Preserving Performance using Thinlay™

DAN STAEBELL
APA
NORTHCENTRAL REGIONAL DIRECTOR
DSTAEBELL@ASPHALTROADS.ORG

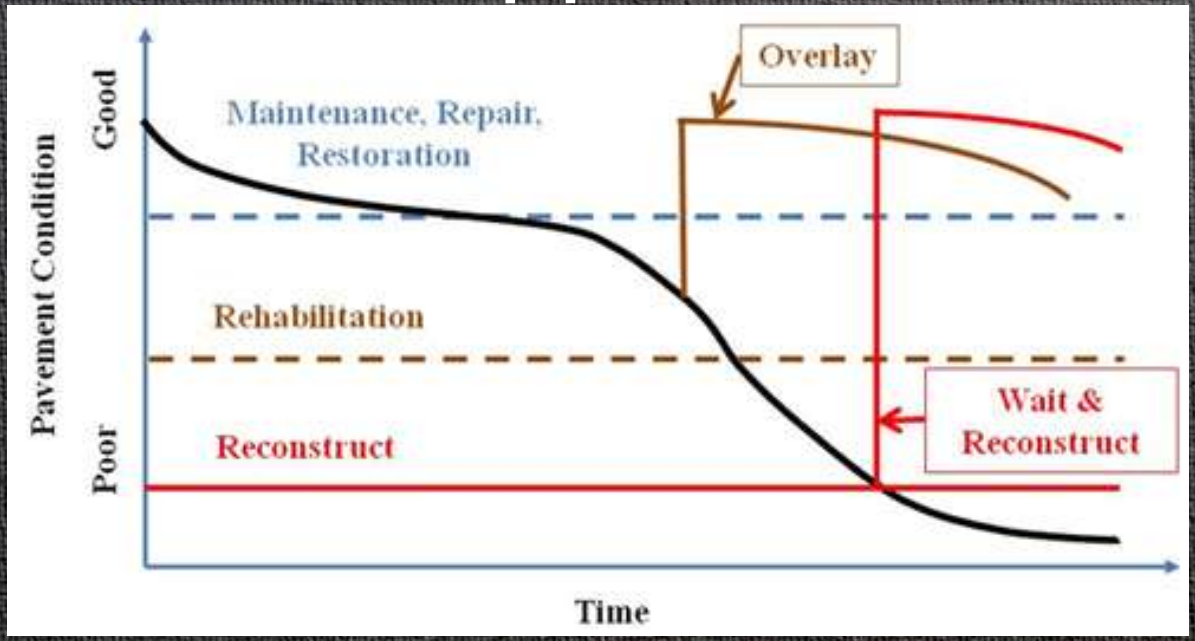
Thanks for Assistance:
Buzz Powell, NCAT
Brett Williams, NAPA

Asphalt. AMERICA RIDES ON US

APA ASPHALT PAVEMENT ALLIANCE

Deterioration Happens

Deterioration is caused by many different forces that affect pavement performance. However, pavements deteriorate predominantly due to the **vehicle loads and environmental elements** they are exposed to over their lifetime.



https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/13038/011.cfm

Why Preservation?

- Focus change from new construction to preservation
- US highway and road network
  - $1.75 trillion
  - 8% expansion (1980-2009)
- Preservation of existing system is focus & challenge for pavement managers
- Cost effective solution

Why this Matters!

- Easy to say and EXTREMELY difficult to do!
- New FHWA Guidance
- FHWA EDC-4
  - http://goaspha.lt/2qBfTSt
- Optimizing our infrastructure
- Agencies requirements for Funding
  - Doing More with less

Right Product → Right Place → Right Time

The Holy Grail!

NCAT Pavement Test Track

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

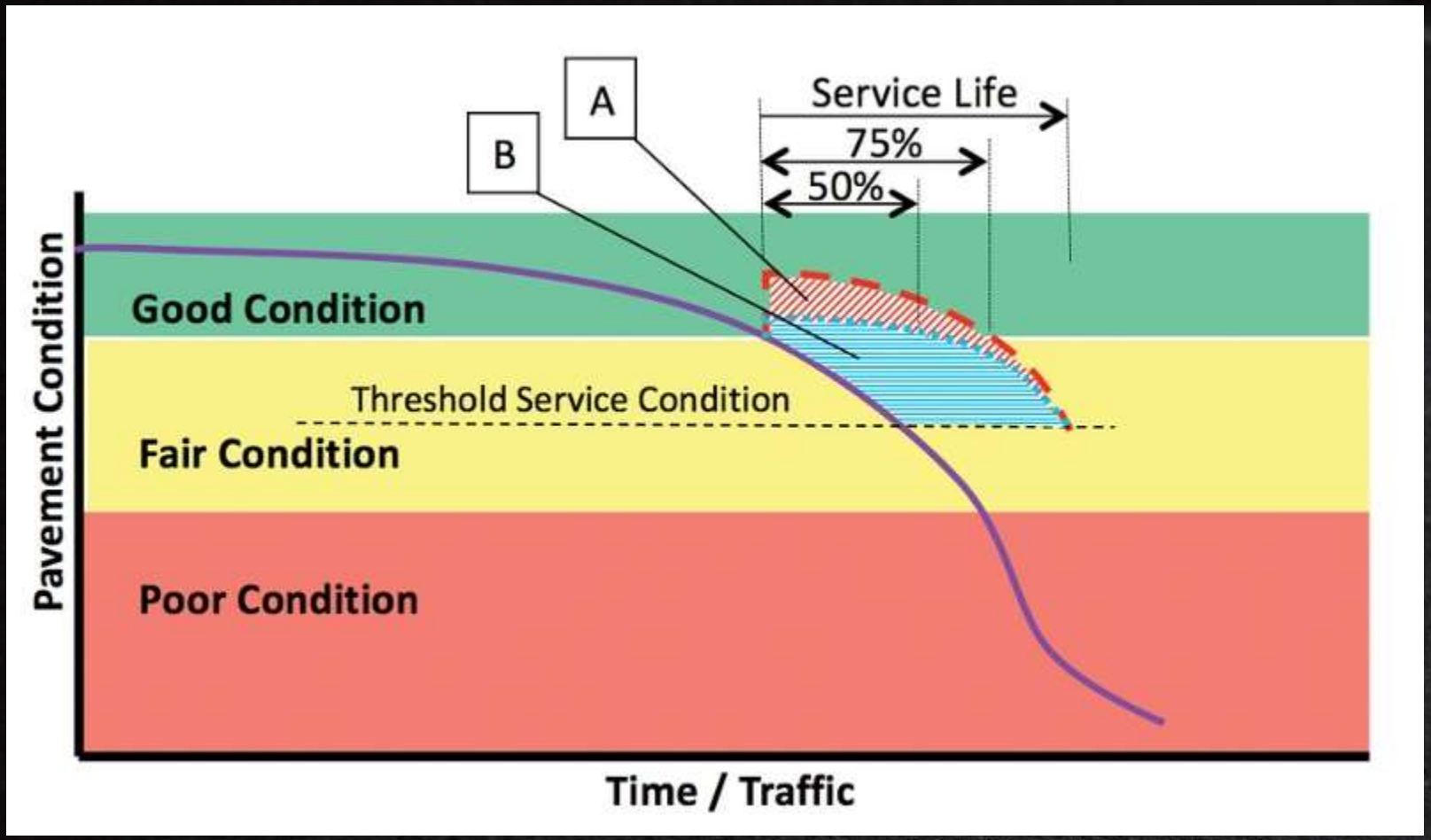
MnROAD

Asphalt. AMERICA RIDES ON US

Pavement Preservation

APA ASPHALT PAVEMENT ALLIANCE

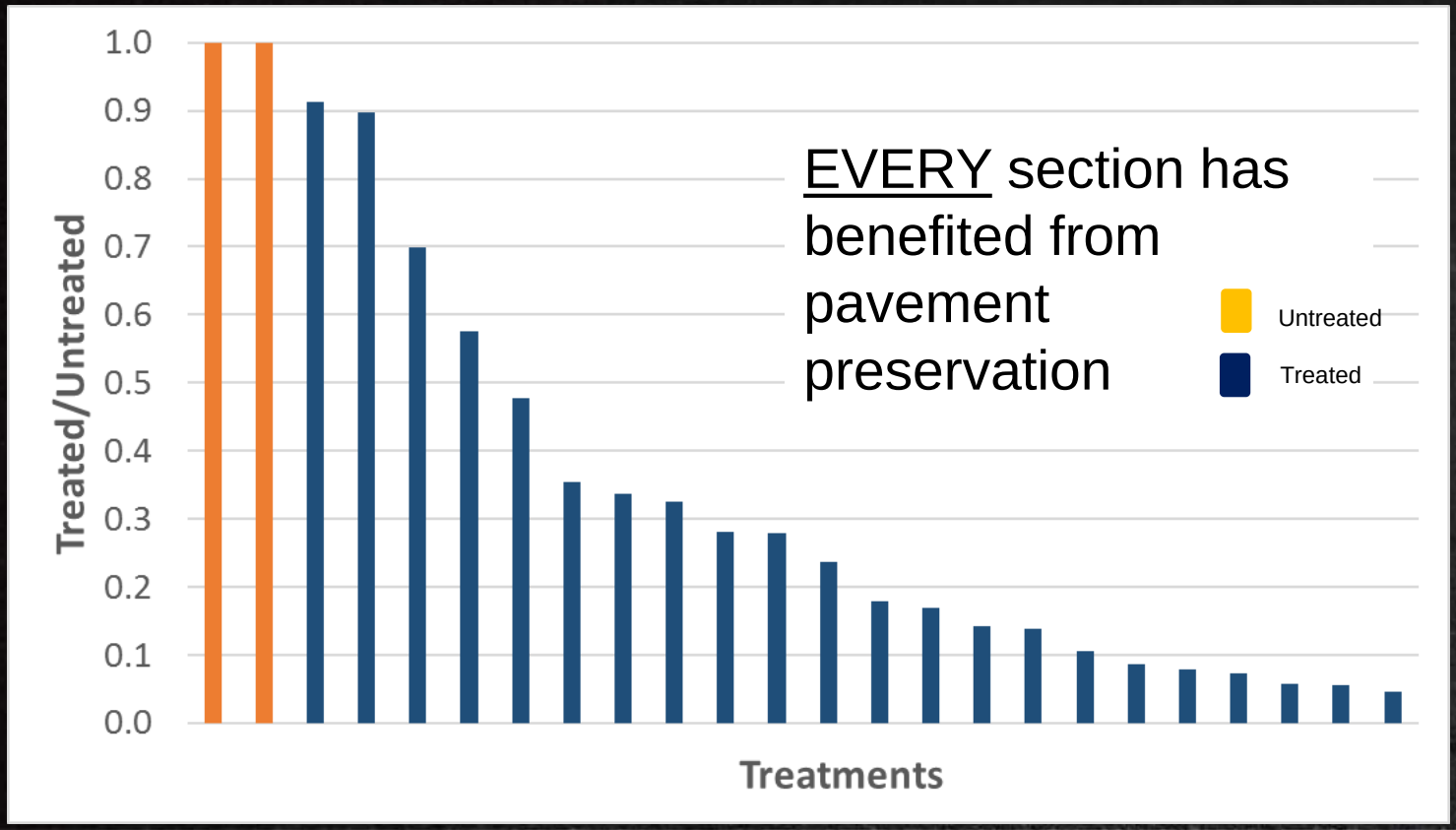
NCAT Resource NCAT Comparison



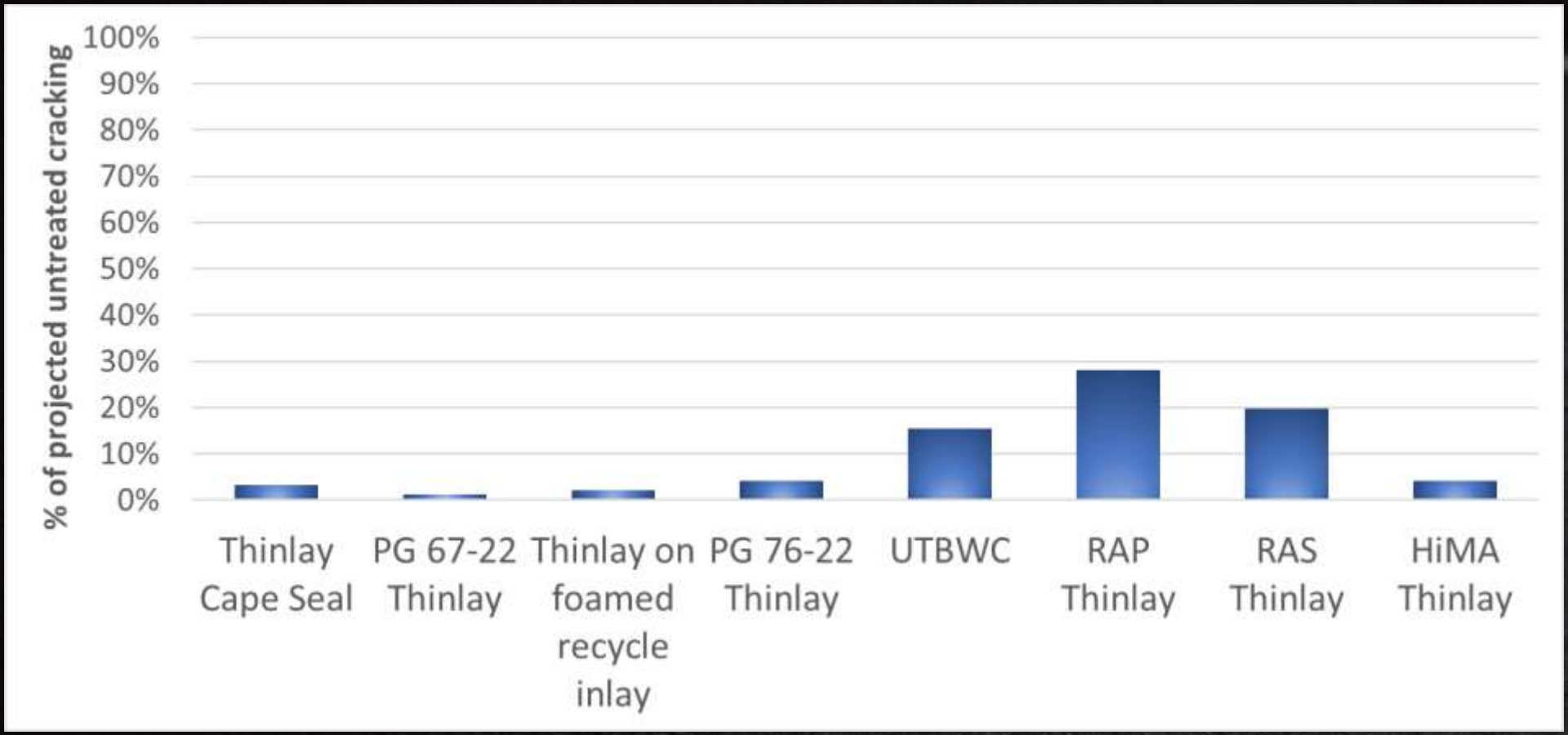
Background Research Thinlays

- History of success on low traffic roads
- Perception they won’t work on high traffic roads
- NCAT Pavement Test Track since 2003
- Preservation on Lee Road 159 since 2012
- Preservation on US-280 since summer 2015
- Preservation in Minnesota since summer 2016
- Low macrotexture and/or friction is only concern
- Combination of rutting & cracking performance.

Treated vs. Untreated @ Year 5



Benefits of Preservation




Question? What to do
with this pavement?

THINLAY

SAFE. SMOOTH. DURABLE.

POSITION PAPER

NATIONAL ASPHALT PAVEMENT ASSOCIATION

Thinlays: The Pavement Preservation Tool of Choice

NAPA Position on Thin Asphalt Overlays for Pavement Preservation

Every day in 2011, more than 48 million tons of goods, worth some $46 billion, were transported across the United States and over 73 percent of these tons was carried over the nation's highways and roads.[1] According to the Federal Highway Administration (FHWA), 49.4 percent of vehicle miles traveled (VMT) on the Federal-Aid Highway System failed to meet the standard of "good ride quality" in terms of smoothness and 18 percent failed to reach the less stringent "acceptable" level.[2] FHWA notes that pavement condition has a "... direct impact on vehicle operating costs in the form of increased wear and tear on vehicles and repair costs. Poor pavement can also impact travel time costs ... and can have an impact on crash rates."[3] Given the value of goods being transported over U.S. highways and roads, and the effect of road condition on costs, time, and safety for the public, it is critical that our nation's highways and roads be kept in proper condition.

Many agencies apply pavement preservation techniques to cost effectively maintain or improve roads in a good condition. Pavement preservation is defined in the Moving Ahead for Progress in the 21st Century (MAP-21) Act, which was signed into law in July 2012, as "programs and activities employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety, and meet road user expectations."[4] The precept of pavement preservation is that it is more cost effective to maintain pavements in good condition rather than allow pavements to deteriorate to such a condition that costly and time consuming rehabilitation or reconstruction is the only recourse.

Several pavement preservation techniques are available; of those Thinlays™ offer the highest value to public and private pavement owners alike. Thinlays are a suite of asphalt mixes that can be placed at a depth of ½ inch or more.

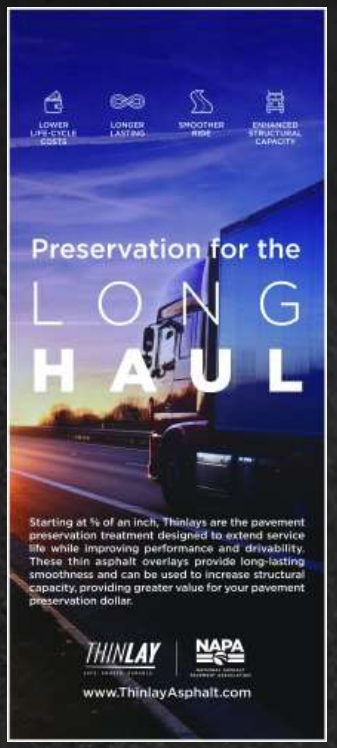
Thinlays share many of the benefits seen in overlays and inlays: extended pavement life, smooth ride, a modest improvement in pavement strength, enhanced safety, and responsible use of natural resources through reuse and recycling. A comparison of the versatility, benefits and costs of the palette of preservation treatments reveals Thinlays rank the highest.

The Need for Maintaining Good Pavement Condition through Pavement Preservation

NAPA supports a well-funded asset management program that includes pavement preservation as one of the tools available to ensure a desired state of good repair over the life cycle of a pavement at minimum practical cost.

SR-210

ver. 1.0.0 May 5, 2016



What is a Thinlay?

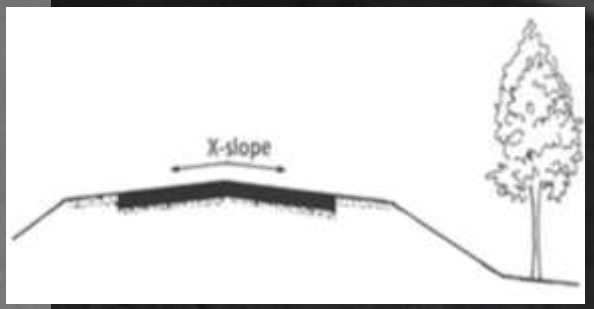
- Surface mix generally placed < 1 inch thick
- Thickness / NMAS requires small aggregates
- Typically combination of screenings & hard sand
- High binder content to get film thickness & voids
- Some ability to correct for ride and cross slope.

Why use Thinlay? Benefits

- User Delays Minimized
  - No Cure Time
  - Ease of placement
  - Staged construction
- Safety
  - Restore skid resistance
  - No loose stones or dust
- Pavement Smoothness
  - Lower IRI

Thinlay Benefits

- Pavement Structure
  - Maintain grade & x-slope
  - Withstand heavy traffic
  - Seal the pavement surface



Asphalt.

APA ASPHALT PAVEMENT ALLIANCE

Thinlay Benefits

- Increased Service Life
  - The 1” Difference

Asphalt Thickness VS. Fatigue Life

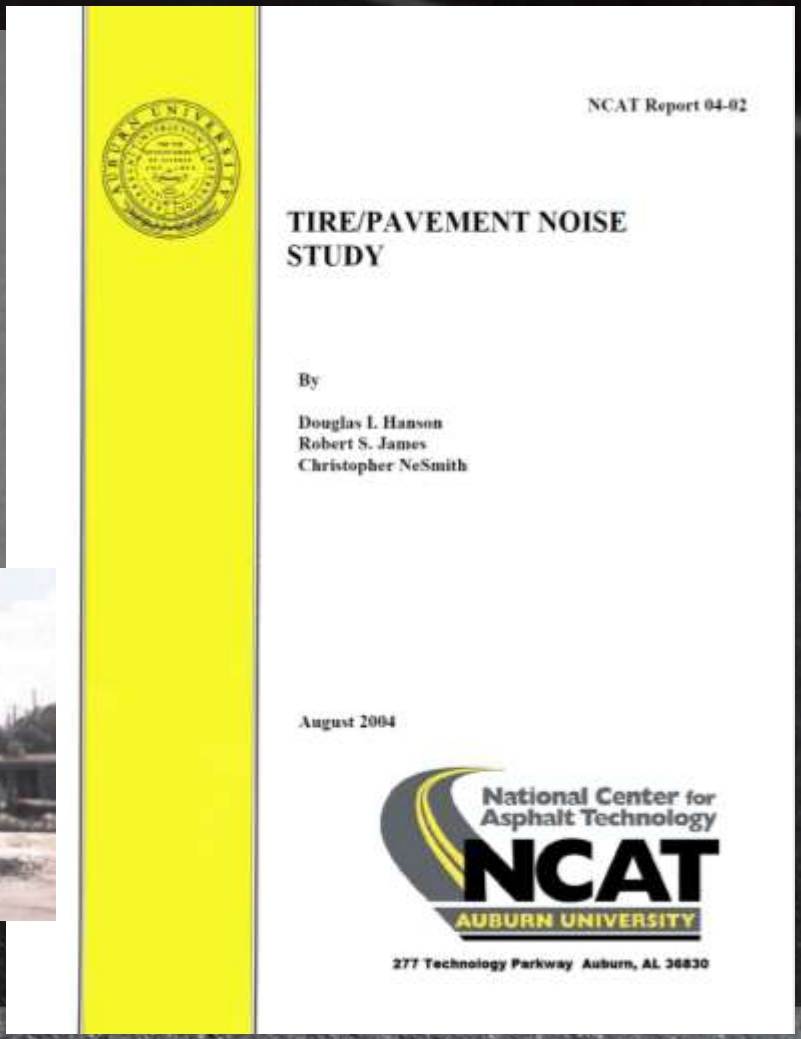
Thickness	Micro strain	Reps to failure
2	-652	30,234
3	-495	71,537
4	-383	160,693
5	-302	340,507
6	-242	682,133

APA ASPHALT PAVEMENT ALLIANCE

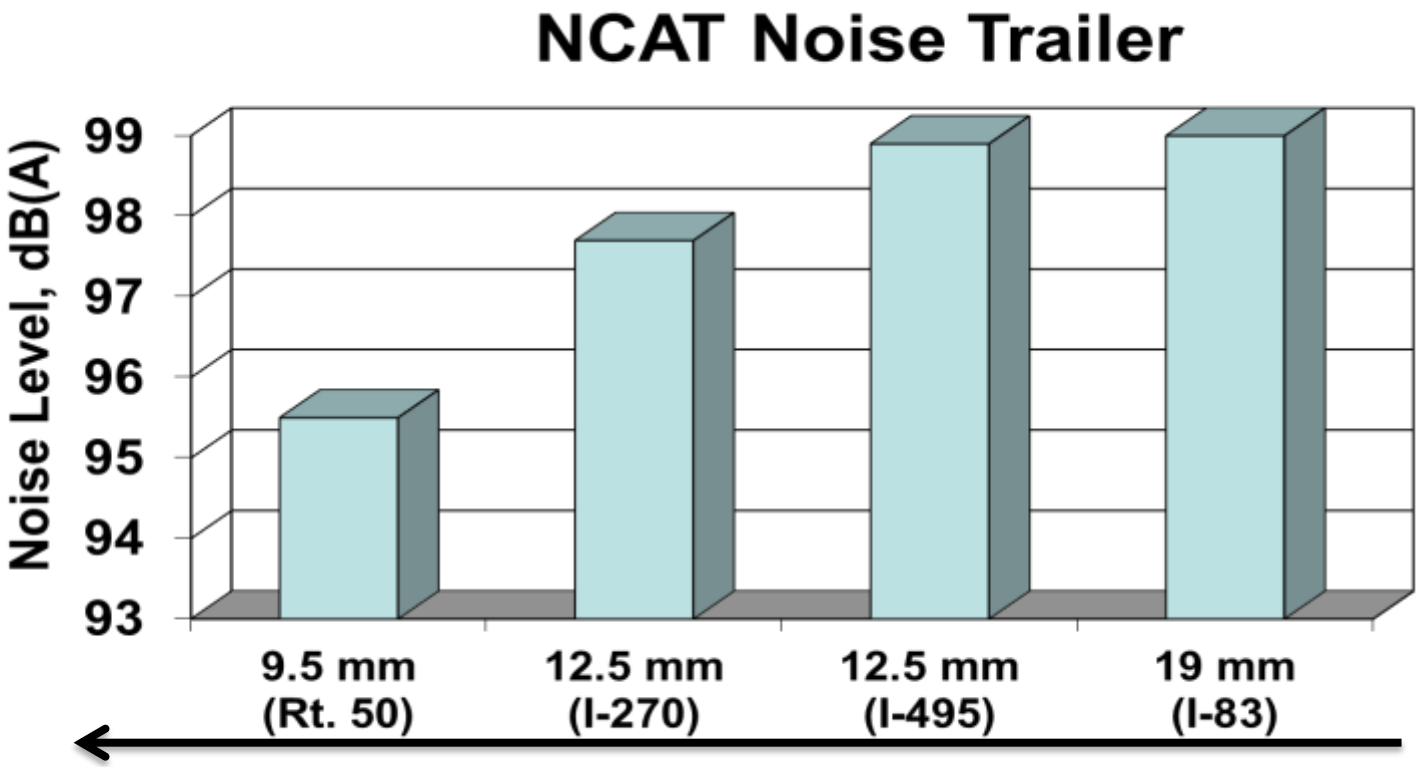
Thinlay Benefits

Sustainable

- Lower Road Noise
- RAM compatible



Noise can be reduced

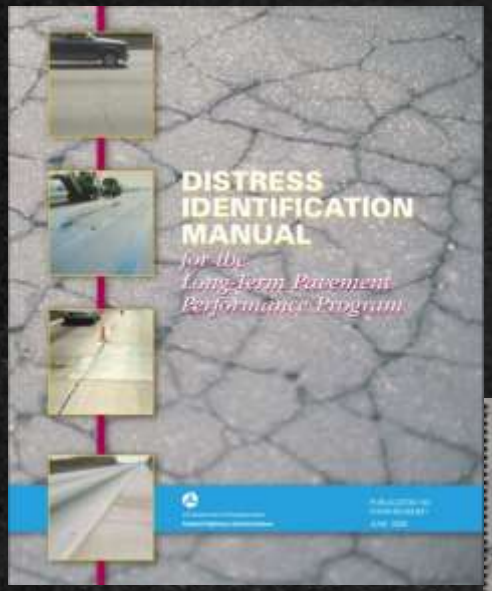


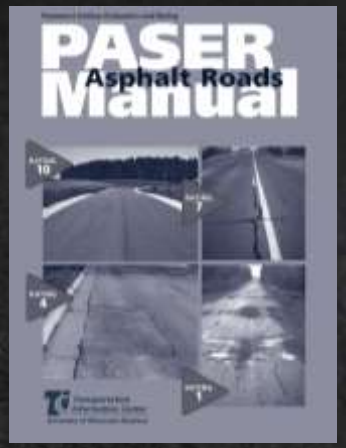
Thinlay Project Selection

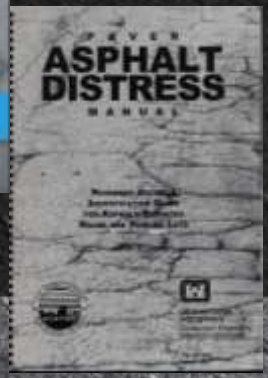
- Thinlays are not appropriate for pavements with structural failure

Thinlay Project Selection

- Pavement Management System
  - Current project-specific performance data
- Need to know:
  - Type of distress
  - Extent
  - Severity
- Site Visit
  - Validate data







Thinlay Project Selection

- Raveling

APA ASPHALT PAVEMENT ALLIANCE

Thinlay Project Selection

- Longitudinal Cracking

Asp

APA ASPHALT PAVEMENT ALLIANCE

Thinlay Project Selection

- Longitudinal Cracking (Wheelpath – minor)

APA ASPHALT PAVEMENT ALLIANCE

Thinlay Project Selection

- Transverse Cracking

Asp

APA ASPHALT PAVEMENT ALLIANCE

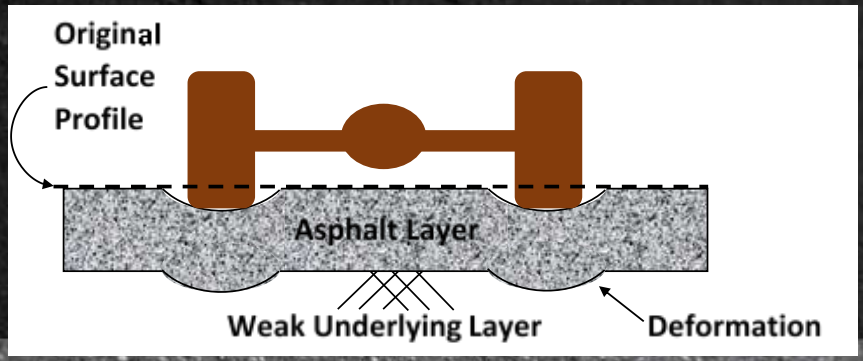
Thinlay Project Selection

- Alligator (Fatigue) Cracking

APA ASPHALT PAVEMENT ALLIANCE

Thinlay Project Selection

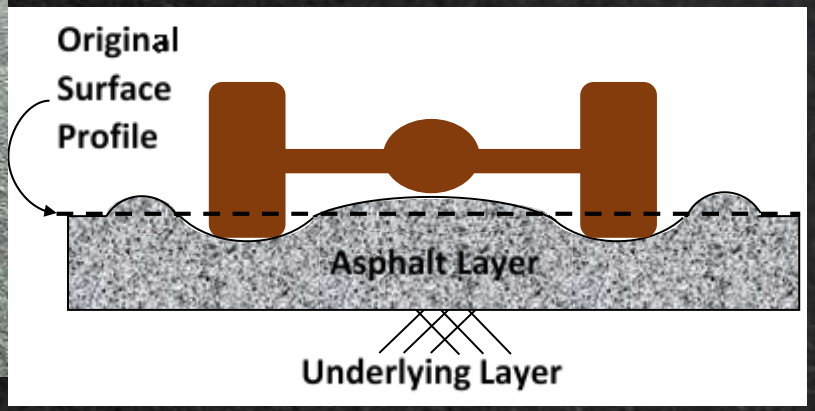
- Rutting or Fatigue (Structural)



APA ASPHALT PAVEMENT ALLIANCE

Thinlay Project Selection

- Rutting or Shoving (Surface Failure)



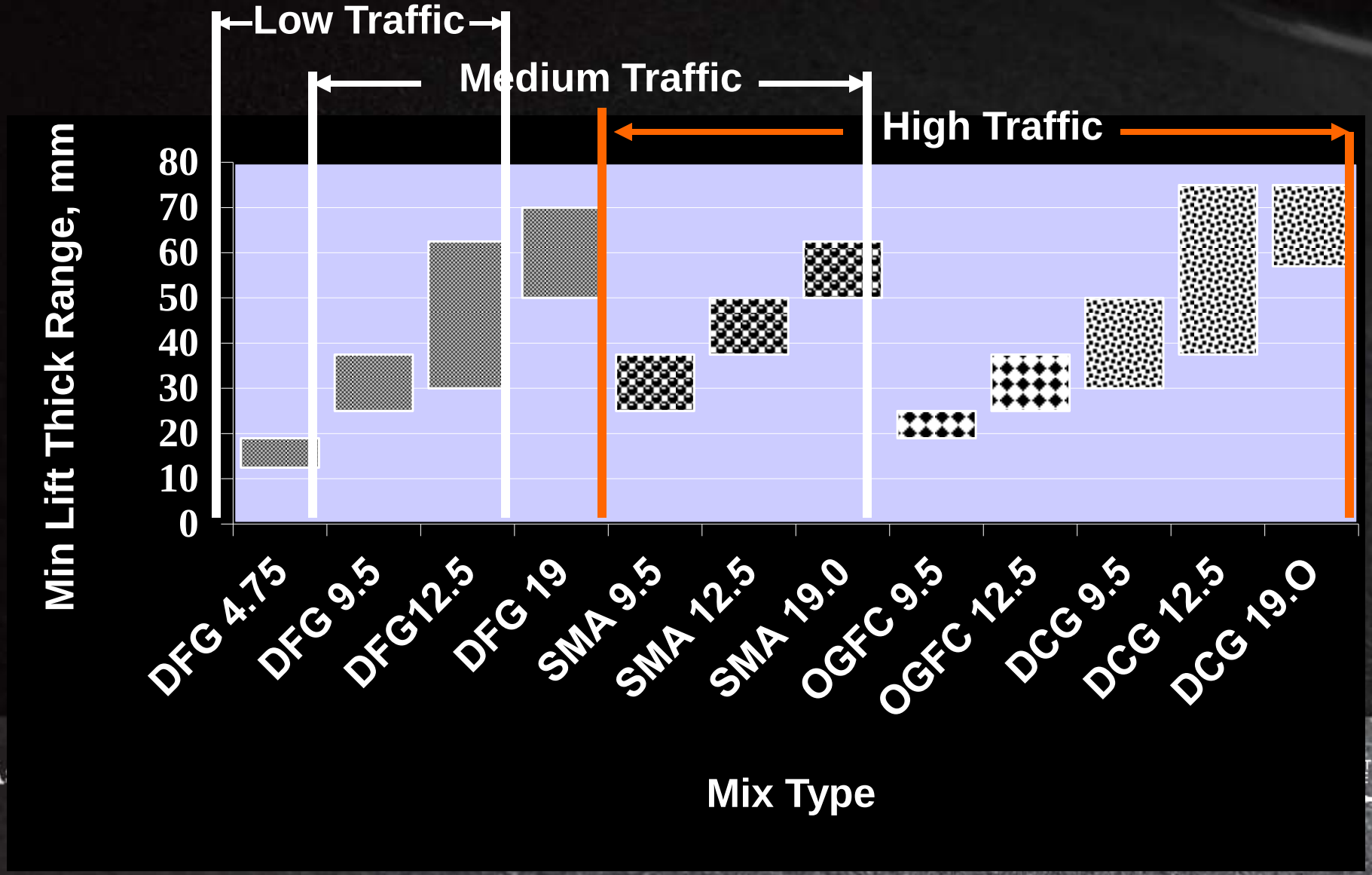
Surface Preparation

	Mill	Fill Cracks with Mix	Clean and Tack
Raveling			✓
Longintudinal Crack	✓	✓	✓
Transverse Crack	✓	✓	✓
Rutting	✓		✓

Asphalt

APA ASPHALT PAVEMENT ALLIANCE

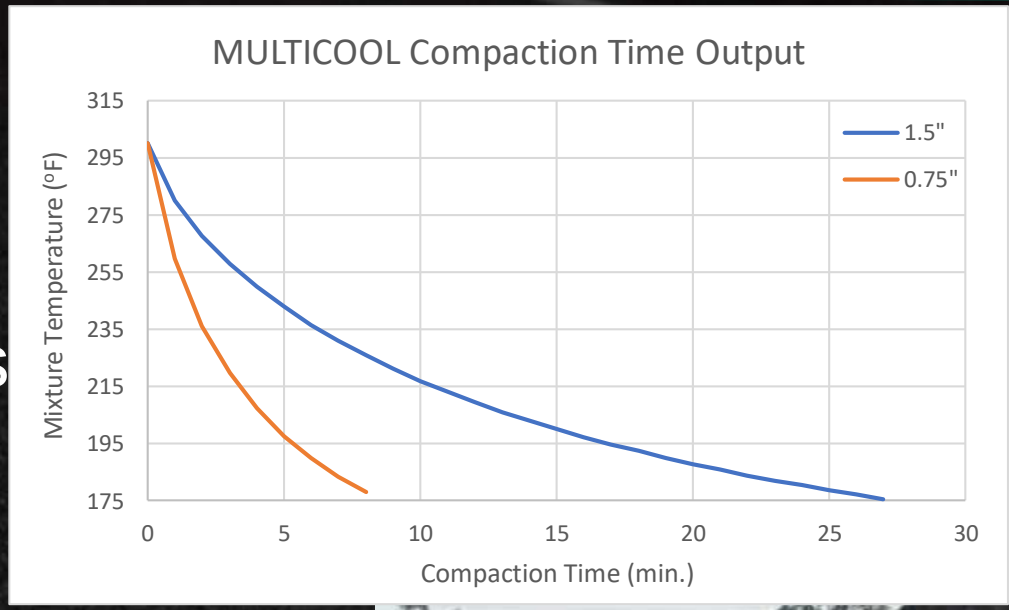
Recommended Mix Types
Surface Courses



Mix Type Recommended

NMAS factors
- Local Materials
- Thickness
  - Geometric/Cross
  - Surface Prep.
- Traffic

WMA
- Assist in paving over crack sealer
- Achieve density at lower temperatures
  - Increase compaction time



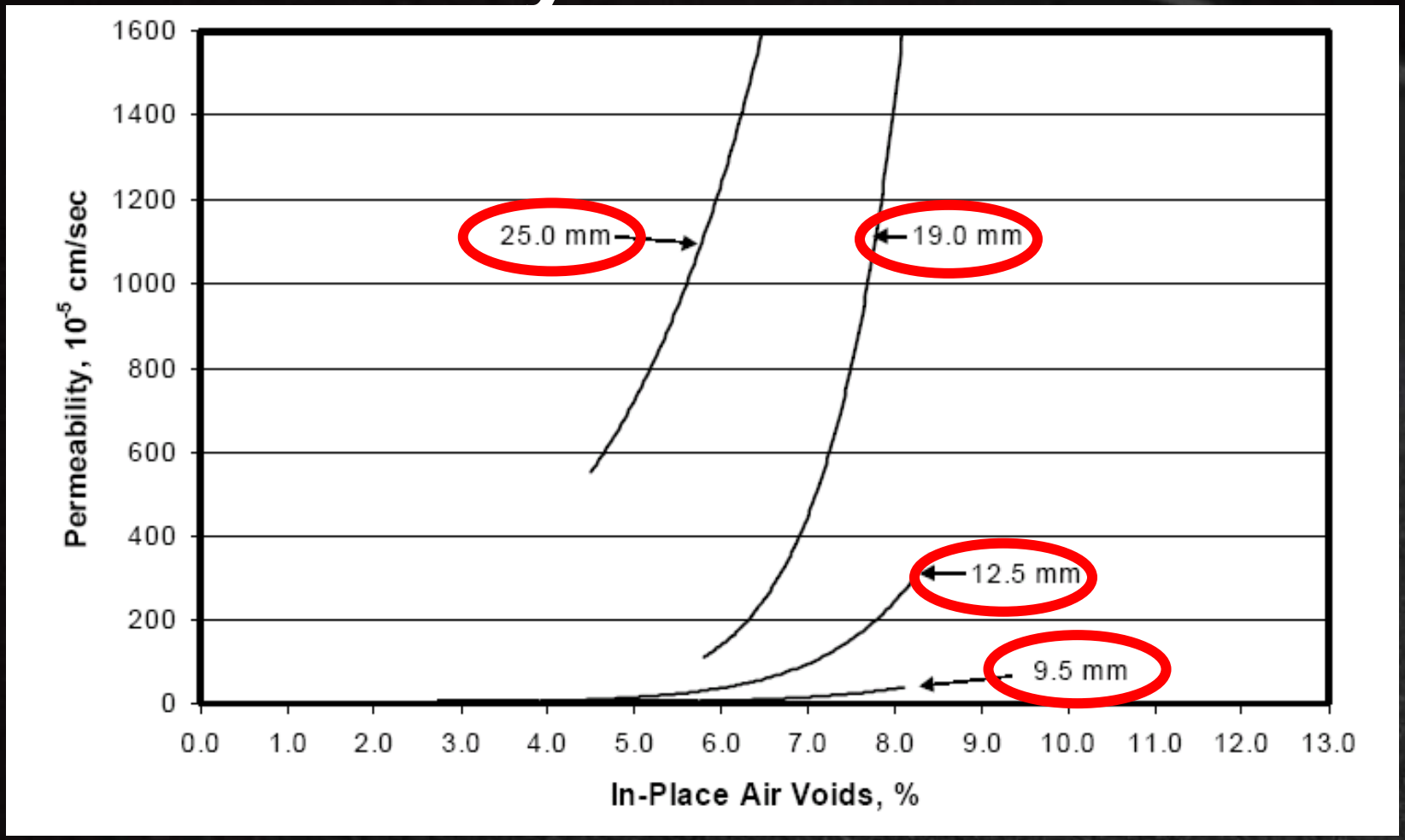
Recycled Asphaltic Material

- RAP/RAS – Processed
  - Consistency
  - Max size ≤ NMAS
- Benefits
  - Stabilize costs
  - Sustainable
  - Reduce demand for virgin AC & Agg
  - Improve rutting performance
  - Helps prevent scuffing
- Maximize usage
  - Maintain Volumetrics, Gradation

Asphalt Binder

- Performance Grade (PG) System
  - Climate
  - Traffic
- Modification option
  - Polymer
  - Assists in Reducing Cracking

Permeability



Plant – QC – Prep - Construction

- Production and Construction BMP's
- Mixture QC
- Surface Preparation
  - Crack Fill
  - Bumps & Dips
  - Tack

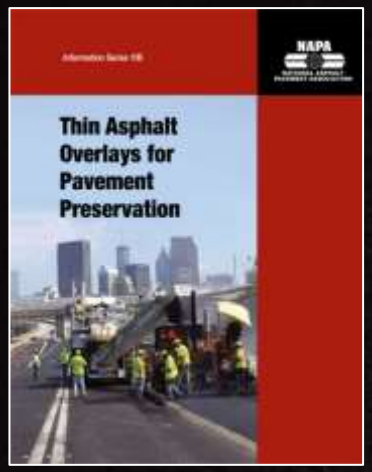
Construction – Project Site

- Dragging
  - Grade (mat thickness)
  - Contamination

Construction – Project Site

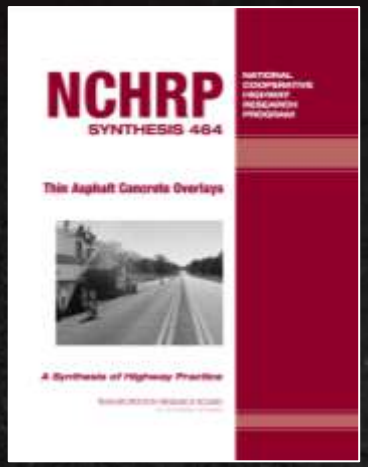
- Rolling
  - Static
    - Mat thickness < 1”

Thinlay Resources

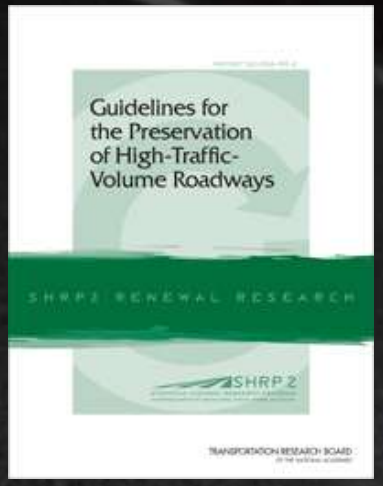


download.

download



NCHRP) Synthesis 464:



TRB SHRP Report S2-R26-RR-2

NAPA Position Paper

DVD
TAS-40

NAPA Thinlay Web Link

NATIONAL ASPHALT PAVEMENT ASSOCIATION

Asphalt. AMERICA RIDES ON US

ASPHALT PAVEMENT ALLIANCE
APA

Summary

- Thin Overlays for Pavement Preservation
  - Improve Ride Quality
  - Reduce Distresses
  - Maintain Road Geometrics
  - Reduce Noise
  - Lower Life Cycle Costs
  - Provide Long Lasting Service
- Place before extensive rehab required
- Expected performance
  - 10 years or more on asphalt
  - 6 to 10 years on PCC

Thank You

Dan Staebell
North Central Regional Director
Asphalt Pavement Alliance
dstaebell@asphaltroads.org
608-440-0142 Cell
563-927-3044 Ofc