

ALABAMA ASPHALT PAVEMENT ASSOCIATION



ALABAMA ASPHALT PAVEMENT ASSOCIATION

Alabama Asphalt Pavement Association

630 Adams Avenue

Montgomery, AL 36104

334/834/5314 (Phone) 334/834/5537 (Fax)

E-mail: alapa@bellsouth.net

Web site: www.alasphalt.com

THIN LIFT ASPHALT PAVEMENTS

JANUARY 28, 2021

ASCE TUSCALOOSA BRANCH
MEETING

Agency Funding

- ▣ ALDOT / County / City Funds Are Limited Even With Recent Gas Tax Increase.
- ▣ ALDOT / County / City New Construction Projects Are Still Rare.
- ▣ If You Can Not Afford To Maintain Existing System, Why Add New To System?
- ▣ ALDOT / County / City Priority Is Still Maintaining Current System.

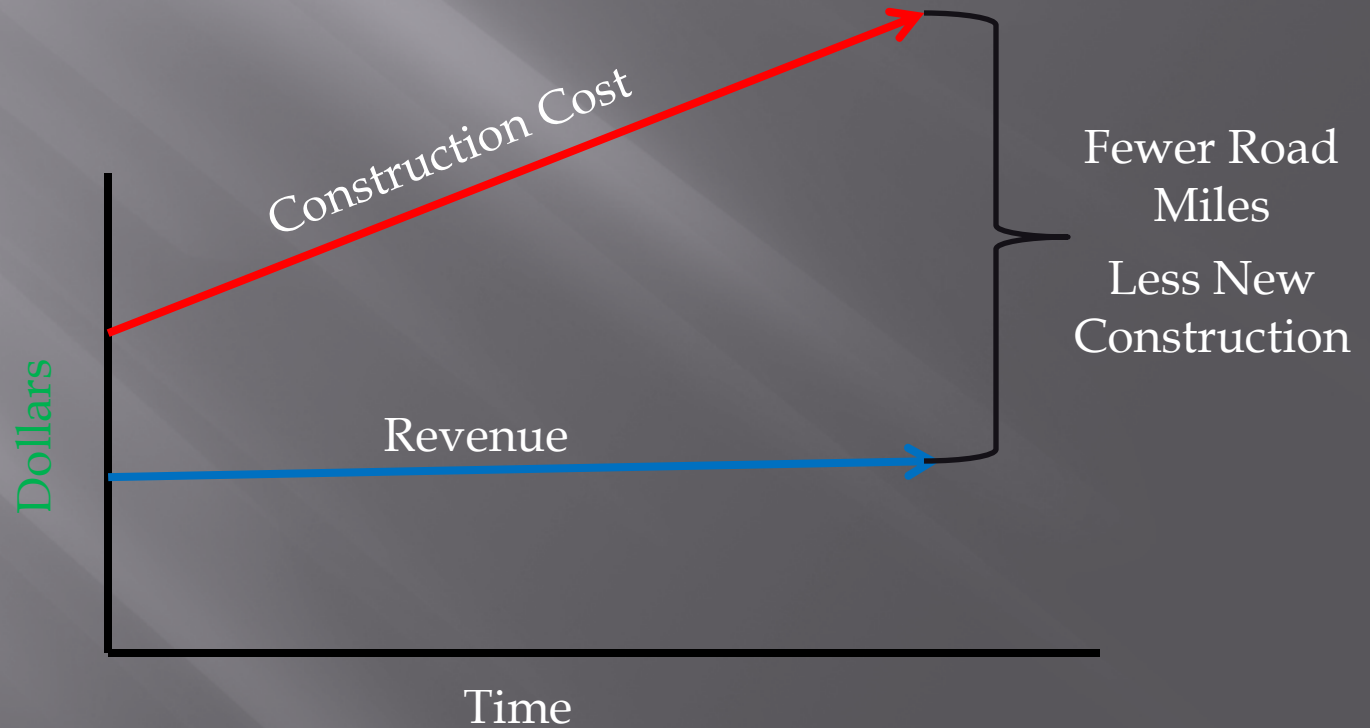
Objectives -

- ▣ **Why** Thin Lift Asphalt?
- ▣ **Where** Thin Lift Asphalt?
- ▣ **Specifications** For Thin Lift Asphalt.

Why Thin Lift Asphalt?

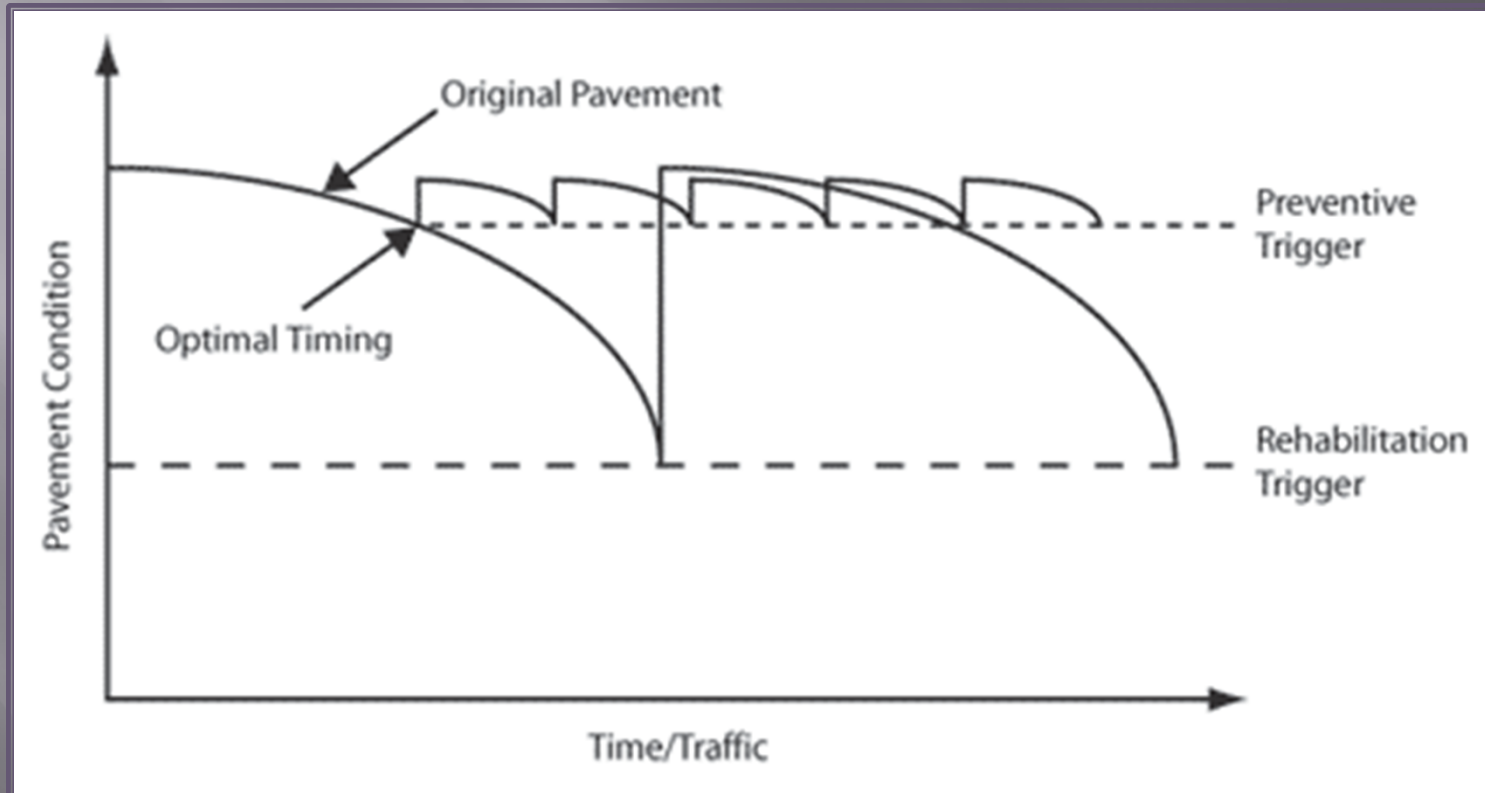
Why Thin Lift Asphalt?

- ▣ Funding Crisis
 - Escalating Construction Cost
 - Flat Revenue



Why Thin Lift Asphalt?

- Concept Of Pavement Preservation



Why Thin Lift Asphalt?

Benefits To The Traveling Public

- Improved Ride
- Improved Smoothness
- Public Perception – Freshly Paved Road – New Road
- Public Perception – No Broken Windshields
- Local / In State Contractors – Contributing To Tax Base And Employment At Local / State Level

Where Thin Lift Asphalt?

Where Thin Lift Asphalt?

- ▣ Roads That Are Structurally Sound



Good Candidates?

Good Candidate?



Good Candidate?



Good Candidate?



Project Selection

- ▣ Section Of US 31 South Of Montgomery In Butler County.
- ▣ Rural 2 Lane US Route.
- ▣ AADT - 5260
- ▣ TADT - 11%
- ▣ Minimal Rutting.
- ▣ Low To Moderate Cracking.

Existing Roadway Condition



Project Details

Project Details – Thin Lift Asphalt

- ▣ Project Letting Date – April 7, 2017.
- ▣ Project Length – 14.599 Miles In Butler County.
- ▣ Bituminous E Treatment To Address Cracking In Existing Roadway.
- ▣ Thin Lift HMA – 90 Pounds Per Square Yard of 3/8” Maximum Aggregate Size Mix.
- ▣ ALDOT Guidelines Allow Placement Rate From Minimum Of 80 Pounds Per Square Yard To Maximum Of 110 Pounds Per Square Yard.
- ▣ Project Construction – Summer 2017.

3/8 Inch Maximum Aggregate Size Mix

Sieve Size	% Passing	
1/2"	100	
3/8"	95 - 100	
#4	75 - 100	
#16	30 - 60	
#200	6 - 12	

3/8 Inch Maximum Aggregate Size Mix Design

- ▣ 24% Coarse Sand
- ▣ 21% Granite Screenings
- ▣ 20% RAP
- ▣ 13% Crushed Gravel
- ▣ 11% Shot Gravel
- ▣ 10% #8910 Limestone
- ▣ 1% Baghouse Fines
- ▣ Design Asphalt Content : 5.90% (PG 67-22)
- ▣ 60 Design Gyration



Project Construction

Thin Lift Asphalt Texture



Thin Lift Asphalt Edge Line



Thin Lift Asphalt Longitudinal Joint



Thin Lift Asphalt Transverse Joint (One Year Old)



Thin Lift Asphalt (One Year Old)



Ride Quality / Smoothness

Ride Quality / Smoothness

- ▣ ALDOT Uses Inertial Profiler To Measure Smoothness.
- ▣ ALDOT Measures Smoothness By Mean Roughness Index (MRI).

Ride Quality / Smoothness – Thin Lift Asphalt

- ▣ Average Pre – Construction MRI = 88.9 Inches Per Mile.
- ▣ Average Post – Construction MRI = 36.8 Inches Per Mile.
- ▣ Significant Average MRI Improvement Of 52.1 Inches Per Mile.
- ▣ Average Pay Factor Of 100.4% If Applicable.
- ▣ Quiet Ride.

ECONOMICS OF PAVEMENT PRESERVATION TREATMENTS



Project Cost – Thin Lift Asphalt

- ▣ Bituminous Treatment E – 225,000 Square Yards At \$1.25 Per Square Yard.
- ▣ Thin Lift Asphalt – 10,200 Tons At \$80.20 Per Ton. Approximately \$3.61 Per Square Yard.
- ▣ Total Cost - \$1,099,290.
- ▣ Average Cost Per Mile = \$75,299 Per Mile.
- ▣ Average Cost Per Lane Mile = \$37,649 Per Lane Mile.

Project Cost – Thin Lift Asphalt (Local Project)

- ▣ Project On US 43 In Green County Through Forkland.
- ▣ Bid And Constructed In 2020.
- ▣ Thin Lift Asphalt – Bid At \$97.90 Per Ton.
- ▣ 4 Days Of Side Roads And Turnout Paving.

Specifications For Thin Lift Asphalt

Alabama DOT Specifications

Thin Lift Mix

Sieve Size	3/8 Inch Mix % Passing	Thin Lift Mix % Passing
1/2"	100	100
3/8"	95 - 100	100
#4	75 - 100	90 - 100
#16	30 - 60	30 - 60
#200	6 - 12	6 - 13

Thin Lift Mix – Design Considerations

Fine Aggregate Angularity (FAA) Requirements

- ▣ FAA Greater Than Or Equal To 43 For ESAL Range A/B Mixes.
- ▣ FAA Greater Than Or Equal To 45 For ESAL Range C/D Mixes.
- ▣ Fine Aggregate Is Aggregate Passing The No. 4 Sieve.

Carbonate Stone (Limestone) Criteria

- ▣ Varies From A Range of 30% To A Maximum of 50% Depending Upon BPN 9 Value of Aggregate Source.

Liquid Asphalt Binder Requirements

- ▣ PG 67-22 Required For ESAL Range A/B And ESAL Range C/D Mixes.
- ▣ No ESAL Range E Mix In Specification At This Time.

Design Gyration And Minimum Design AC Requirements

- ▣ Design Gyration Of 60 Gyration.
- ▣ Minimum Design AC Content Of 6.2%.

Air Voids, VMA, Dust Proportion And TSR Requirements

- ▣ Design Air Voids Of 4.0%.
- ▣ Minimum Design VMA of 16.5% And Maximum Design VMA Of 18.0% With A 0.5% Production VMA Tolerance.
- ▣ Maximum Design VMA Applies To ESAL Range C/D Mixes Only.
- ▣ Dust Proportion Range of 0.90 To 2.00 Based On Effective Asphalt Content.
- ▣ TSR Of Minimum of 0.80.

RAP And RAS Requirements And Warm Mix

- ▣ Maximum 20% RAP Use.
- ▣ RAP Processed So That 100% Passes 3/8" Sieve.
- ▣ No RAS Use Allowed.
- ▣ Warm Mix Asphalt Allowed As Contractor Option On All Section 424 Superpave Mixes.

Spread Rate And Density Requirements

- ▣ Spread Rate Can Be Specified From A Minimum of 60 Pounds Per Square Yard (0.54 Inches) To A Maximum Of 75 Pounds Per Square Yard (0.68 Inches).
- ▣ Density Requirement Is To Satisfaction Of Engineer. Typically A Roller Pattern Using Non – Destructive (Nuclear Or Non – Nuclear) Density Gauges.

Thin Lift Mix

Sample Mix Design #1

- ▣ 50% Limestone Screenings.
- ▣ 38% Granite Screenings.
- ▣ 10% Sand.
- ▣ 2% Baghouse Fines.
- ▣ Design Asphalt Content : 6.25%.

Thin Lift Mix

Sample Mix Design #2

- ▣ 57% Granite Screenings.
- ▣ 22% Sand.
- ▣ 20% RAP.
- ▣ 1% Baghouse Fines.
- ▣ Design Asphalt Content : 6.20%.







Projects To Date

- ▣ NCAT Test Track.
- ▣ NCAT County Road 159 Sections.
- ▣ NCAT US 280 Sections.
- ▣ City Of Opelika Roads.
- ▣ No Structural Issues Reported.
- ▣ No Major Performance Issues Reported.
- ▣ No Friction Number Issues Reported. Some NCAT Sections Exceeded ALDOT Carbonate Stone (Limestone) Criteria.

AAPA Publications

- ▣ www.alasphalt.com
- ▣ Asphalt Pavement Design Guide For Low-Volume Roads And Parking Lots
- ▣ Alabama Porous Pavement Parking Lots Guide Specifications
- ▣ OGFC Best Practices Guidelines

Pavement Design Program

- ▣ PaveXpress
- ▣ www.pavexpressdesign.com
- ▣ Accessible Via Web And Mobile
- ▣ Free, No Cost To Use
- ▣ Based On AASHTO Pavement Design Equations
- ▣ User - Friendly
- ▣ Share, Save And Print Project Designs
- ▣ Interactive Help And Resource Links

Questions ?????



ALABAMA ASPHALT PAVEMENT ASSOCIATION



ALABAMA ASPHALT PAVEMENT ASSOCIATION

Alabama Asphalt Pavement Association

630 Adams Avenue

Montgomery, AL 36104

334/834/5314 (Phone) 334/834/5537 (Fax)

E-mail: alapa@bellsouth.net

Web site: www.alasphalt.com