



MIXBUSTERS

Buzz and Dave



MIXBUSTERS

Four asphalt myths to consider

Welcome to the third installment of Mix Busters – truths about asphalt myths. Emulating the theme of the Discovery Channel program, “Myth Busters,” Between Buzz and Dave, they have over 70 years of experience designing, constructing, maintaining, and experimenting with asphalt pavements.

For 15 years Myth Busters would address various myths or urban legends to try to determine if they were true or not. Similarly, within the asphalt world, there are many long and often strongly held beliefs that may need to be examined objectively to establish if they are true or not.



Moreover, the authors have a willingness to question and challenge various “truths” we “know” about the design, construction, and maintenance of asphalt pavements. Drawing heavily on the eight completed cycles of the Pavement Test Track operated by the National Center for Asphalt Technology (NCAT) at Auburn University and untold numbers of field projects, they will explore topics that they recognize as needing to be examined for their validity.



MYTH

“Do we really need big rock for strong asphalt?”

Thank you, Dr. Isaac Howard, P.E. (Mississippi State University) and Oak Metcalfe, P.E. (formerly with the Montana Department of Transportation and the Federal Highway Administration) for independently suggesting this topic.

This one’s been passed down through generations of asphalt professionals: large nominal maximum aggregate size (NMA) goes in the bottom, small NMA at the top. But somewhere along the line, the original rationale got lost. While it’s true that finer surface mixes provide a smoother and more impermeable ride, the idea that deeper layers require larger aggregates for structural strength doesn’t hold up to scrutiny.

Well-designed mixes using smaller aggregates and higher binder contents can perform exceptionally well throughout the pavement depth.

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Four Installments to Date



Winter '24₃ – skipping tack, RAM cooling, ≤ 4 x NMAS



Spring '25₃ – coefficients, thick perpetual, lean binder



Summer '25₄ – big rock, low Va, friction agg, COAC



Fall '25₄ – fogging OGFC, complexity, '93 Guide, PTRs





Welcome to Hey NAPA

What asphalt pavement questions can I answer for you?

I've been trained on hundreds of NAPA publications and have broad general knowledge of asphalt pavement topics. Ask me anything that you'd like and I'll do my best to provide a concise answer and point you to additional resources.

Do you have access to Asphalt Magazine articles?

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www.HeyNAPA.com

“I don't have direct access to external publications, including articles from Asphalt Magazine. However, I can provide information and answer questions related to asphalt paving, materials, and industry practices. If there's a specific topic or question you have in mind, please let me know, and I'll be happy to assist you with the information I have!”



NCAT Pavement Test Track

ALDOT
Alabama Department of Transportation

National Center for
Asphalt Technology
NCAT
at AUBURN UNIVERSITY

25
Years
2001-2026

Four Installments to Date



Winter '24₃ – skipping tack, RAM cooling, 4xNMAS



Spring '25₃ – coefficients, thick perpetual, lean binder



Summer '25₄ – big rock, low Va, friction agg, COAC



Fall '25₄ – fogging OGFC, complexity, '93 Guide, PTRs



Winter 2024



Paving thicker than 4 times NMAS hurts compaction



Higher recycled asphalt mix (RAM) cools faster



Tack coat can be skipped between multiple lifts.



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What are the upper and lower limits on paving lift thicknesses?

HeyNAPA.com

Fine mix lifts should be placed 3 to 5 x NMAS

Coarse mix lifts should be placed 4 to 6 x NMAS

Justification is ability to compact and measure

“Thick lifts” are greater than 5_{fine} and 6_{coarse} x NMAS

$\frac{1}{2}$ ” mixes are “thick lift” when $> 2\frac{1}{2}_{\text{fine}}$ and 3_{coarse}

3 Track sections₂₀₁₈ have ratios between 14 & 16!

Winter 2024



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Tack coat can be skipped between multiple lifts.

Tack Coat

Purpose of Each Layer	N5 Control	S5 Higher RAP	S6 RAP+RAS	S13 Recyc Tires
Durable, Rut Resistant Surface	20% RAP ₂₀ 67-22/82-16 DG	25% RAP ₁₁ 67-22/86-22 SMA	5% RAS ₂₁ 67-22/88-16 SMA	VIRGIN 82-22 ₁₂ SMA
Stiff, Strain Reducing Middle	35% RAP ₃₉ 67-22/88-10 DG	50% RAP ₄₁ 67-22/82-16 DG	50% AGED ₂₆₋₂₄ 67-22/94-10 DG	35% RAP ₃₇ 82-22 ₁₂ DG
Fatigue Resistant Base Layer	35% RAP ₃₉ 67-22/88-10 DG	35% RAP ₃₄ 94-28/94-10 DG	25% RAP ₂₄ +76-22/88-16 DG	VIRGIN 88-22 ₂₀ AZ

Green = Evotherm Q1 Additive, Blue = Astec Green Foamer



Spring 2025



Intermediate layer mixes can be leaner, stiffer

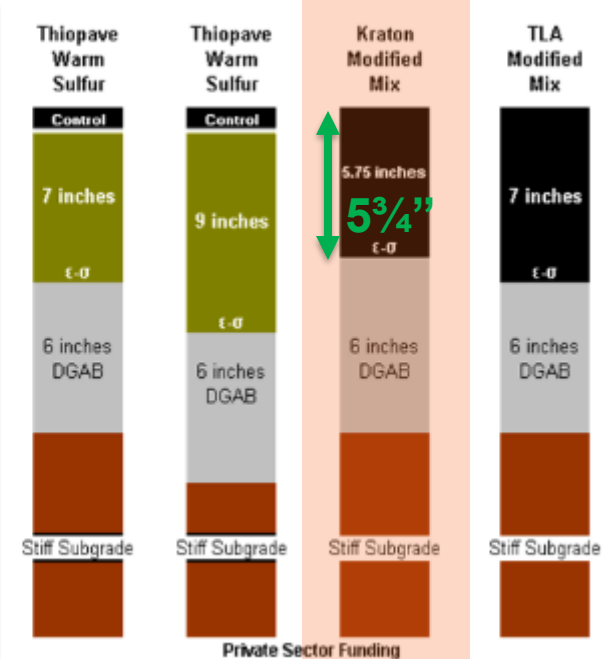
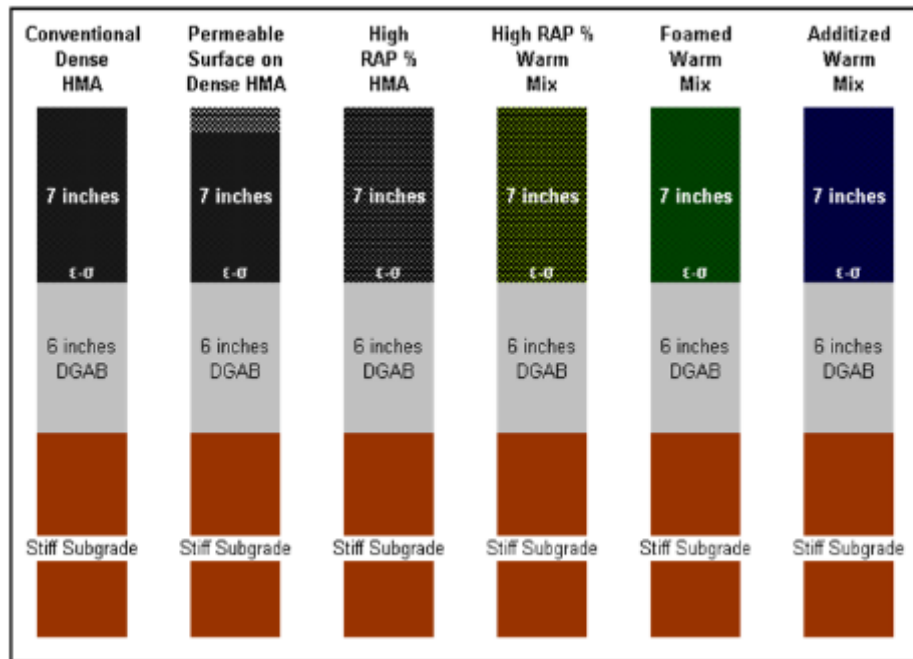


Layer coefficients should be the same for all mixes



Pavements must be very thick to be perpetual.

Thin Perpetual Pavements



NCAT Report 25-01

NCAT Report 25-01
November 2025



Determining Structural Layer Coefficient and Comparative Life Cycle Assessment for Asphalt Mixtures with HiMA™ Technology **x 1.7 !**



Summer 2025



Big rocks are necessary for strong (lower) asphalt



Polishing sources should be banned from surface mix



RBA implementation requires changing volumetrics



Low Va & high VFA always risks rutting & bleeding.

Friction and Safety



Summer 2025



Big rocks are necessary for strong (lower) asphalt



Polishing sources should be banned from surface mix



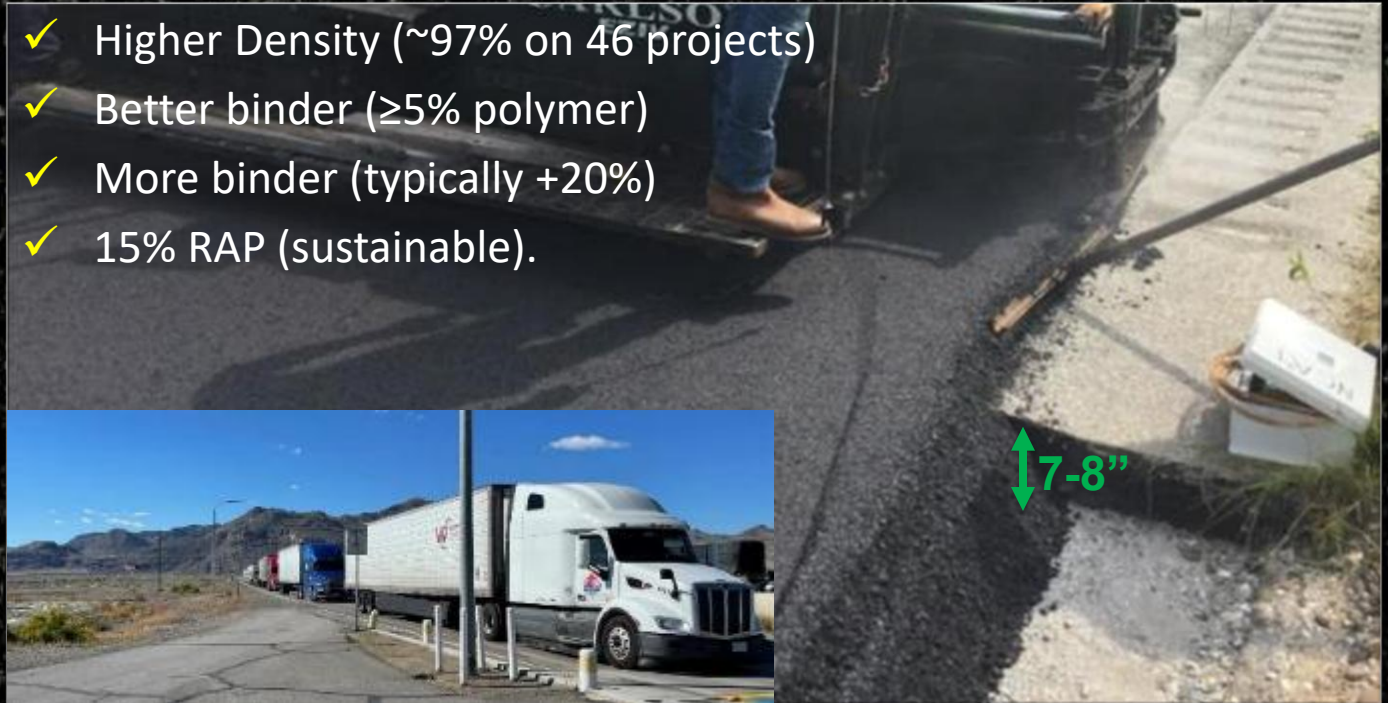
RBA implementation requires changing volumetrics



Low Va & high VFA always risks rutting & bleeding.

Low Void “HiMod” Mixes in Utah

- ✓ Higher Density (~97% on 46 projects)
- ✓ Better binder (≥5% polymer)
- ✓ More binder (typically +20%)
- ✓ 15% RAP (sustainable).



Low Void “HiMod” Mixes in Utah

- Bridge decks, rubblization overlays, SMA swaps
- 3” for interstate bridge deck preservation
- 5½” on rubblization (\$40M savings vs PCC rebuild!)
- PCC advocate now flipping projects for cost savings
- Up to 7” in a single lift in specialty applications
- 2” as switch from SMA standard overlay (less cost)
- More expensive than DGA, less than SMA.

Fall 2025



Pavements designed thinner than '93 Guide will fail



More complex specs are needed to improve quality



Rubber-tired rollers (PTRs) are not worth the cost

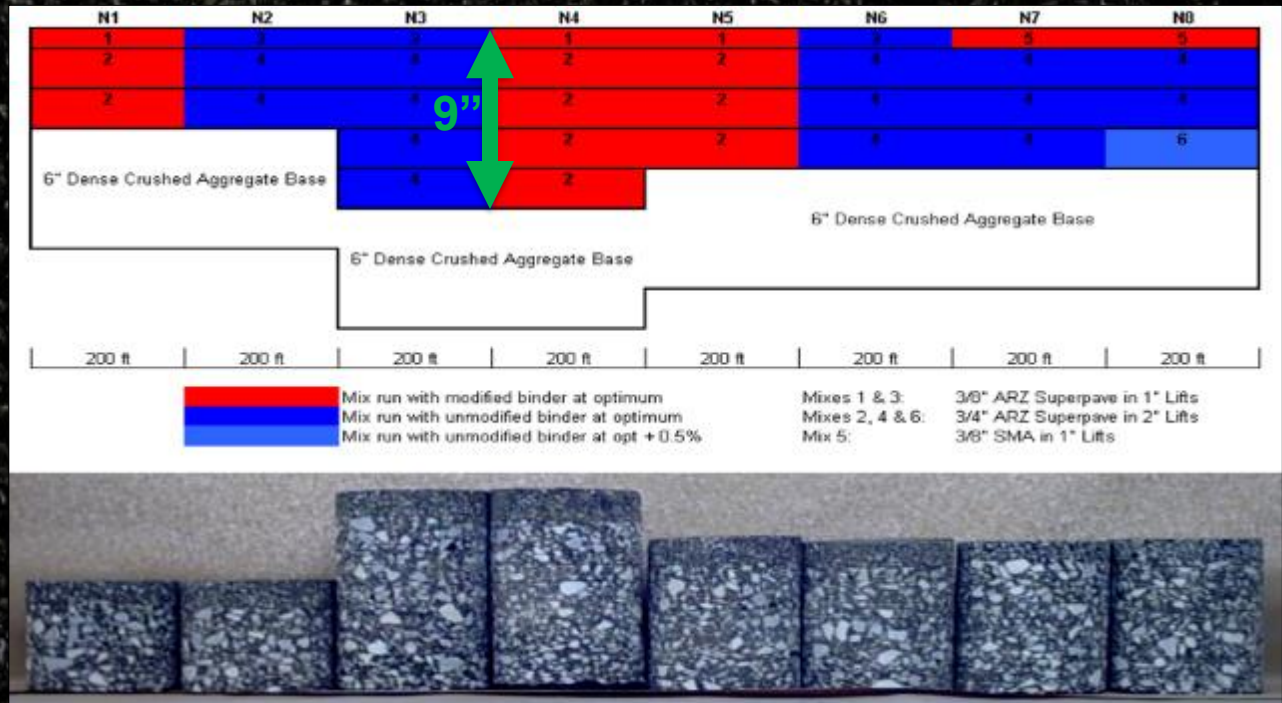


Fogging OGFC surfaces will reduce permeability.

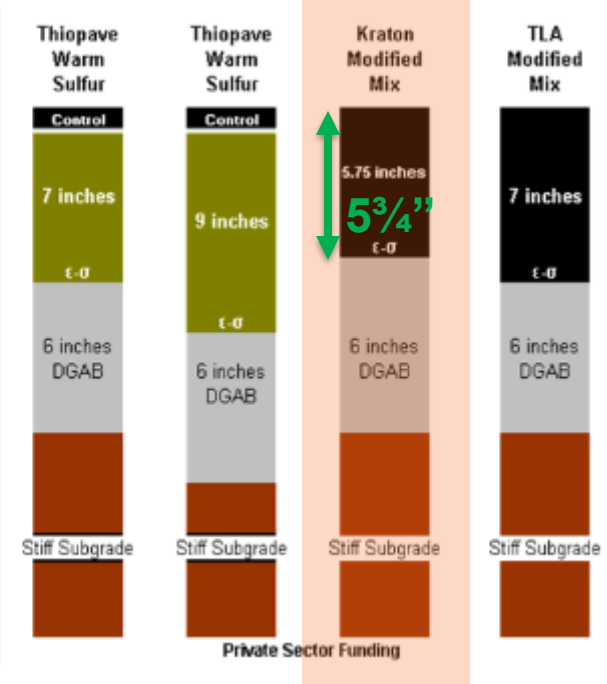
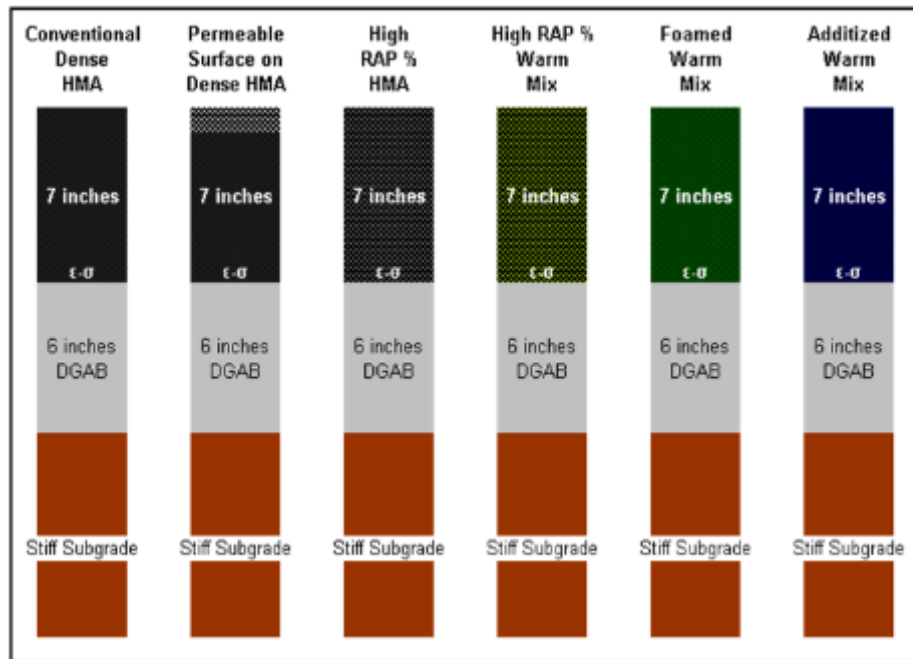
2000 NCAT Pavement Test Track



2003 NCAT Pavement Test Track



2009 NCAT Pavement Test Track



Fall 2025



Pavements designed thinner than '93 Guide will fail



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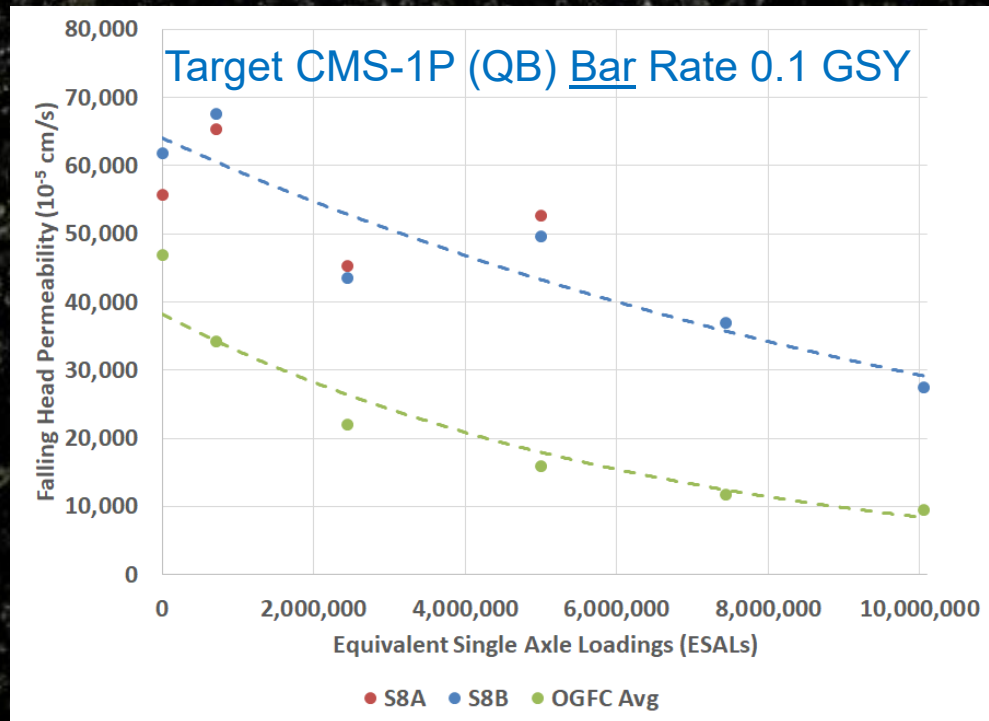


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OGFC Preservation



Mix Busters Big Takeaways

Better tack or elimination via thicklay paving

Higher layer coefficients from innovation

Perpetual asphalt at concrete thickness

BMD for Vb_{eff} quantity and quality

Specify performance with less words

1) Protect taxpayers and 2) incentivize innovation

Cracking, rutting, friction at lowest $\$/C_{\text{BMD+f, LCA}}$

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#BuzzOnAsphalt

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