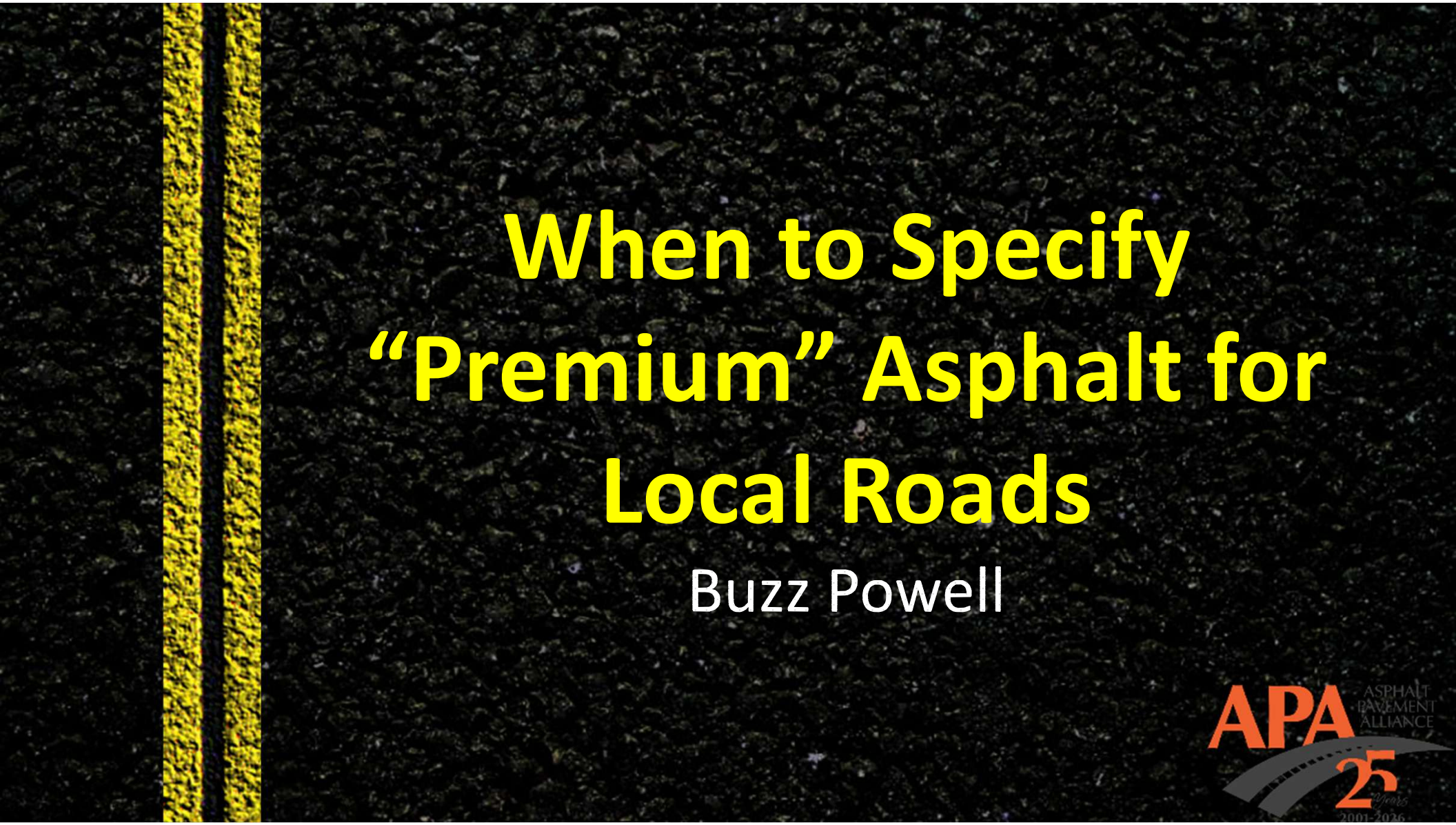

When to Specify
“Premium” Asphalt for
Local Roads
Buzz Powell
APA
ASPHALT PAVEMENT ALLIANCE
25 Years
2001-2026


NAPA
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ALLIANCE
FLEXIBLE PAVEMENT
DESIGN CATALOG
FOR NON-STATE
DOT ROADWAYS
NAPA
AAPTP
Asphalt Paving Handbook
2025 Edition
APA
ASPHALT
PAVEMENT
ALLIANCE
25
2001-2026

Technical Resources

- www.DriveAsphalt.org – Asphalt Pavement Alliance (APA)
- www.AsphaltPavement.org – National Asphalt Pavement Association (asphalt mix)
- www.SAPAinc.org/members – local market driven advocacy & resources
- www.AsphaltInstitute.org – Asphalt Institute (liquid asphalt, emulsion, AIEI)
- www.NCAT.us – National Center for Asphalt Technology (reports, preservation)
- ccpic.ucdavis.edu – City & County Pavement Improvement Center (tech transfer)
- www.ChatGPT.com – general information about roads & highways (good & bad)
- www.HeyNAPA.com – focused technical library for asphalt pavement (vetted!).

NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION



XBE

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.

When is it smart to utilize “premium” asphalt for local roads?

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HeyNAPA.com

- When local road has at least one “premium” demand
- Value added feature match for “premium” demand?
- Does the road/project justify additional cost per ton?
- Selective, needs based utilization or entire project?
- Bridging or addressing underlying conditions?
- High stress, known distress, targeted solution, ROI.



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NCAT Pavement Test Track



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“Premium” Demands

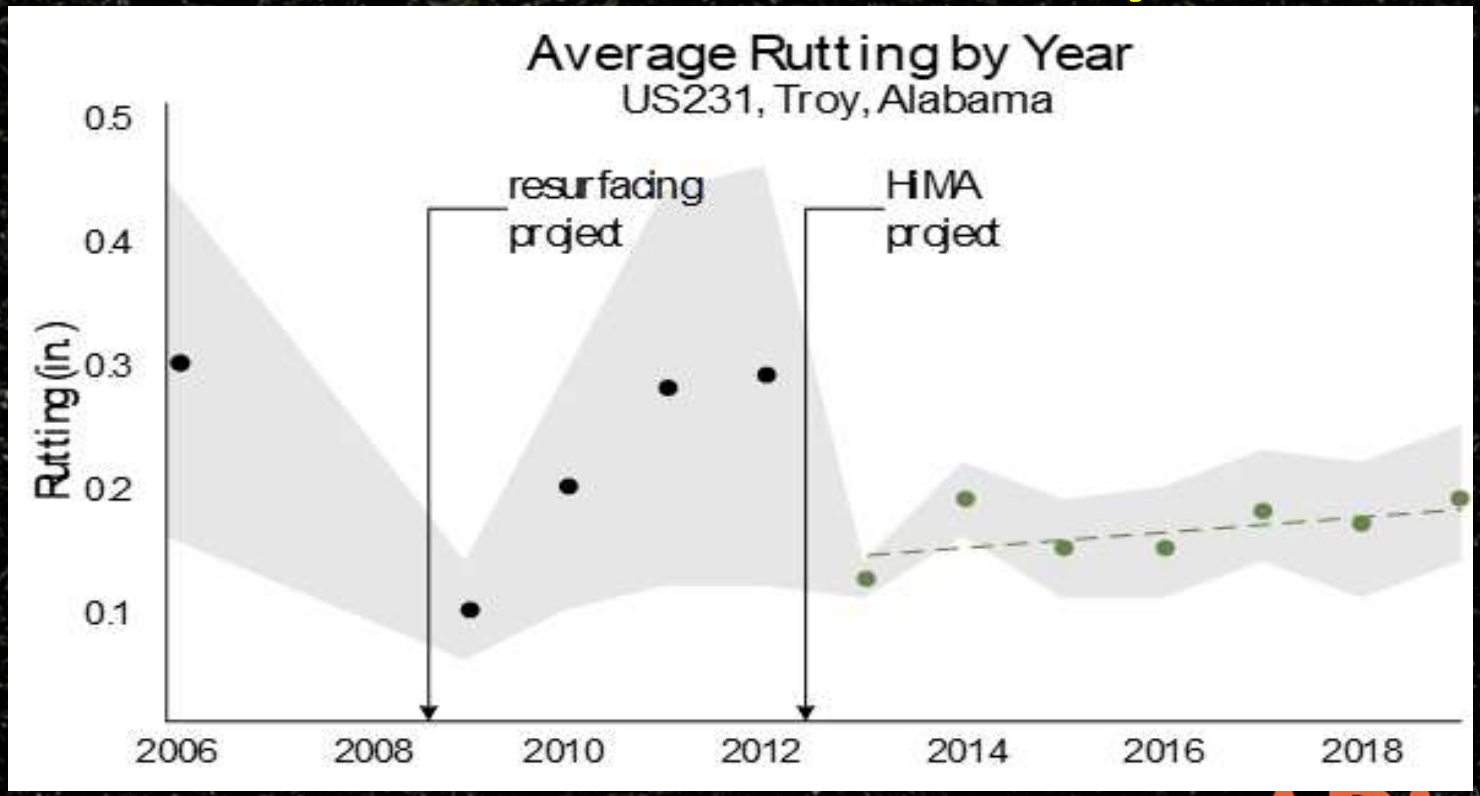
- Heavy truck, slow-moving, and/or stopping traffic
- Intersections, turn lanes, other high-stress areas
- Frequent maintenance for rutting or shoving
- Prevent reflection over existing cracked pavement
- High moisture exposure or stripping concerns
- Better performance needed without extra thickness
- Clearance issues, curb reveal, utility constraints
- Inadequate existing foundation support.

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2012 US-231 in Troy, AL



2012 US-231 in Troy, AL



Rehabilitation Bottom-Up Cracking



“Premium” Asphalt

- Enhanced properties of mix constituent materials…
- More costly asphalt binder grade (e.g., polymer)
- *Better* aggregate properties (e.g., polish resistant)
- Additives to alter mix performance (e.g., GTR)
- High-strength aramid fibers (Forta, Surface Tech,..)
- Not for every project, must be a good investment
- DGA mix design that’s both crack & rut resistant
- Conventional vs healthy vs premium.

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High Strength Aramid Fibers



Asphalt Quality

Conventional volumetric specification procurement

Worked well with virgin aggregates & neat asphalts

Desire for sustainability & cost savings via RAP use

Quality & quantity of effective **total** binder volume

Balanced mix design (BMD) for healthy mix +½-¾ = $3-$5

Need for performance that goes beyond BMD

Premium rut, crack resistance + structural +1% = $15

Costs more via higher content, HP binder.

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2018 NCAT Pavement Test Track

"Type B Intermediate Special"

- Rehabilitation Repairs, Interstates, High Volume Primary Routes

12.5 NMAS

PG64-22 and HP with 25% RAP

WMA (Evotherm M1 @ 0.5%)

- Mixing @ 275-280F
- Compaction @ 245-250F

Design Air Voids = 2.5%

N_{des} = 75

Asphalt Content = 5.75%

- 4.37% Virgin
- 1.38% RAP



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Terminology Review

High modulus asphalt mix (HIMOD or HMAC) stiffness

Highly$_{\sim 3x}$ modified asphalt (HiMA™) binder proprietary

High$_{\geq 2x}$ polymer binder (HP) Asphalt Institute (non-proprietary)

High polymer grade binder (HPG) TxAPA (guidance document)

Highly modified asphalt mix (HiMod) Utah, Missouri,..

HiMod = ↑binder$_{HP}$, ↑V_{be}, ↓V_a, DGA$_{quarry\ balance}$

"Thicklay" paving option for HiMod mix.

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2021 Utah Weigh Station



Media provided by UDOT!

Utah HP "PG" Binder M320

PG76-34 Highly Modified		
Original Binder		
Dynamic Shear Rheometer, AASHTO T 315	@ 76° C, G*, kPa	1.30 Min.
	@ 76° C, phase angle, degrees	70.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 76° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	90 Min.
PAV Residue, 20 hours, 2.10 MPa, 100 °C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 25° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -24° C, S, MPa	300 Max. 150 Min.
	@ -24° C, m-value	0.300 Min.
Delta Tc from additional BBR test, ASTM D7643	@ -30° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

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Utah HiMod Asphalt

Property	Mix Design Requirement	Mix Design Value
Asphalt Binder	PG 76-34	PG 76-34
Gyrations	50	50
NMAS Crushed Aggregates	12.5 mm 100%	12.5 mm 100%
Asphalt Content	6.0 % minimum	6.0% (5.33% Virgin, 0.67% RAP Binder)
Air Voids	1.0	1.0% (0.1% at 75 gyrations)
Voids in Mineral Aggregate	15.0-17.0	15.3
Voids Filled with Asphalt	90.0-95-0%	93.3%
Drain Down	0.3% max	0.0%
RAP	15% max	15%
Hamburg Depth (note bath temperature increased from 50 to 54°C for second 20,000 passes) Slab Void target 4 %	7.0 mm max after 20,000 passes 10.0 mm max after 40,000 passes	3.9 mm 6.1 mm

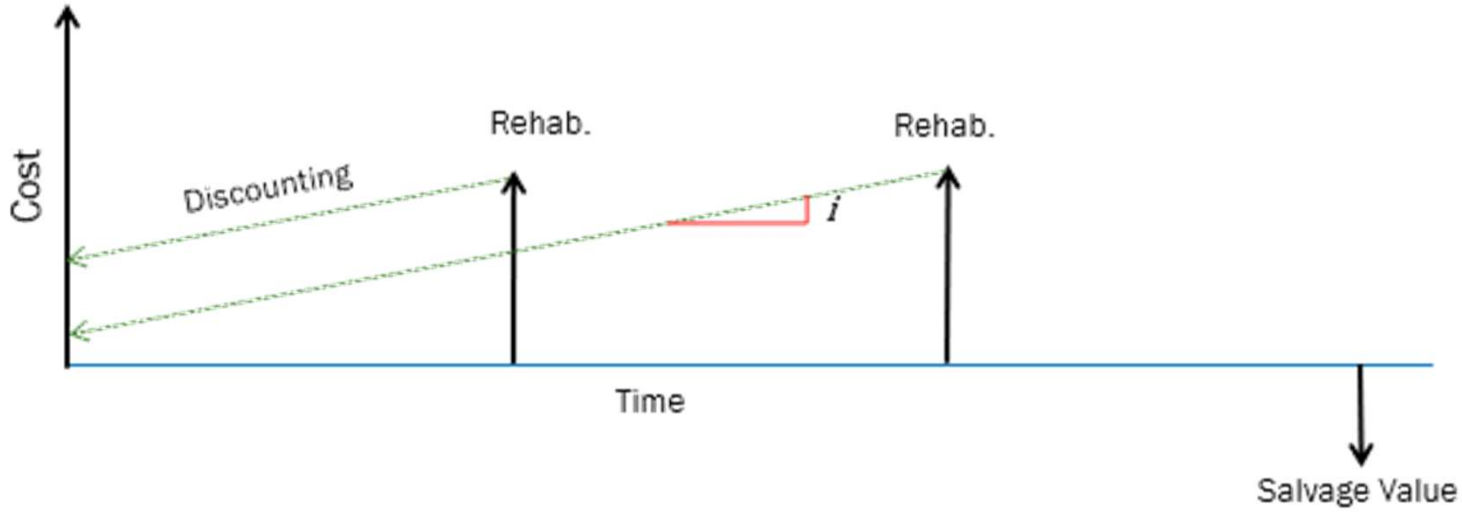
~2M tons successfully placed by UDOT!

Return on Investment

- Premium investment must address the demand
- Increased structural capacity, reflective cracking, etc.
- Increase in the cost per ton of treated mix
- Total increase in the present cost for the project
- Expected life extending benefit (built as specified)
- Life cycle cost analysis for the additional cost
- Verification for a positive return on investment.

Life Cycle Cost Analysis

Excel Function = NPV(real discount rate, year 1 expense, year 2 expense, … year n expense)



High-Strength Aramid Fibers



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High-Strength Aramid Fibers



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High-Strength Aramid Fibers



Premium Mix Utilization

- Ability of local industry to produce/place as required
- Dry additive technology versus preblended binder
- Targeted use in specific need area (e.g., soft spot)
- Intermittent use for recurring needs (e.g., bridges)
- Over the entire length of the project (e.g., trucks)
- Communication with industry to obtain buy-in
- Taking full advantage of improved performance.

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NCAT Report 25-01

NCAT Report 25-01
November 2025

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

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

x 1.7 !

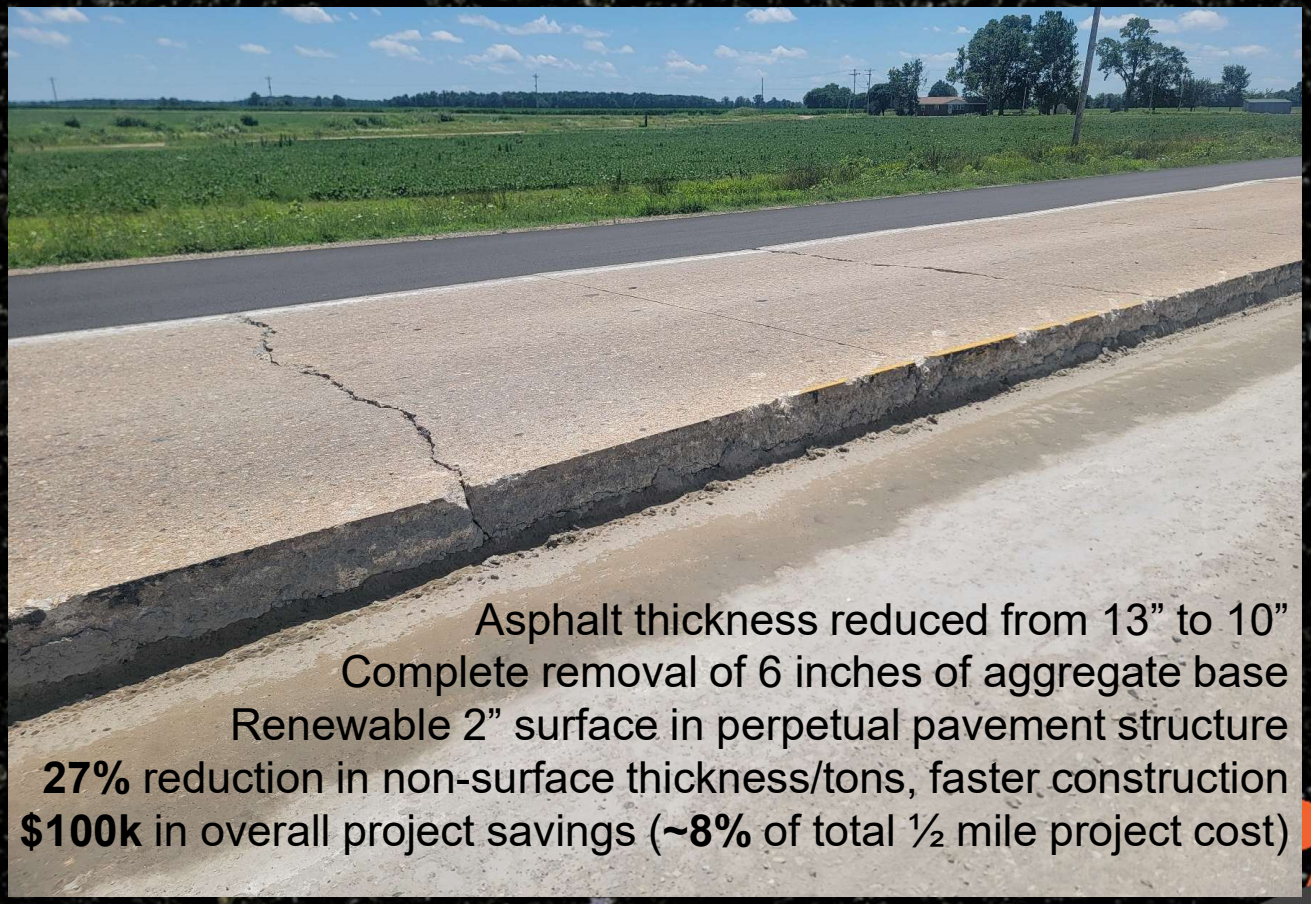


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2011 I-20 in Tuscaloosa, AL



Failed Arkansas Concrete



Asphalt thickness reduced from 13” to 10”
Complete removal of 6 inches of aggregate base
Renewable 2” surface in perpetual pavement structure
27% reduction in non-surface thickness/tons, faster construction
$100k in overall project savings (**~8%** of total ½ mile project cost)

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Industry Buy-In



Plant dialed in immediately, ran spot on
Reduced breakdown coverage from 4 to 2
Mobilized 3 rollers, but didn't need intermediate
Obtained over 96 percent density with reduced effort.

High Polymer Mastic Patching

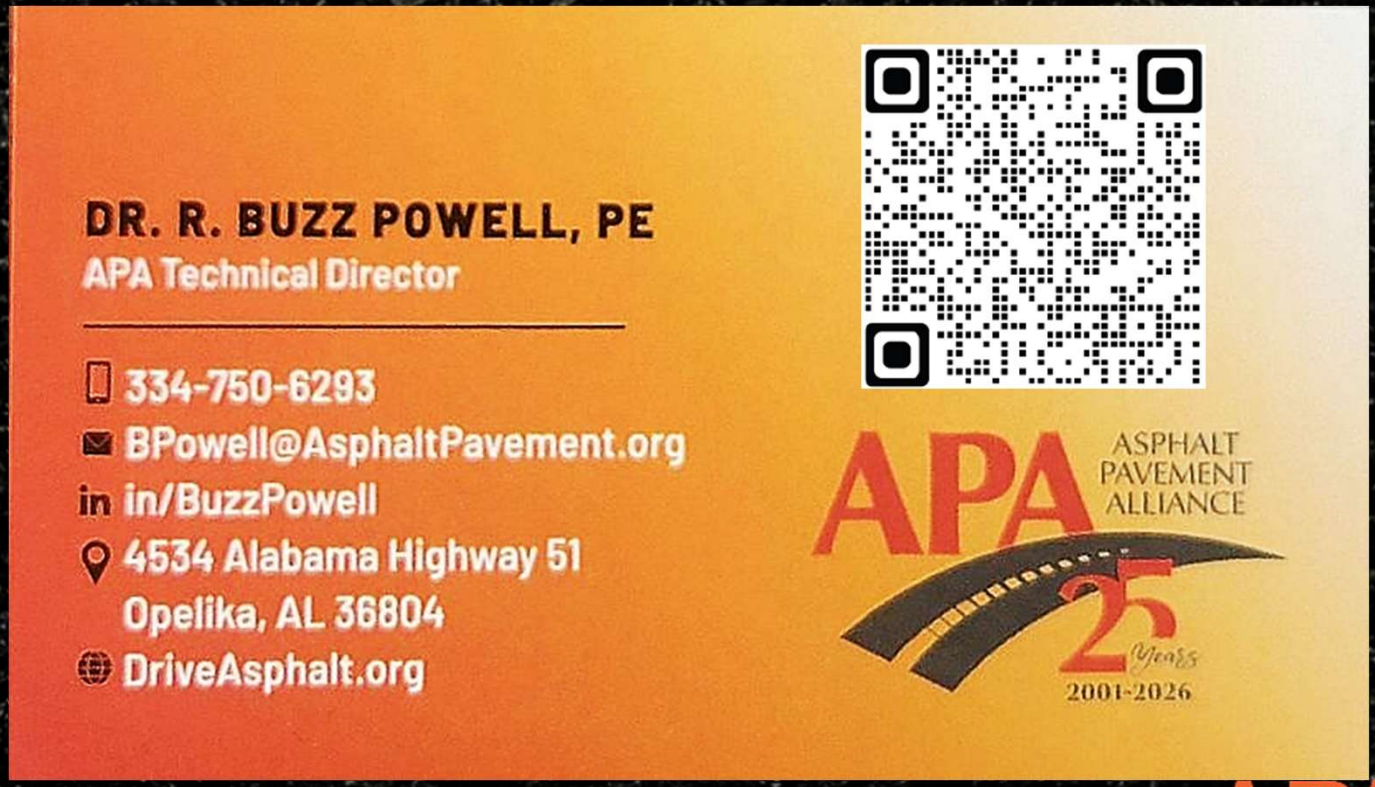


Takeaways

- Lower cost asphalt may not be the lowest LCCA
- Communicate with industry to get buy-in
- Target premium mix where it provides ROI
- Entire projects or targeted to optimize investment
- ~$10 for aramid fibers, ~$12 for HP, ~$15 for HiMod
- Take advantage of improved structural value
- Safe, sustainable pavement at lowest life cycle cost!

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#BuzzOnAsphalt



#DriveAsphalt