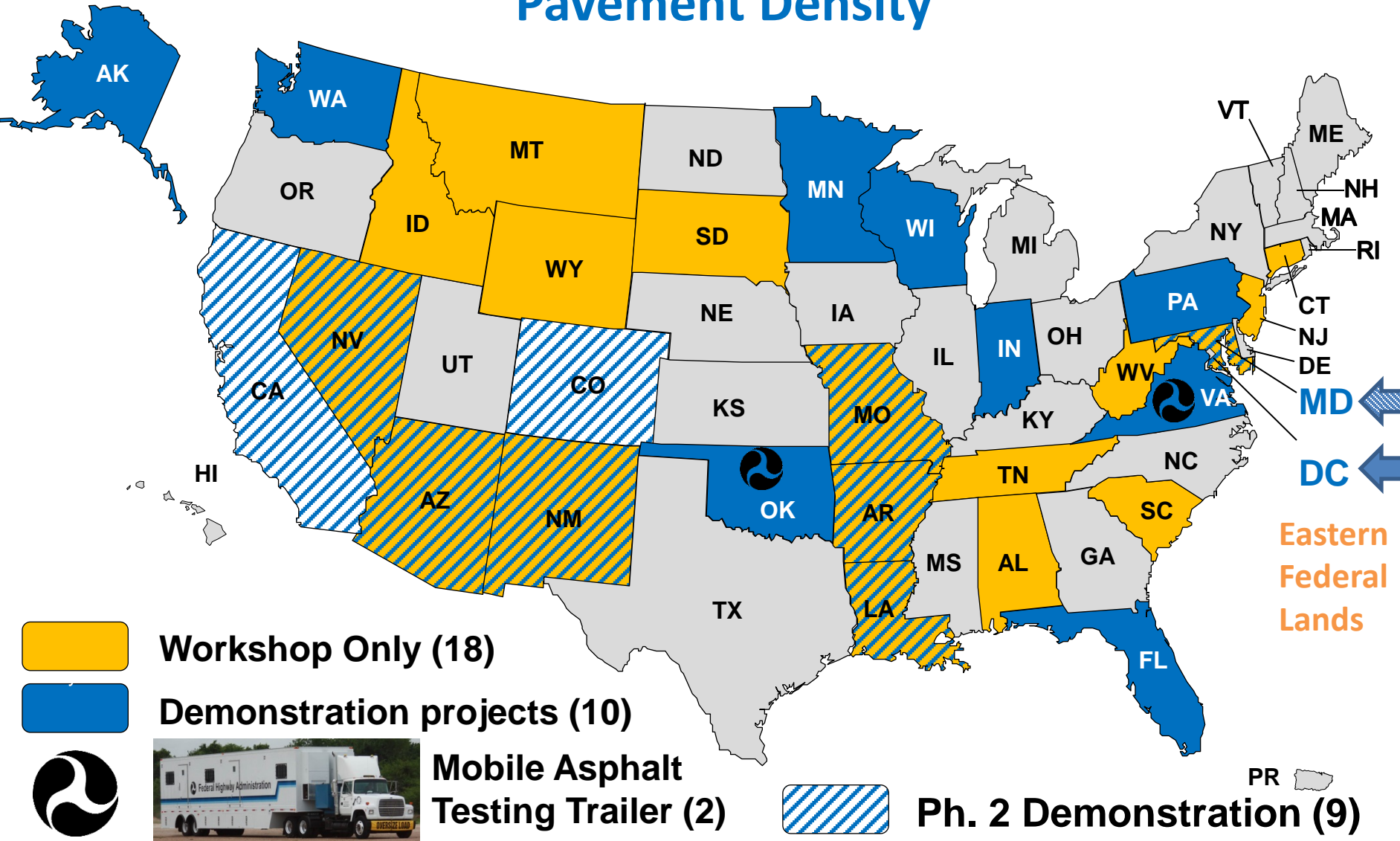


# Next Steps

- Field experiment – Phase 1
  - 10 states selected
  - Projects completed in 2016
- Extend field experiment – Phase 2
  - 9 states selected
  - Projects under construction in 2017 and early 2018
- FHWA's best practices communication
  - Summary document
  - Tech Brief
  - Additional workshops
    - Funding dependent



# Enhanced Durability of Asphalt Pavements through Increased In-Place Pavement Density



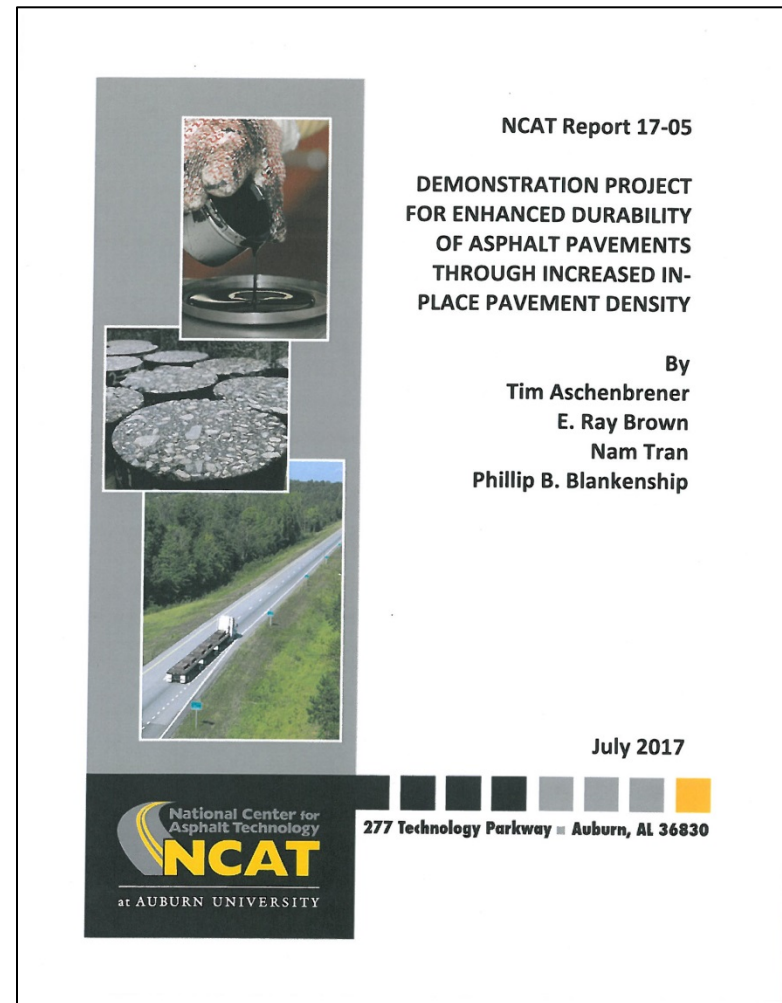
# Summary Document

NCAT Report 17-05

“Demonstration Project  
for Enhanced Durability  
of Asphalt Pavements  
through Increased  
In-place Pavement  
Density”

July 2017

<http://eng.auburn.edu/research/centers/ncat/files/technical-reports/rep17-05.pdf>



# Can We Achieve Increased In-place Density?

**Yes!**

Test sections had increased % TMD:

- 8 of 10 states achieved > 1.0% increase
- 7 of 10 states achieved > 94.0%  $G_{mm}$
- 6 of 10 states achieved > 95.0%  $G_{mm}$

Will there be changes?

- 7 of 10 states are changing specifications



# How Do We Achieve Increased In-place Density?

Best practices cannot be mentioned enough

- Compactive Effort
  - Wide differences from state to state
    - Number of rollers
    - Types of rollers
    - Number of passes
- Consistency
- Temperature



# How Do We Achieve Increased In-place Density?

Measuring density (1)

Reference density (1)

Density of pavement to meet requirements (4)

- Some at 90 to 91%  $G_{mm}$
- Others at 94%  $G_{mm}$

Type of specification (2)

- 22 states use minimum lot average
- 25 states use PWL
  - Impacts contractors' target and consistency

Consistency (2)

- Standard deviations <1.00 were achievable

(#) – States making  
changes or in the process

# How Do We Achieve Increased In-place Density?

## Incentives (3)

- 37 states have incentives: range from 1 to 10%
- Average 2.9%

## Mixture design changes (5)

- Many states changing Superpave to get more asphalt
- Must also look at density specification

## New technologies (2)

- Did not help improve density, but were a good troubleshooting tool

(#) – States making changes or in the process

# States Ask:

## Should we look at our density specification?

### Option 1: Case-by-case basis

- Contact me for additional discussion to find out if your SHA's density could be improved.

### Option 2: Put a number out there?

- Average densities on a project are ??? (< 91 or 92%  $G_{mm}$ )
  - Definite benefits
- Average densities on a project are ??? (< 92 or 93%  $G_{mm}$ )
  - Time spent wisely



# Thank you



**QUESTIONS / COMMENTS:**



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