



Enhanced Durability Through Increased In- Place Pavement Density

JOHN BUKOWSKI
FEDERAL HIGHWAY ADMINISTRATION

Improved Durability through Increased Field Compaction

- Assumption – Pavement density can be increased with a minimum of additional cost.
- Objective – States increase their in-place asphalt pavement density requirements resulting in increased pavement life.

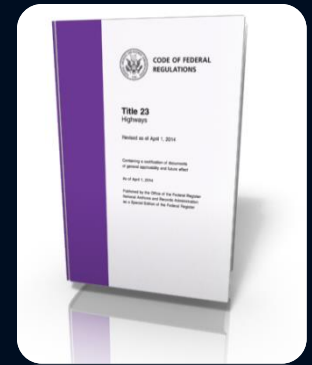


FHWA's Strategic Goal for the Pavement Technology Program

- Provide leadership and technology for the delivery of **long-life pavements** that meet our customers needs and are safe, cost effective, and can be effectively maintained.



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.”

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 resource responsible 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 extend pavement service-life?

Today's Environment

2011 FHWA Division Office Assessment

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

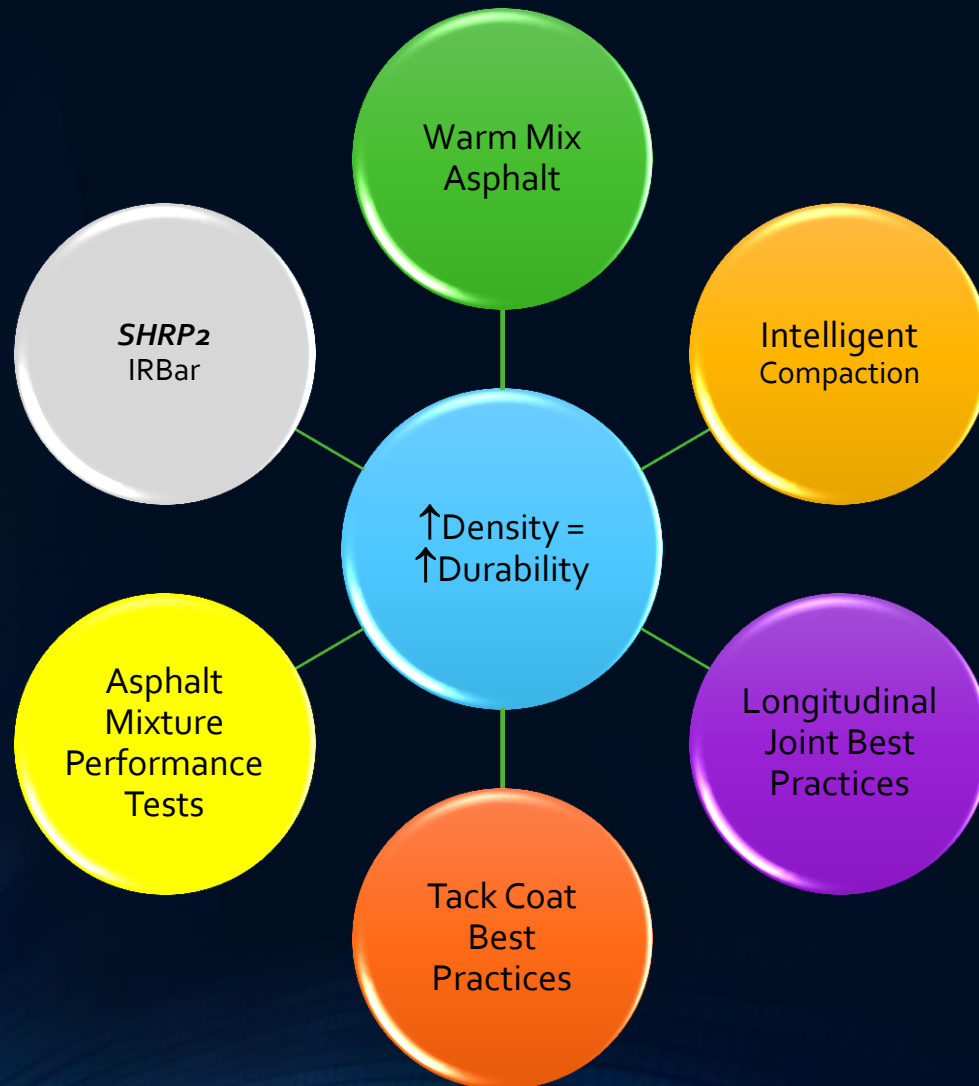
2013 NAPA Industry Survey

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

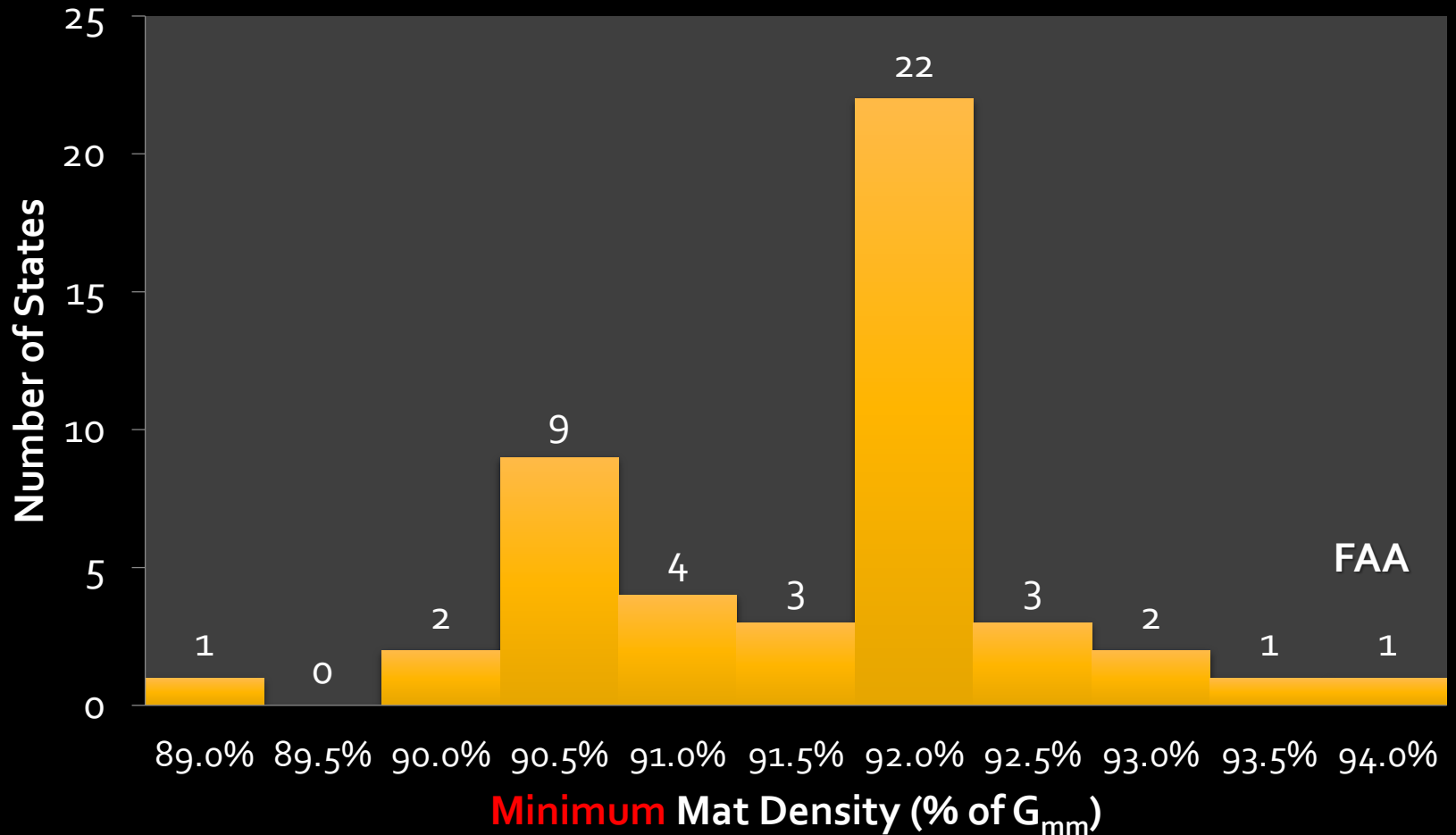
Many State Target Density requirements have not changed since the 1980s!

Let's Bring it **ALL** together...
↑ Density = ↑ Durability



2003 AASHTO SOM Survey

Minimum Target



Challenges – Many Considerations

How Density is Measured:

- Percent within Limits (PWL)
- Minimum with Maximum
- Running Average
- Target with Tolerances $\pm 0.2\%$

Important Considerations:

- Appropriate lift thickness for NMAAS and coarse gradations
- Appropriate mix design requirements
- Appropriate test methods for measuring compaction (both G_{mm} and G_{mb})
- Density only a surrogate for permeability
- Appropriate acceptance criteria that properly motivates and rewards the contractor to reach the desired level of compaction as opposed to just the minimum

Improved Durability through Increased Field Compaction

- A 2% increase in field compaction claimed to increase asphalt pavement service-life from 5 to 10+%!
- Today's compaction target - typically 92% of maximum (G_{mm}) or 8% air voids), with varying requirements for the area near the longitudinal joint

❖ **Increased Density Pavements** target a 2% increase across the entire pavement!

- Just 2% more... makes a huge difference!



Improved Durability through Increased Field Compaction

- A 2% increase in field compaction claimed to increase asphalt pavement service-life from 5 to 10+%!
- Today's compaction target - typically 92% of maximum (G_{mm}) or 8% air voids), with varying requirements for the area near the longitudinal joint

❖ **Increased Density Pavements** target a 2% increase across the entire pavement!

- Just 2% more... makes a huge difference!



Increased Density Pavements

Improved Durability through Increased Field Compaction

EXAMPLE
Schedule



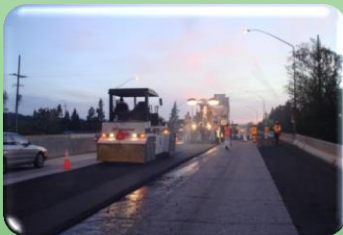
By December 2016, 10+ State highway agencies will host an “Increased Density” Asphalt Construction Workshop

- SHA, Contractors, Equipment Supplies, and Academia.



By December 2016, 10+ State highway agencies will place a “Increased Density “ Pavement Section

- FHWA fund evaluations on existing pavement projects.



2017, document number of states that modify existing standards.

- Goal 10+ states.....

Increased Density Initiative

Improved Durability through Increased Field Compaction

Possible Next Steps :

1. Webinars (NAPA), On-site training (AI), Information search (NCAT)
2. Fund State Agency trials/reports on feasibility
3. Encourage State Agency standards changes (ex. 2% increase in MTD)



THANK YOU.....

