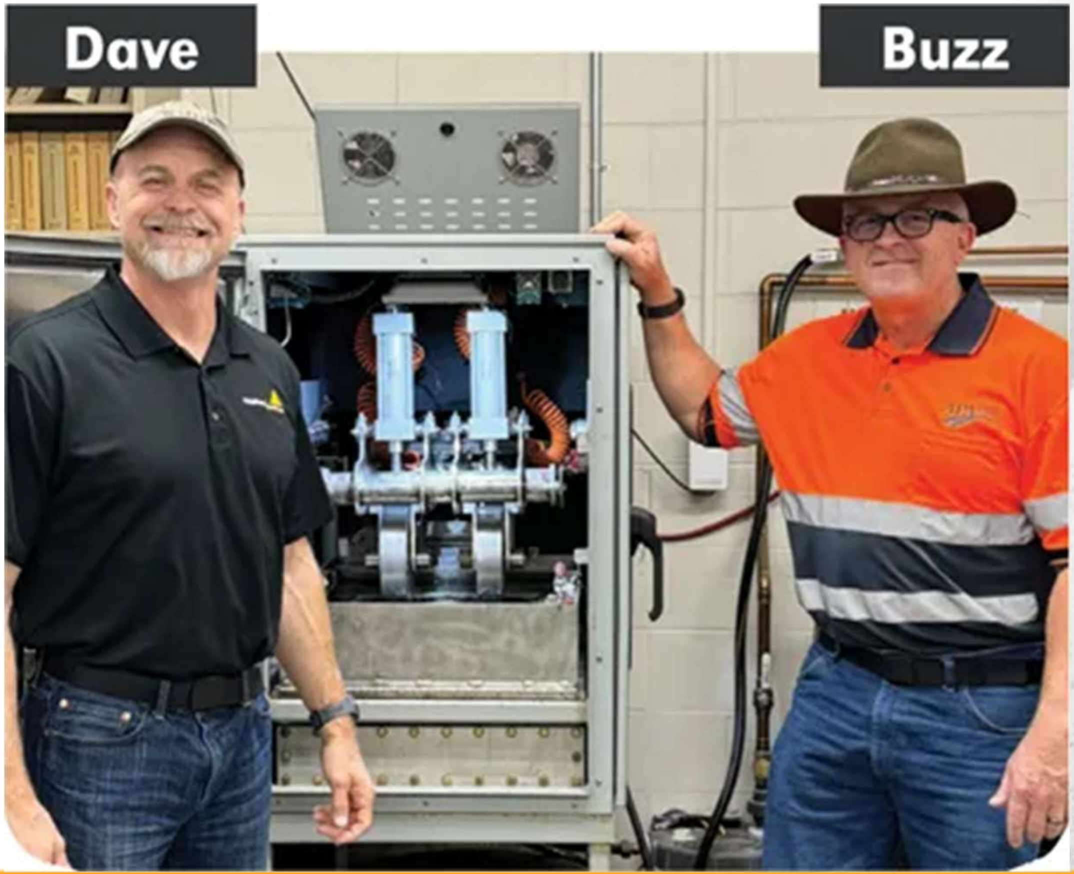
Asphalt Pavement
Design, Construction, and Management

Dan Lewis (APANM),
Dave Johnson (AI), and Buzz Powell (APA)
5/21-22/25

MixBusters



Coarse Introduction by Dan Lewis

- 9:00-9:15 Introduction (Dan, Dave, and Buzz)
- 9:15-10:30 Materials (Dave) then Mixes (Buzz)
- 10:30-10:45 AM Break
- 10:45-Noon Preparation (Dave) then Production (Buzz)
- Noon-1:00 Lunch (Provided)
- 1:00-2:15 Placement (Dave) then Compaction (Buzz)
- 2:15-2:30 PM Break
- 2:30-3:30 Structures (Buzz) then Management (Dave)
- 3:30 Adjourn (Dan)

Materials by Dave Johnson

Mixes by Buzz Powell

Background

NAPA

APA
ASPHALT
PAVEMENT
ALLIANCE

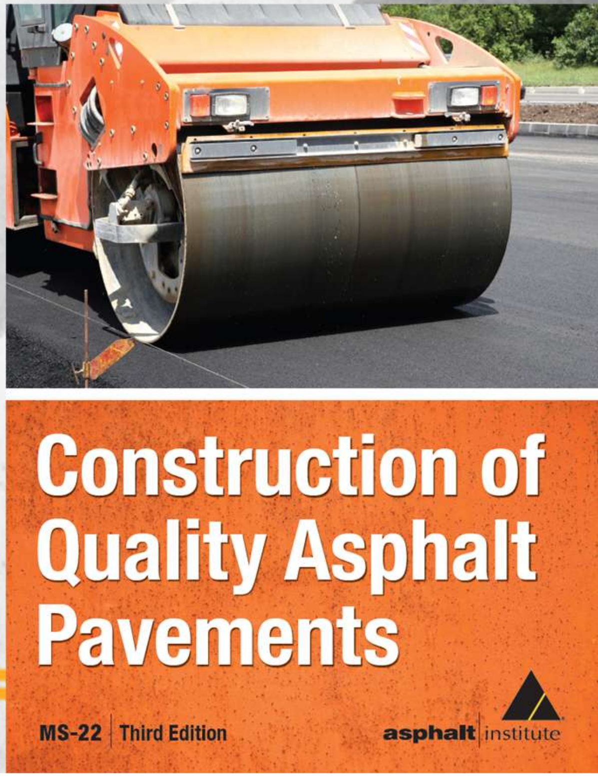
SA
State Asphalt Pavement As

sphalt | institute

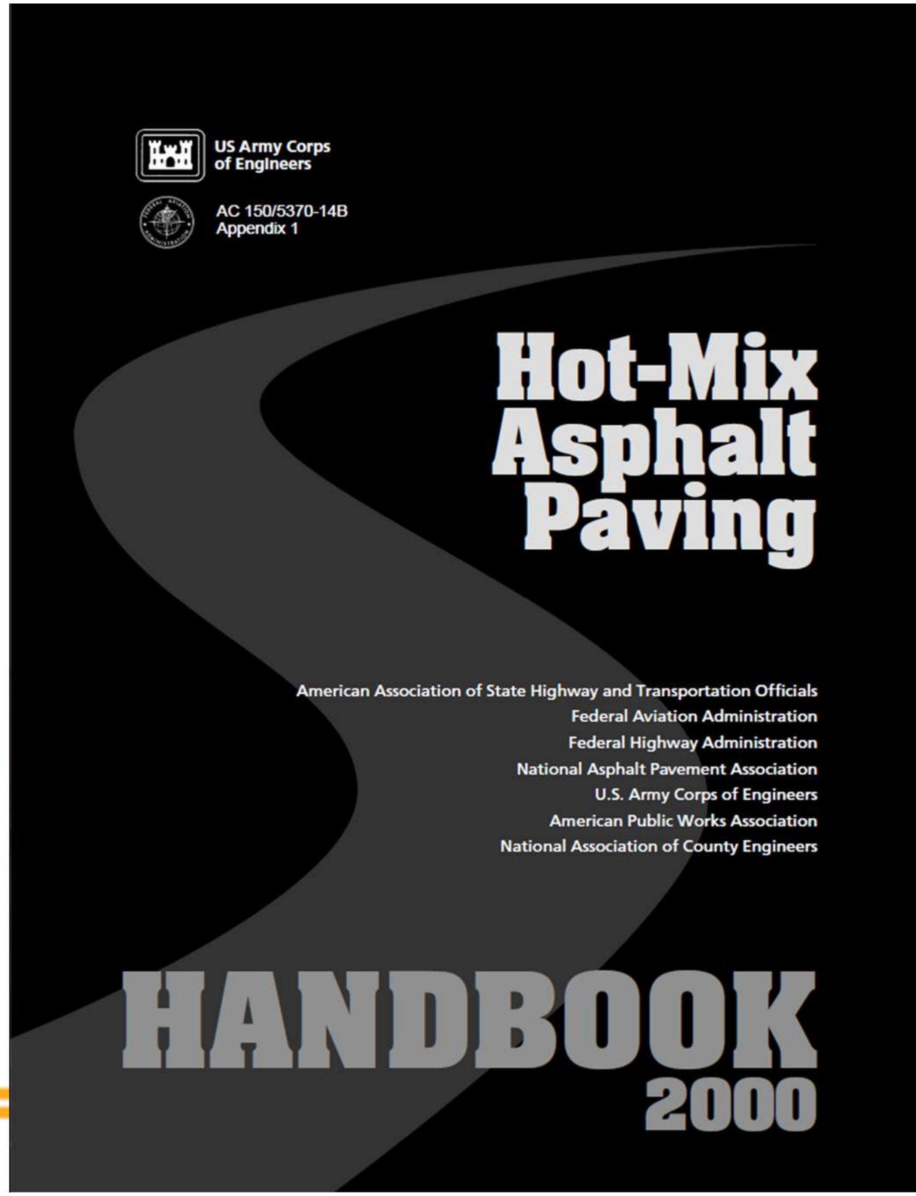
APA
ASPHALT
PAVEMENT
ALLIANCE

MS-22 Reference

- Introduction 1
- Inspection 2
- Materials 3
- Mix design 4
- Preparation 7
- Production 5
- Transportation 6
- Placement 8
- Compaction 9
- Testing 10.

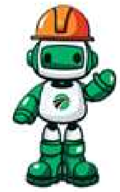


APA ASPHALT PAVEMENT ALLIANCE



APA ASPHALT PAVEMENT ALLIANCE

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.

Talk to HeyNAPA just like you talk to a friend. ☺

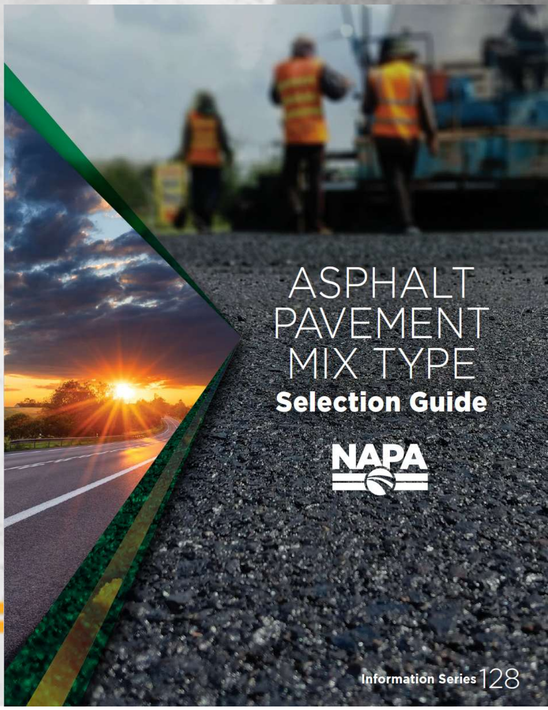
APA ASPHALT PAVEMENT ALLIANCE

Mix Design

- Introduction - quality from materials, mix design $_{\text{MS-2}}$, effort, inspection
- Characteristics – rutting, cracking, permeability, workability, **safety**
- Legacy volumetrics – recipe proportions for asphalt, aggregates, air
- Recycling and additives – impact on gradation, asphalt, mix quality
- Balanced mix design (BMD) – tests for rutting, cracking, durability (H_2O)
- Production – what matters most is what's placed on the roadway.

Mix Type Selection IS-128

- Roadways: range of structural and functional needs
- Airfields: P-401/403, specialty loads, fuel resistant
- Parking Lots: workability, low permeability, scuffing
- Heavy-Duty Pavements: QIP-123 NAPA resource
- Sports and Recreational Facilities: racing, running…



APA ASPHALT PAVEMENT ALLIANCE

Conceptual Pavement Structure

Mix Selection Factors

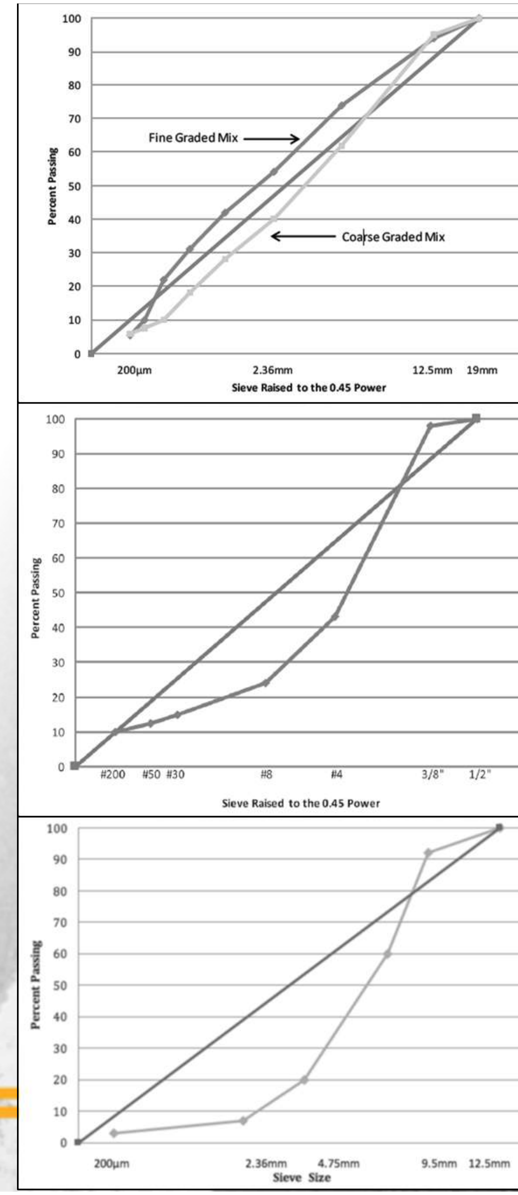
- Traffic (volume and load spectra)
- Environment (temperature and moisture)
- Supporting pavement structure
- Existing pavement condition/preparation
- Economics/budgetary constraints.

Decision Process

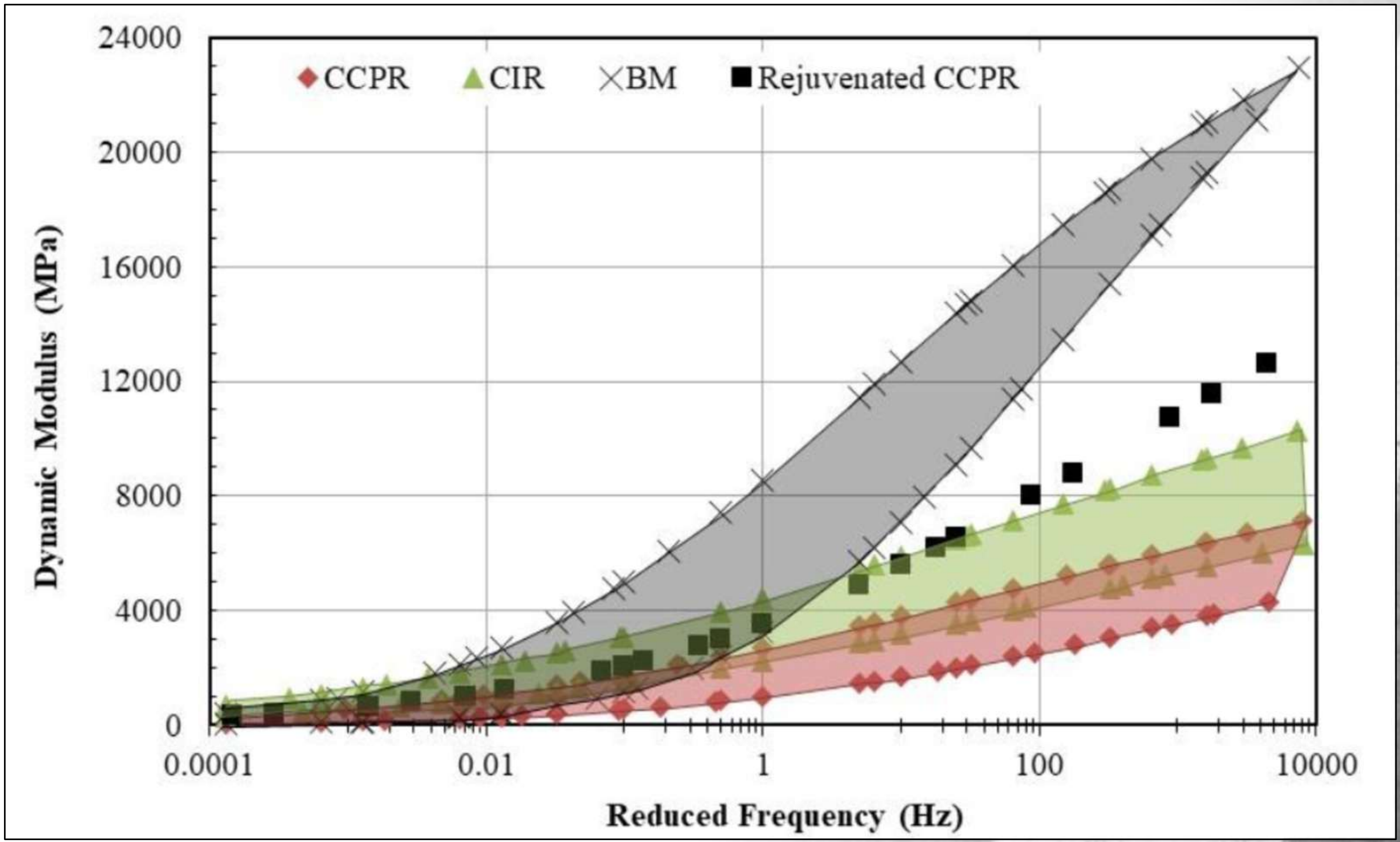
- Identify the application for the mixture
- Estimate the anticipated design traffic
- Calculate the total required asphalt thickness
- Select the appropriate mixture type(s)
- Determine the appropriate layer thickness(es)
- Select mix materials, design method for each layer
- Aggregate blend, asphalt content for compaction and performance.

Mix Type Examples

- High performance thin overlay (HPTO)
- Highly polymerized asphalt (HiMA)
- Crack attenuating mixture (CAM)
- Stone matrix asphalt (SMA)
- Asphalt rubber gap graded (ARGG)
- Open graded interlayer (OGI)
- Permeable asphalt treated base (PATB)
- Cold recycle (CR)…

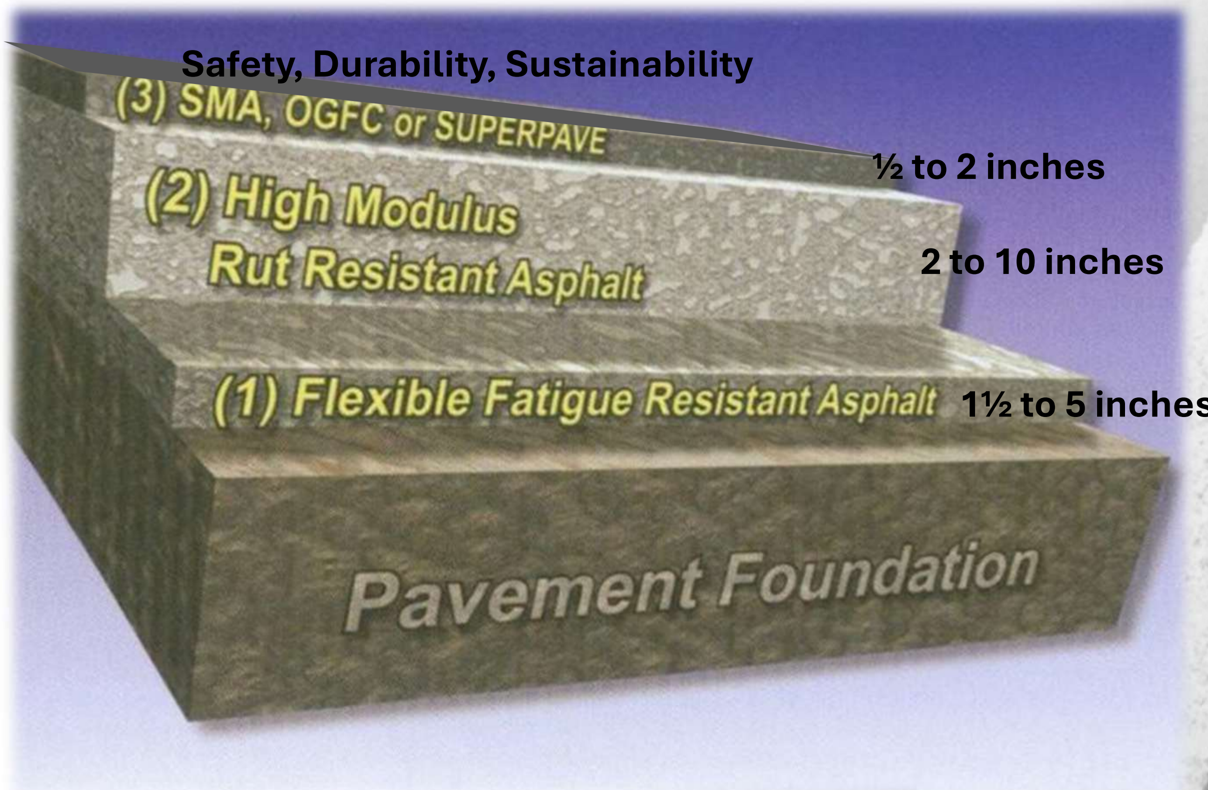


Cold Recycle Mix (Central Plant, In-Place)



ASPHALT PAVEMENT ALLIANCE

Conceptual Pavement Structure



APA ASPHALT PAVEMENT ALLIANCE

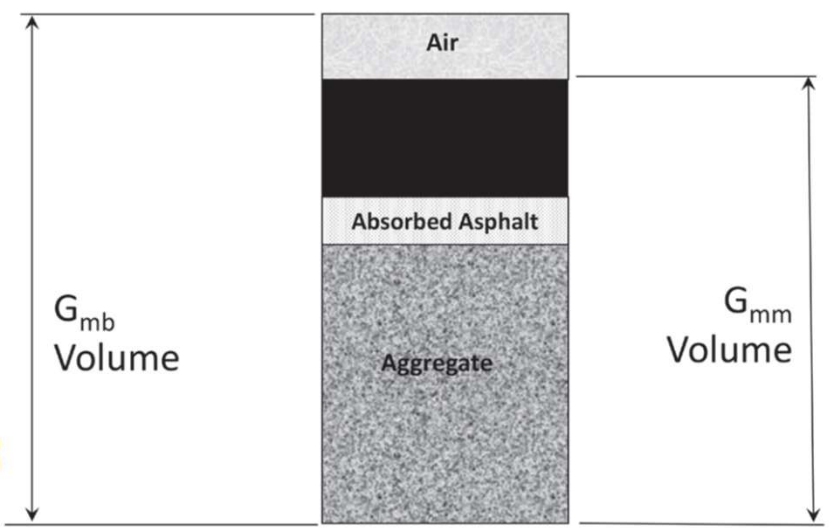
Conventional Wisdom

- Larger stone, lower binder content mixes on bottom
- Smaller stone, higher binder content mixes on top
- Lift thicknesses 3_{fine} to -4_{coarse} x NMAS of mix placed
- Rules developed for virgin blends, neat binder
- 5 x NMAS or more considered “thicklay” paving

- UP to 16 x NMAS at the NCAT Pavement Test Track!

Legacy Volumetrics

- Lab compaction with recipe proportions for asphalt, aggregates, & air
- Developed using virgin aggregates & asphalt binders without polymers
- Estimates the quantity of effective binder content (but not quality)
- Air space for thermal expansion, not too much for traffic densification.



- $V_a = 100 \times ((G_{mm} - G_{mb}) \div G_{mm})$
- $VMA = 100 - ((G_{mb} \times P_s) \div G_{sb})$
- $V_{be} = VMA - V_a$
- $VFA = 100 \times (V_{be} \div (V_{be} + V_a))$
- $65 \leq VFA \leq 75_{DGA}$, $VFA \geq 80_{GGA}$

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.

What are the basic principles of asphalt mix design?

1. Selection of Materials

- **Aggregates:** The selection of aggregates is based on their size, shape, and gradation. Aggregates provide structural strength and stability to the mix. They should be clean, durable, and have a gradation that allows for proper compaction and interlocking.
- **Asphalt Binder:** The asphalt binder acts as a glue to hold the aggregate particles together. The selection of the binder is based on climate conditions, expected traffic loads, and desired performance characteristics. The Performance Grade (PG) system is commonly used to select the appropriate binder.

2. Volumetric Properties

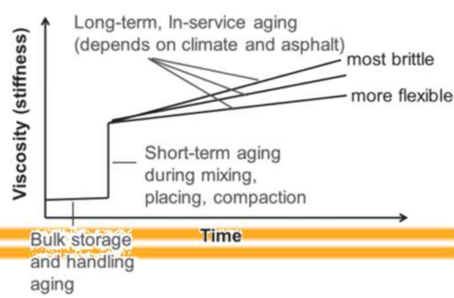
- **Voids in Mineral Aggregate (VMA):** Ensures there is enough space to accommodate the asphalt binder and air voids. Adequate VMA is essential for durability and flexibility.
- **Air Voids (Va):** Provides space for binder expansion and prevents bleeding. Proper air void content is crucial for pavement longevity and resistance to deformation.
- **Voids Filled with Asphalt (VFA):** Indicates the percentage of VMA filled with asphalt binder. This is important for ensuring adequate coating of the aggregates and preventing moisture damage.

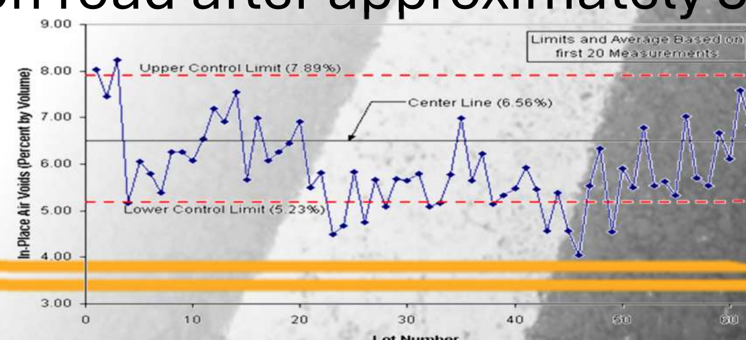
Some Mix Design Best Practices

- Economy of locally available materials will drive the mix design
- Use at least 4 stockpiles for DGA and 3 stockpiles for GG/OG
- Understand stockpile tendencies to predict mix production
- Will segregation make it hard to satisfy gradation requirement?
- How much production “collapse” will occur from breakdown?
- Respect recycle stockpiles more than you respect virgin stockpiles
- Use as much RAP as you have access to and can run well, but…
- Consider using BMD to meet mix quality expectations!

Balanced Mix Design (BMD)

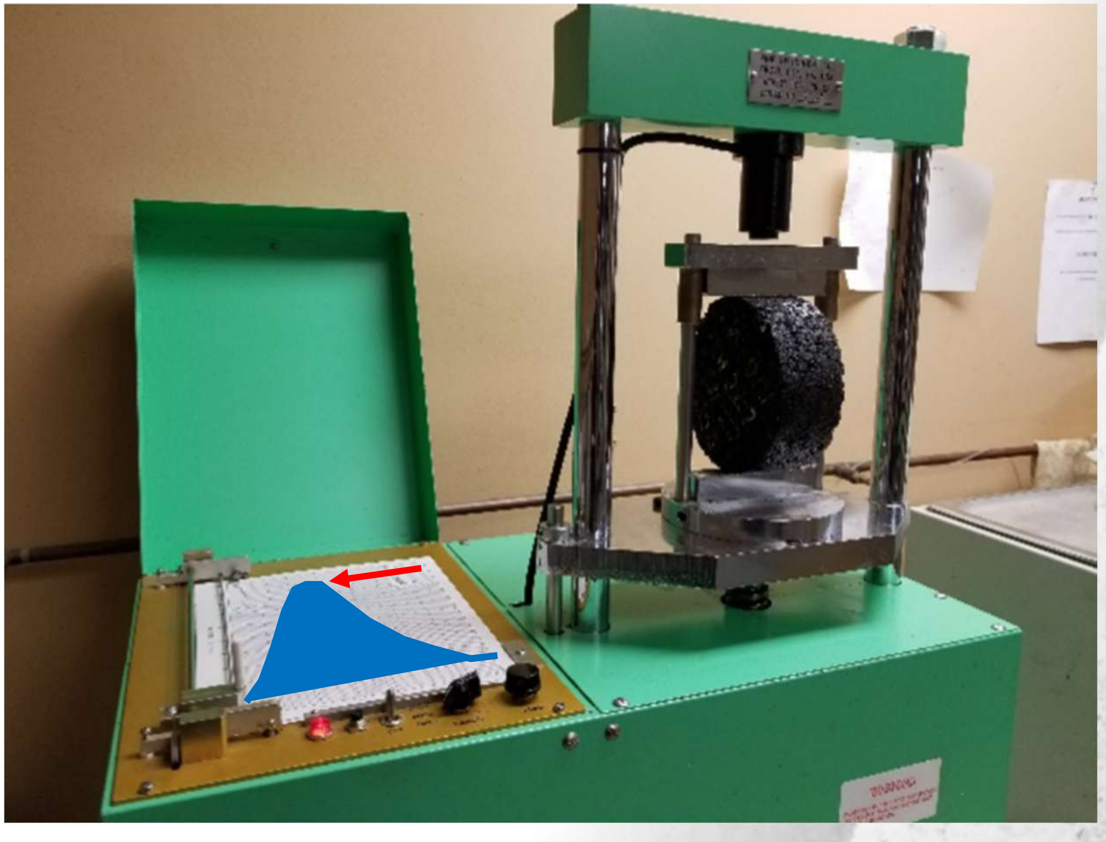
- Develop mix designs using principles from legacy volumetrics (SGC)
- Higher percentages of reclaimed and recycled materials (RAP, RAS)
- Increase V_{be} (via V_a and VMA) and/or softer binder/additive (quality)
- Optimize to satisfy cracking test (e.g., IDEAL-CT) requirement
- Deformation test (e.g., Hot-IDT) to check rutting performance
- Short-term aging to simulate mix that comes out of the plant
- Long-term aging to simulate mix on road after approximately 5 years.





ASPHALT PAVEMENT ALLIANCE

Balanced Mix Design (BMD)



Simple BMD for Alabama Counties

- Mix desigr
- ALDOT-24
- Up to 35 p
- From truc
- Mass to pı
- IDEAL-CT
- CT-Index a
- Repeat te:

Hot asphalt plant mix {3/8"(9.5MM), 1/2"(12.5MM), and 3/4"(19MM) maximum aggregate sizes} in quantities as requested through August 31, 2020. Materials to be in compliance with Section 424 of the State of Alabama Highway Department Standard specifications for Highways and Bridges, 2018 Edition, with the exception that production mix volumetric testing/frequencies using Ndes samples are to be replaced with mix performance testing/frequencies using height compacted samples. ASTM D8225 (replacing the word "deformation" with "displacement" in Section 6.1.1) will be run at 77F to ensure average CT_{Index} values equal or exceed 50 at intermediate temperature to prevent cracking. Testing will be repeated at 122F on identically prepared samples to ensure average indirect tensile strength at high temperature equals or exceeds 17 psi to prevent rutting. Mix proportions necessary to satisfy performance results will be established via test strip. Mix performance testing will be run within the first 100 tons of shipped mix each day, and testing will be repeated if mix is still being shipped after 5 hours and the total shipped tonnage for the day exceeds 500. Failing results will necessitate retesting. A second set of failing results will necessitate a new test strip to reestablish mix proportions. All mixes (regardless of maximum aggregate size and placement layer) can contain up to 35 percent reclaimed and recycled material and specified virgin aggregate properties (with the exception of minimum bulk specific gravity, absorption, deleterious materials, LA abrasion, and carbonate stone limitations for coarse aggregates and minimum bulk specific gravity and sand equivalency for fine aggregates) may be waived provided all stockpiles meet the requirements of ALDOT-249 and mix performance testing results exceed minimum values. **In no case can recycled asphalt shingles be used in the mix.** Price per ton (less than 75 tons, from 75 to 249 tons, from 250 to 499 tons, from 500 to 999 tons, and 1000 tons or more) in place, including tack coat, on an existing roadway surface and leveling. Price to include all materials, labor, and equipment required to haul, spread, clean roadway and compact the asphalt material in place in compliance with applicable sections of the specifications.

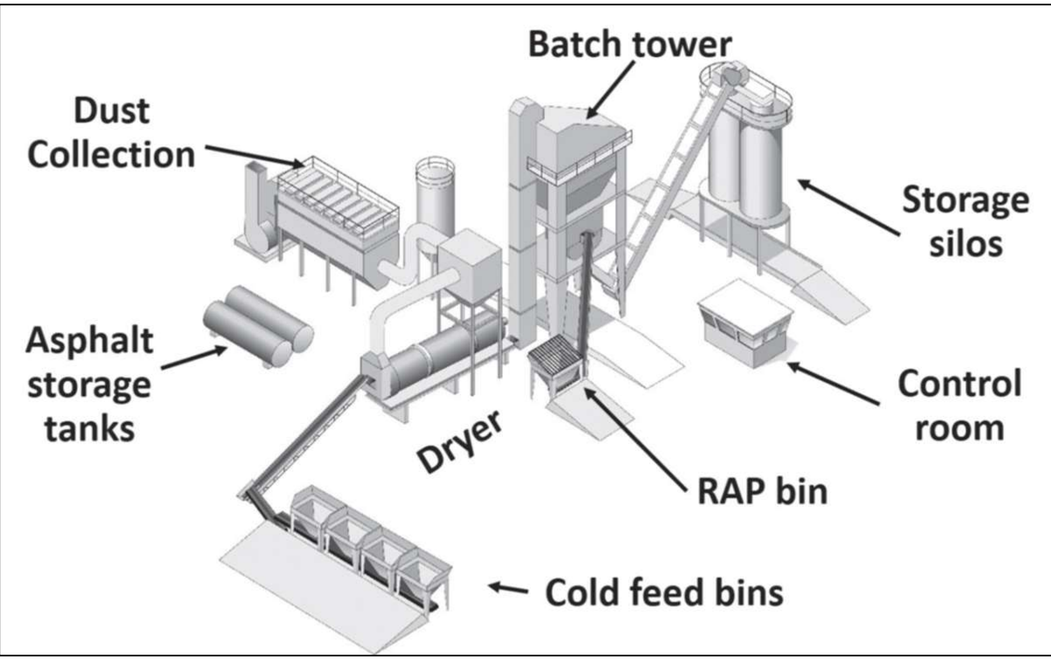
Preparation by Dave Johnson

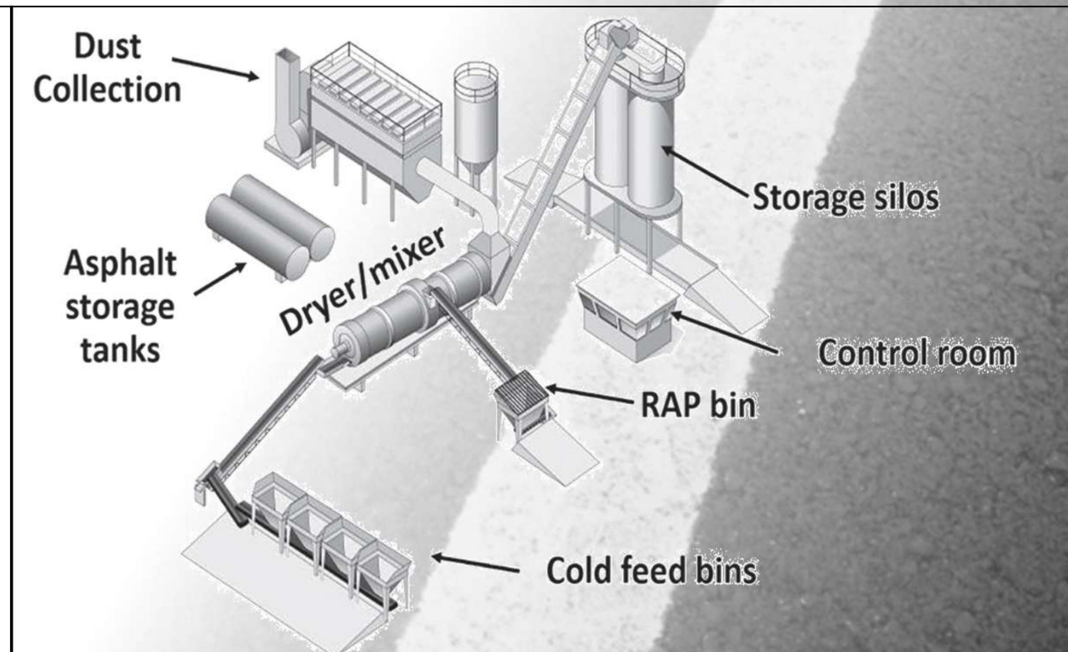
Production by Buzz Powell

Production

- Safety
- Introduction
- Operations
- Materials storage/handling
- Aggregate cold feed
- Drying and heating
- Batch plants
- Continuous plants
- Emissions
- Mix storage
- Weighing and loading
- Troubleshooting.

Batch Plants vs Drum Plants





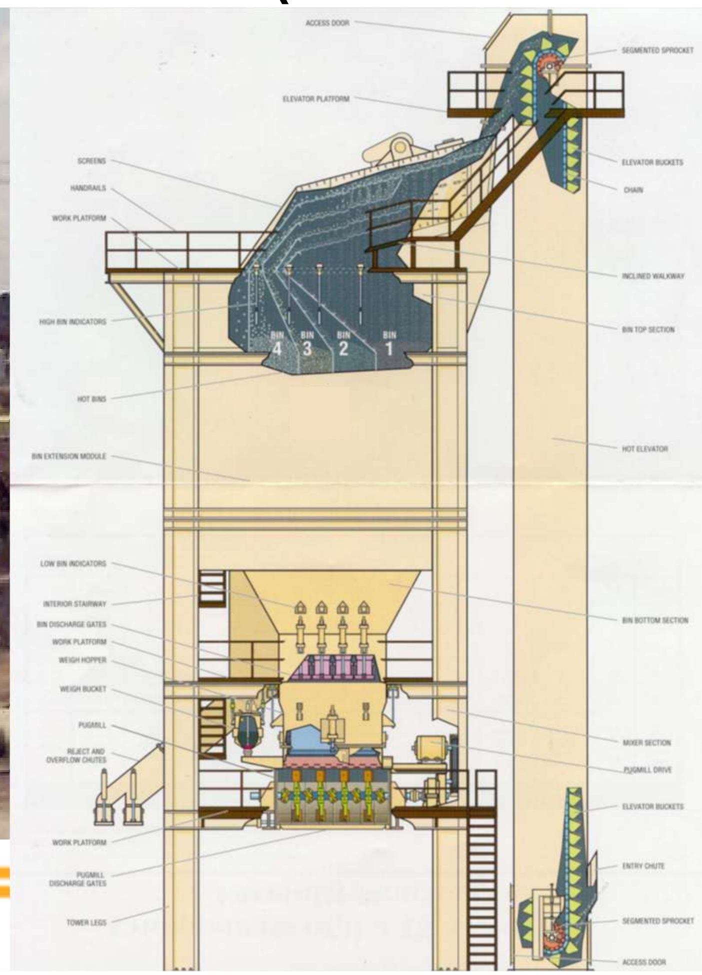
Astec Double Barrel Green Plant

Astec Double Barrel Green Plant

APA ASPHALT PAVEMENT ALLIANCE

Dillman Counterflow Plant

Masden Batch Plant (Now Retired)



Liquid Asphalt Pump

- Calibration tank, QC
- Gravimetric ≠ volumetric
- Unload pump speed only
- Annually, binder change
- Slave pump must = drive
- Flush pump for change
- Special pumps (RTR, etc.)?
- Micro motion sensors specified in some states.

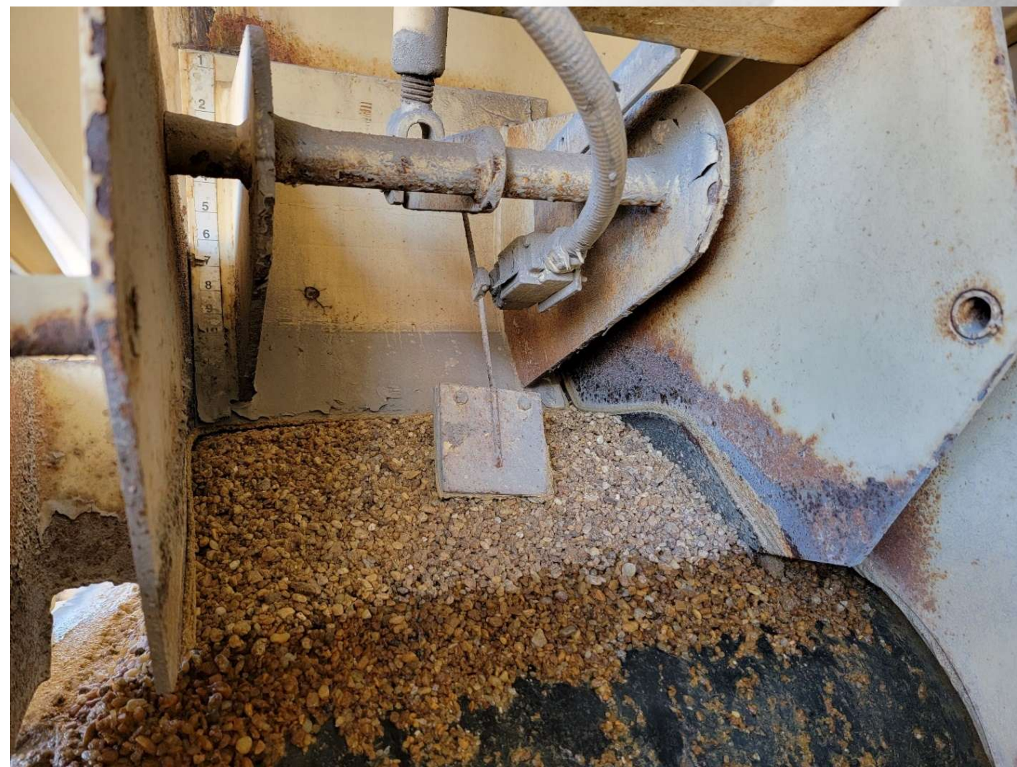
APA ASPHALT PAVEMENT ALLIANCE

Weigh Bridge

- Scales and trucks, yield
- Annually with trucks$_{1\%}$
- Daily with yield$_{5\%}$
- Empty silo zero reset.

Feed Bins

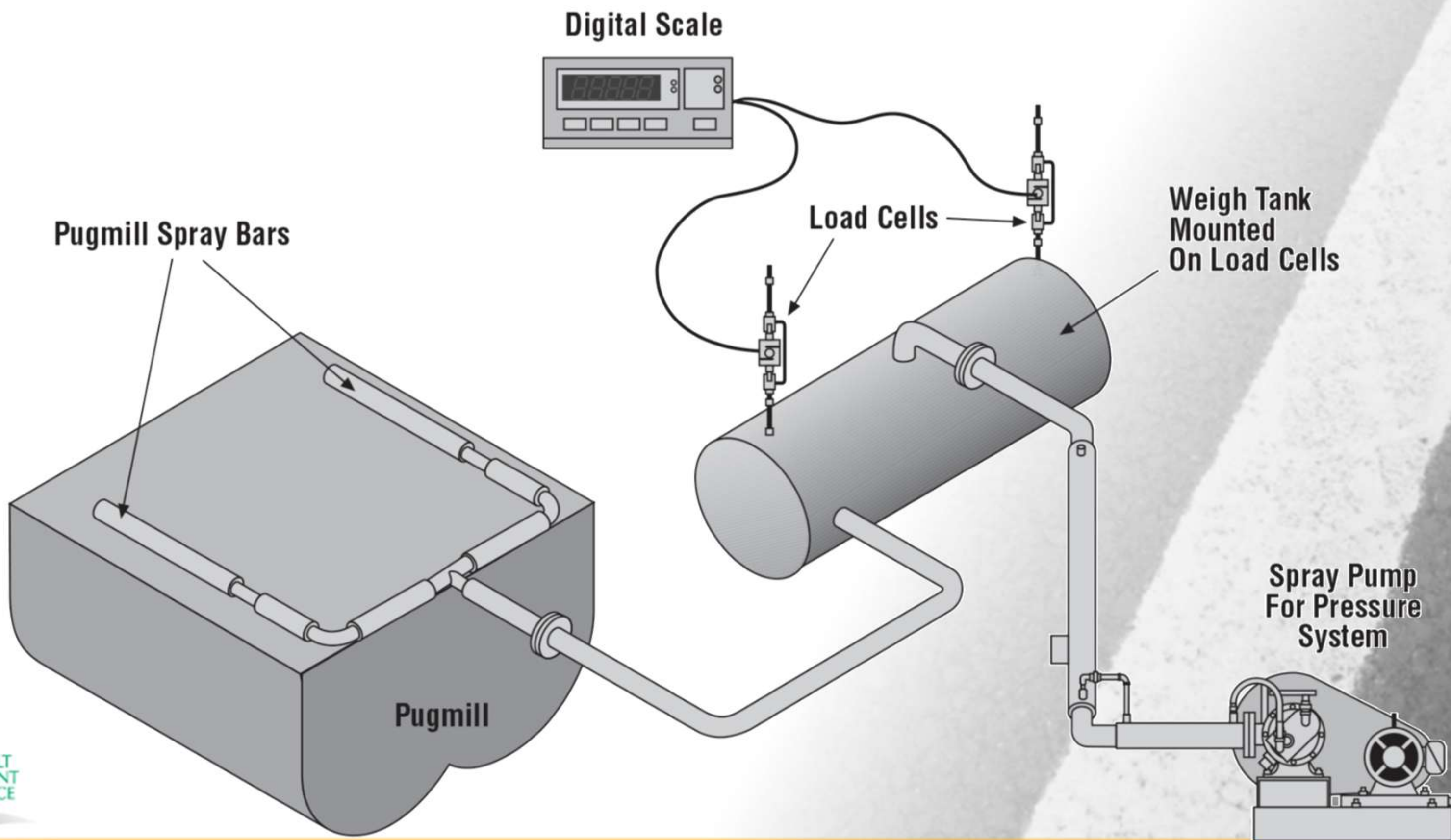
- Size selected bins not enough!
- Aggregate, big mix change
- Note precise gate setting
- Calibrated weigh bridge, or
- Scales and trucks
- Approximate tonnage rate$_{2\%}$
- Actual virgin moistures
- Recycle moisture(s), residual(s), uniqueness.



Liquid Additive Pumping System

Solid Additive Feed System

Batch Plant



Asphalt cement is weighed separately
in a load cell-mounted weigh tank.

ASPHALT PAVEMENT ALLIANCE

Reactive Mix Startup Quality

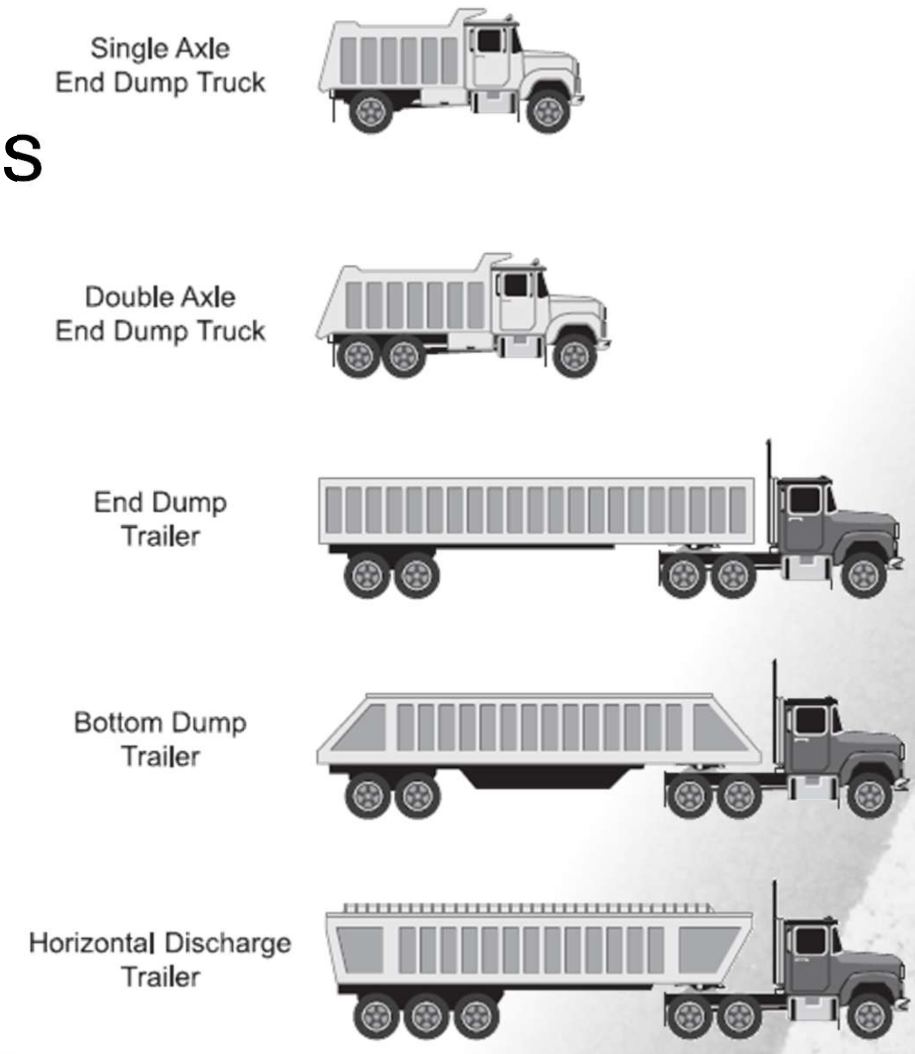
- Startup with ballpark JMF settings
- Pull sample from 2nd or 3rd truck
- Measure quality (AC, gradation, etc.)
- Change settings to “fix” AC, gradation
- Repeat for every 1000 tons…

- Fast quality = profit **and** performance!

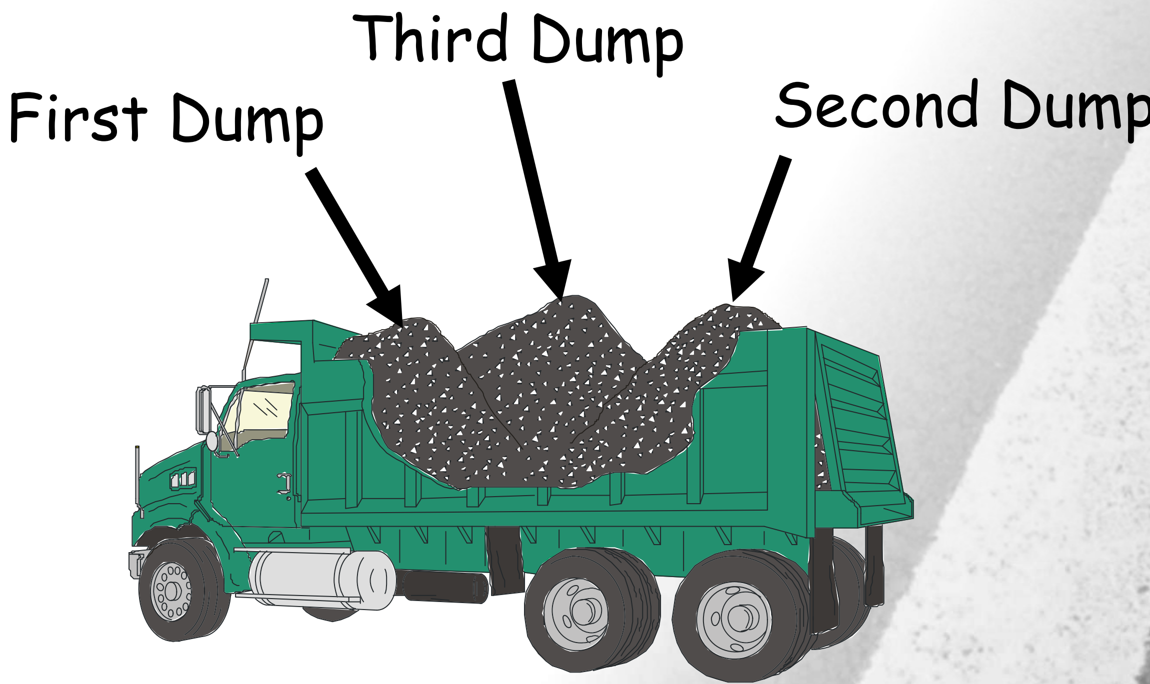
Transportation

- Introduction – Loading mix at the plant, hauling, unloading on roadway
- Truck types – single/double axle dumps, end/bottom/horizontal trailers
- Release agents – prevent mix buildup on truck beds, equipment
- Segregation – physical (stream) versus thermal (invisible) segregation
- Tracking quantities – certified scales, printed vs electronic tickets
- Transporting – Cellular monitoring of fleet location, speed, etc.
- Unloading – caution to prevent bumping/stopping paver
- Troubleshooting – smoke, appearance, segregation, stiffness.

Truck Types


Single Axle
End Dump Truck
Double Axle
End Dump Truck
End Dump
Trailer
Bottom Dump
Trailer
Horizontal Discharge
Trailer

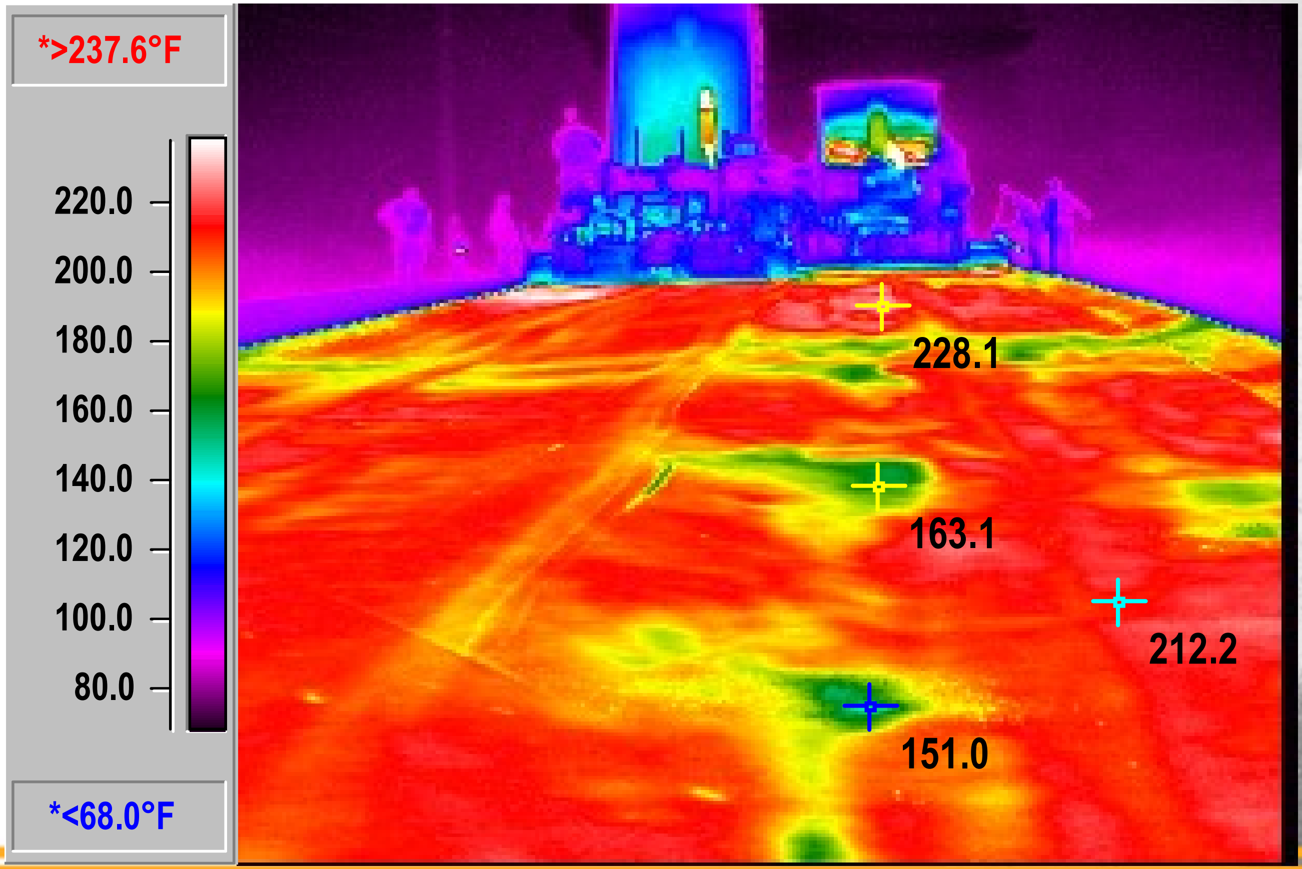
Loading Trucks



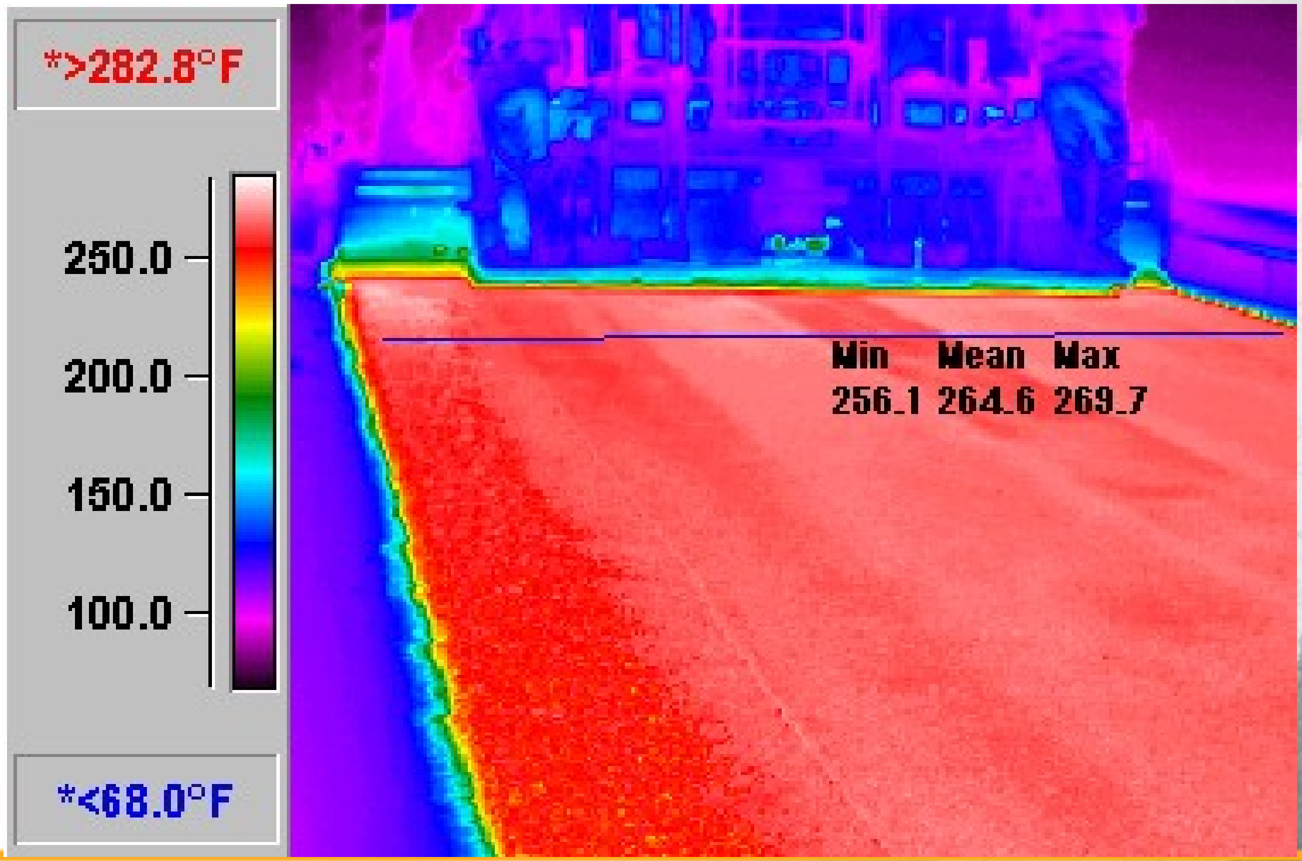
Smart Phone Truck Locations

Tarping Trucks

Without Shuttle Buggy (Echelon)



With Shuttle Buggy



Placement by Dave Johnson

Compaction by Buzz Powell

Compaction

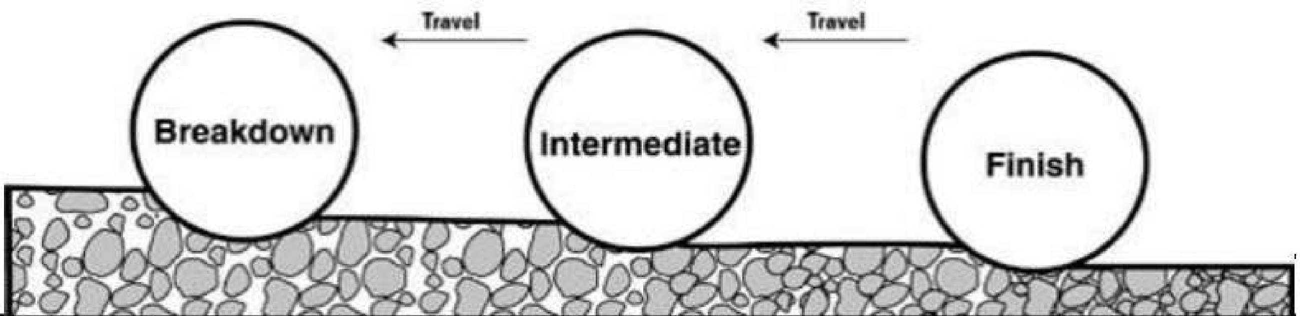
- Introduction – final step in the construction of asphalt pavement
- Mechanics – compressive roller force, mix resistance, base support
- Factors – materials, mix design, mix temp, mat thickness, environment
- Cold weather – mat cools faster, function of base, thickness, wind
- Rollers – breakdown $_{90\%}$, intermediate $_{93\%}$, finish $_{94\%}$ (no rubber tire)
- Innovation – intelligent compaction, thermal imaging, autonomy
- Practices – best practices are well established, supported by industry
- Troubleshooting – tender mixes, low density, erratic density.

Roller Coverage

Roller Options

ASPHALT PAVEMENT ALLIANCE

Target Compaction



%TMD	90-92%	92-94%	94+ %
			
Temp	300-260˚F	260-200˚F	200-160˚F
Coverage	3	2	2 (1 vibe, 1 static)
Settings	High A, Low F	90 psi	Low A, static
	126 feet	200 feet	200 feet

Echelon Breakdown Rolling

ASPHALT PAVEMENT ALLIANCE

Amplitude, Frequency, and Speed

Tender Mixes

- High temperature when asphalt binder is too hot (viscosity)
- Intermediate temperature when cooling/stiffness occurs with a gradient
- Excess mix moisture or higher than necessary binder content
- Rounded aggregates, excess midsize, or insufficient fines
- Poor bonding to the existing asphalt or surface treatment
- Poor roller operation like quick starts and stops.

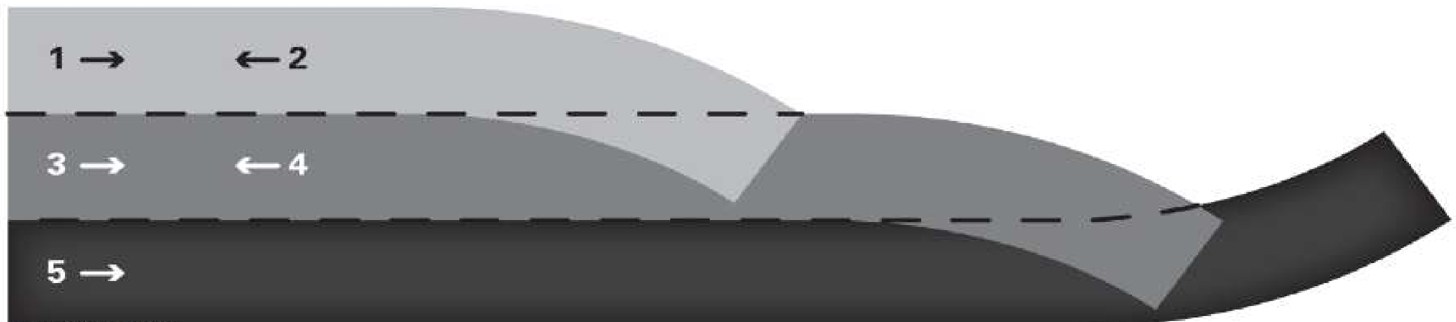
APA ASPHALT PAVEMENT ALLIANCE

Roller Stops

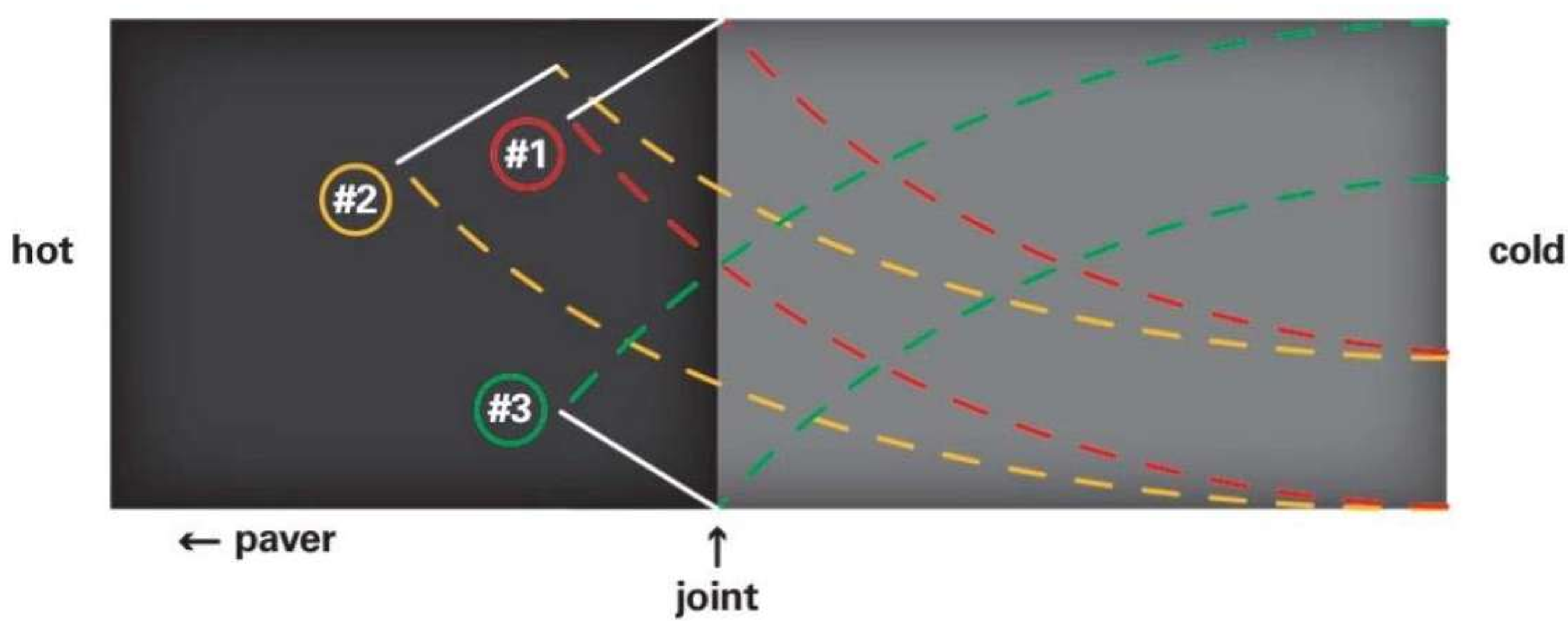
Stop at an angle to the mat

- Roller stops at an angle
- Turn off vibration just before roller starts turning
- Next pass rolls through stop mark
- Stop marks are staggered

REVERSING



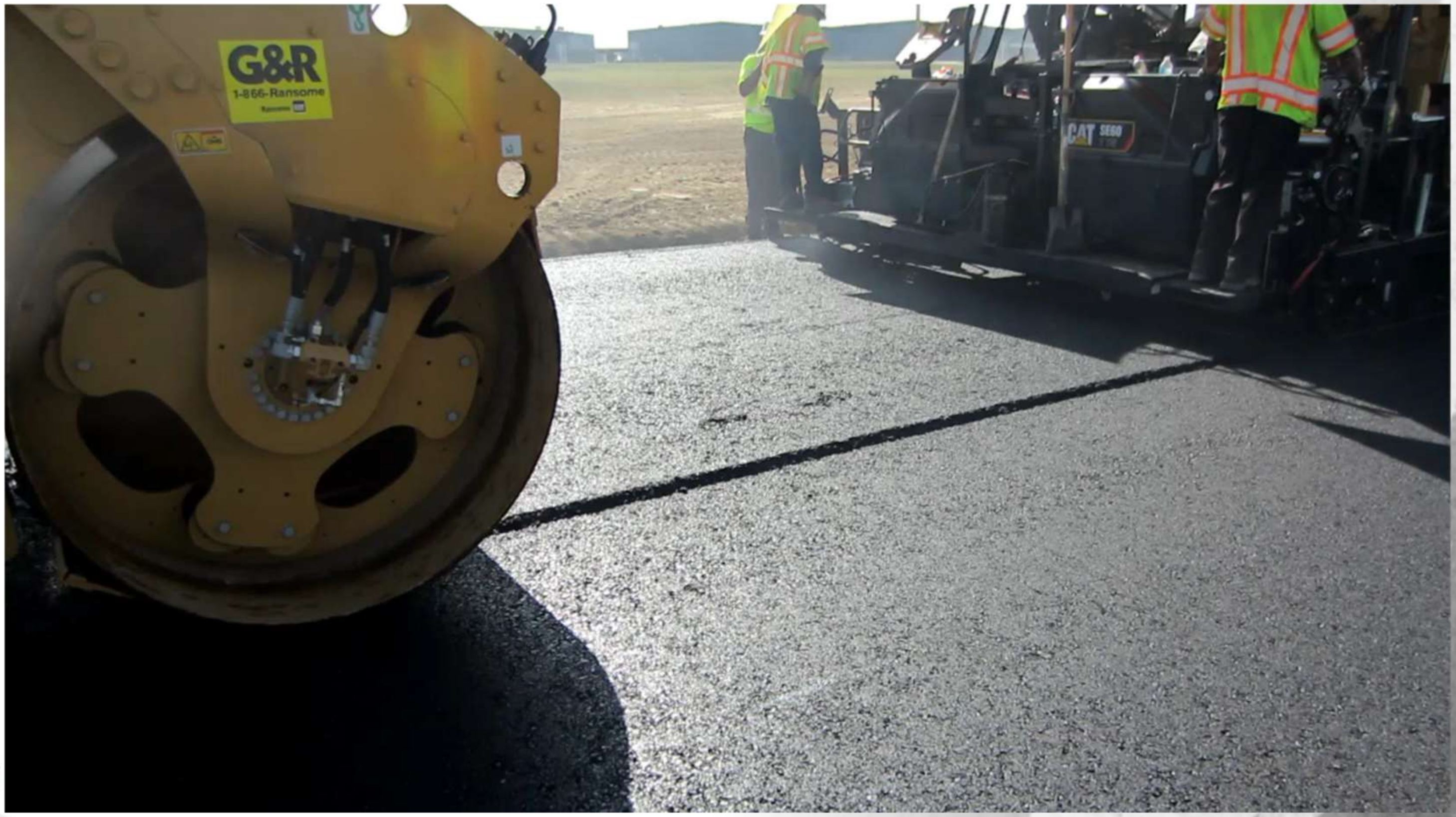
Transverse Joint Rolling



Transverse Joint Rolling

APA ASPHALT PAVEMENT ALLIANCE

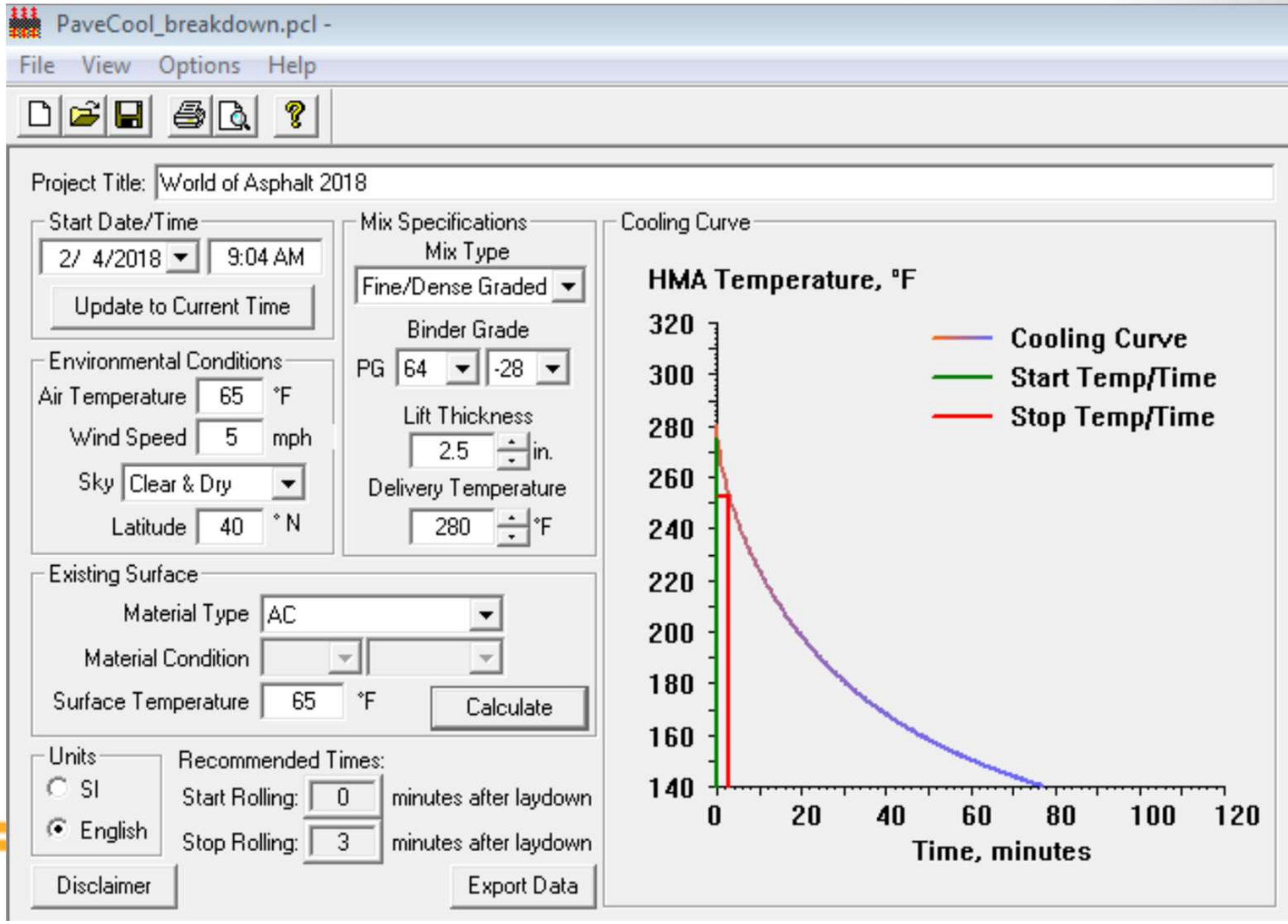
Longitudinal Joint Rolling



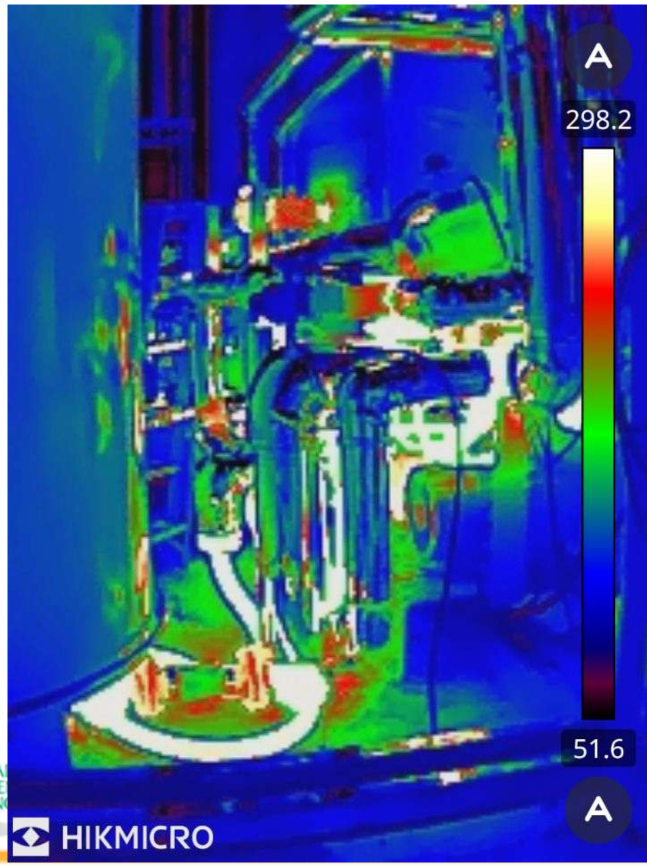
APA ASPHALT PAVEMENT ALLIANCE

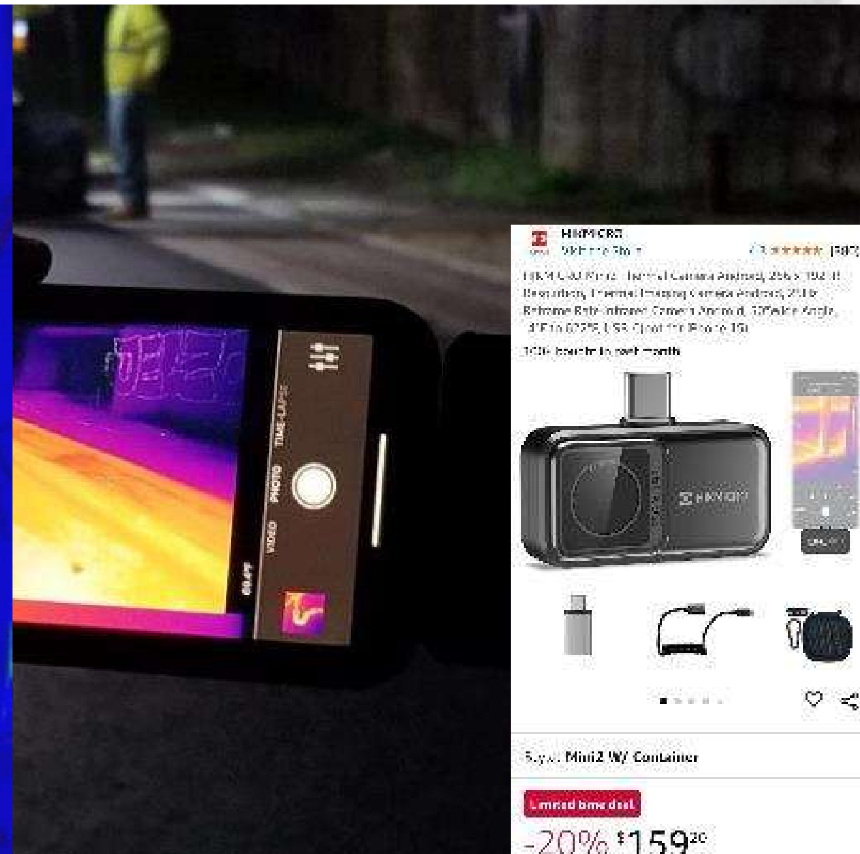
Void Reducing Asphalt Membrane (VRAM)

Pave/Multi Cool Software



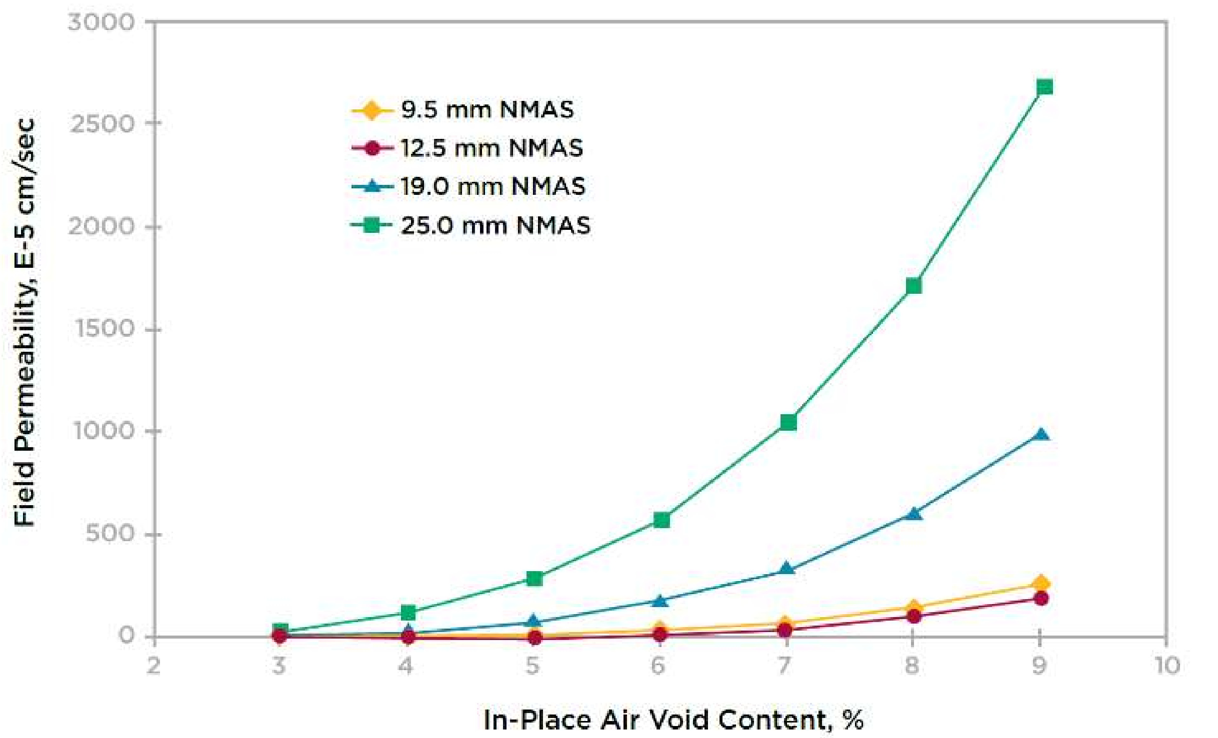
Inspection





Intelligent Compaction

Benefit of Higher Density



Smoothness Measurement

APA ASPHALT PAVEMENT ALLIANCE

Practices to Improve Smoothness

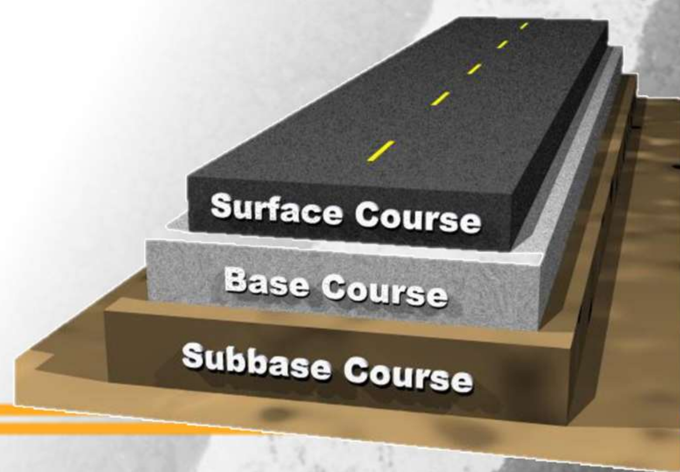
- Ensure surface being paved is a uniform as possible
- Prevent temperature segregation by tarping, MTD, etc.
- Produce and place consistently healthy asphalt mix
- Keep paver moving and avoid stops more than 5 minutes
- Only adjust screws when it’s necessary to control rate
- Ensure stringlines are taunt and right product for the job
- Use good practices in stopping, reversing, parking rollers
- Finish roll out all marks that may influence roughness.

Diamond Grinding

Structures by Buzz Powell

Designing Pavement Structures

- Equations derived from the AASHO Road Test experiment (Empirical)
  - Layer coefficients used to quantify structural contribution of various layers



AASHO Road Test Empirical Design

$$\log_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2-1.5}\right]}{0.4 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 \times \log_{10}(M_R) - 8.07$$

Where:

W_{18} = the predicted number of 18-kip equivalent single axle load (ESAL) applications
Z_R = standard normal deviate
S_0 = combined standard error of the traffic prediction and performance prediction
ΔPSI = difference between the initial design serviceability index (p_i) and the design terminal serviceability index (p_t)
M_R = resilient modulus of the subgrade (psi)

The designer inputs data for all of the variables except for the structural number (*SN*), which is indicative of the total pavement thickness required.

Once the total pavement *SN* is calculated, the thickness of each layer within the pavement structure is calculated

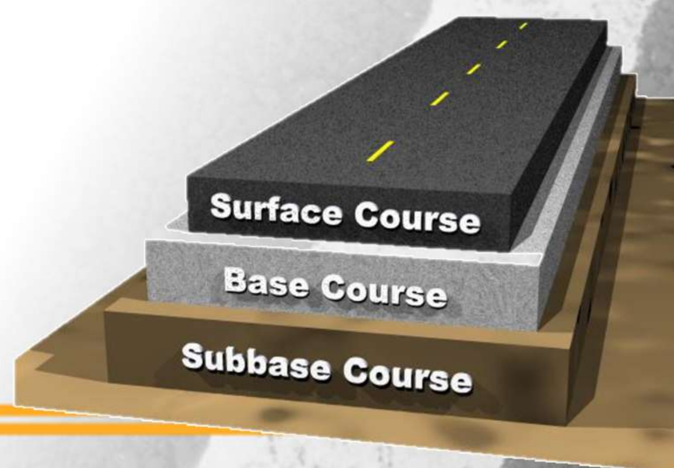
$$SN = a_1 D_1 + a_2 D_2 m_2 + a_3 D_3 m_3 + \cdots + a_i D_i m_i$$

Where:

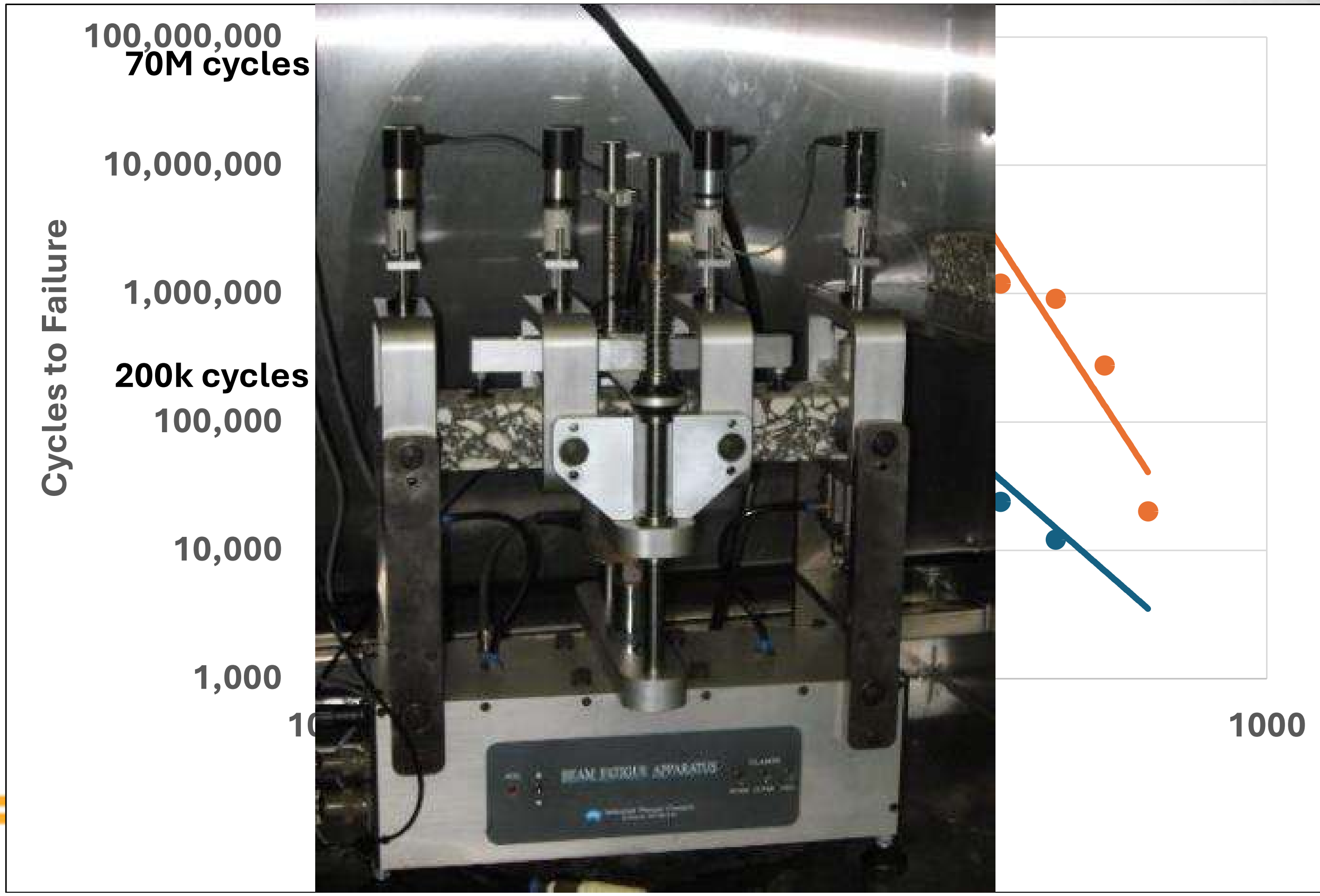
a_i = i^{th} layer coefficient
D_i = i^{th} layer thickness (inches)
m_i = i^{th} layer drainage coefficient

Designing Pavement Structures

- Equations derived from the AASHO Road Test experiment (Empirical)
  - Layer coefficients used to quantify structural contribution of various layers
- Cycles of bottom-of-pavement strains/bending (Mechanistic)
  - Transfer functions to interpret lab results based on actual roadway strains

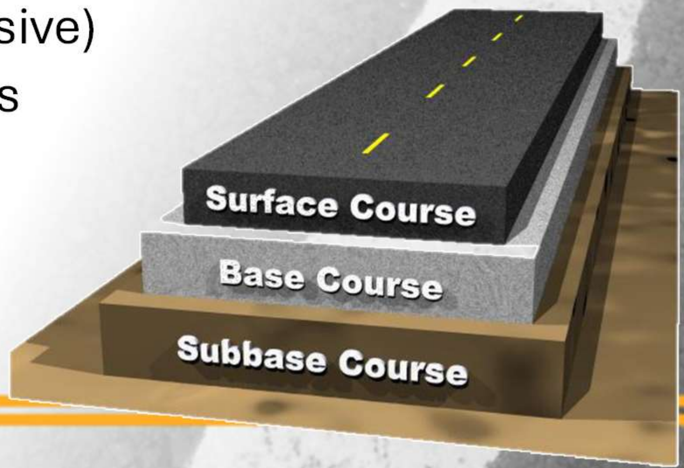


Transfer Functions from Beam Fatigue Testing



Designing Pavement Structures

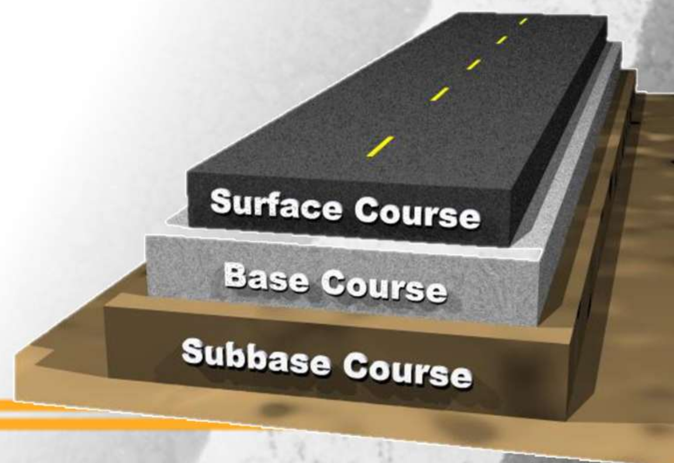
- Equations derived from the AASHO Road Test experiment (Empirical)
  - Layer coefficients used to quantify structural contribution of various layers
- Cycles of bottom-of-pavement strains/bending (Mechanistic)
  - Transfer functions to interpret lab results based on actual roadway strains
- Strains/bending calibrated to experiments (Mechanistic-Empirical)
  - Pavement ME (computationally intensive)
  - PerRoad (simplified perpetual designs
  - PaveXpress (www.PaveXpress.com)



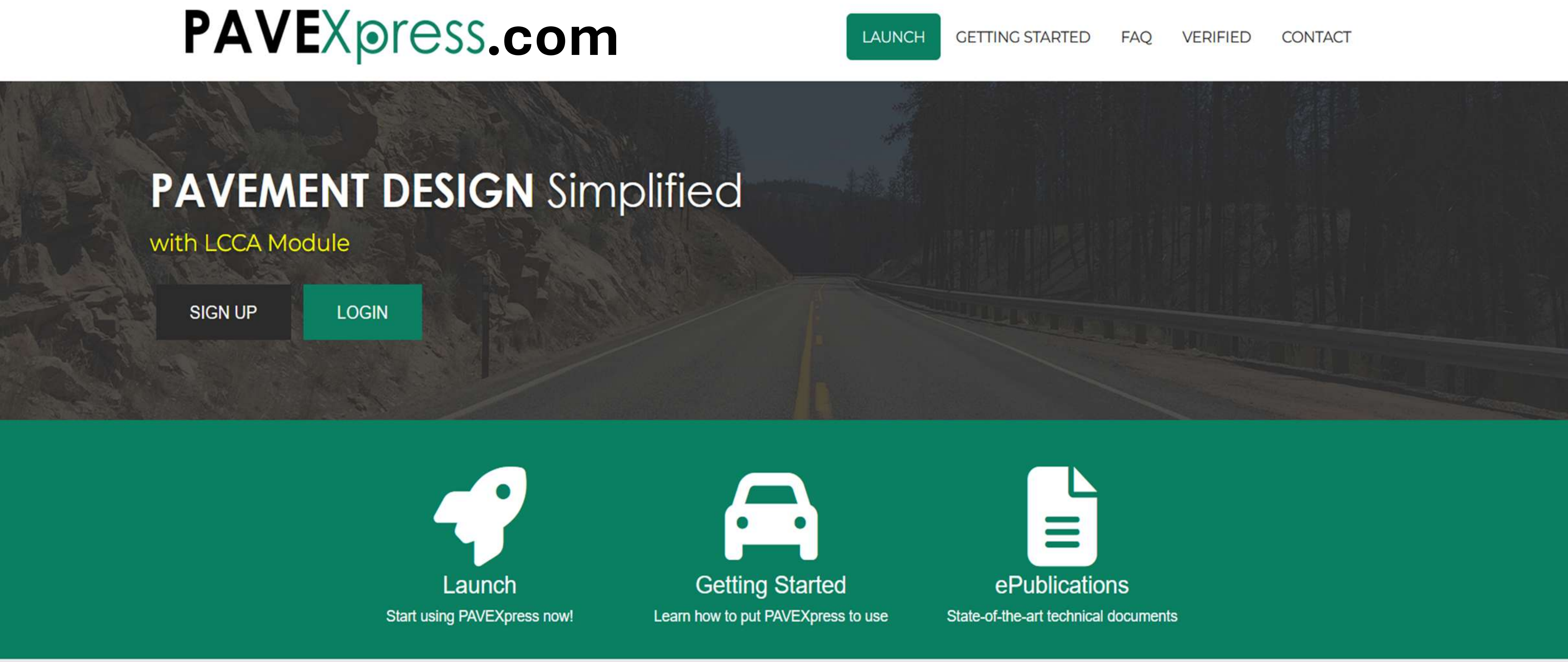
ASPHALT PAVEMENT ALLIANCE

PaveXpress.com

- New asphalt pavement ‘93
- Asphalt pavement overlays ‘93
- Porous asphalt pavement
- New concrete pavement ‘98
- Asphalt overlay on concrete Soon

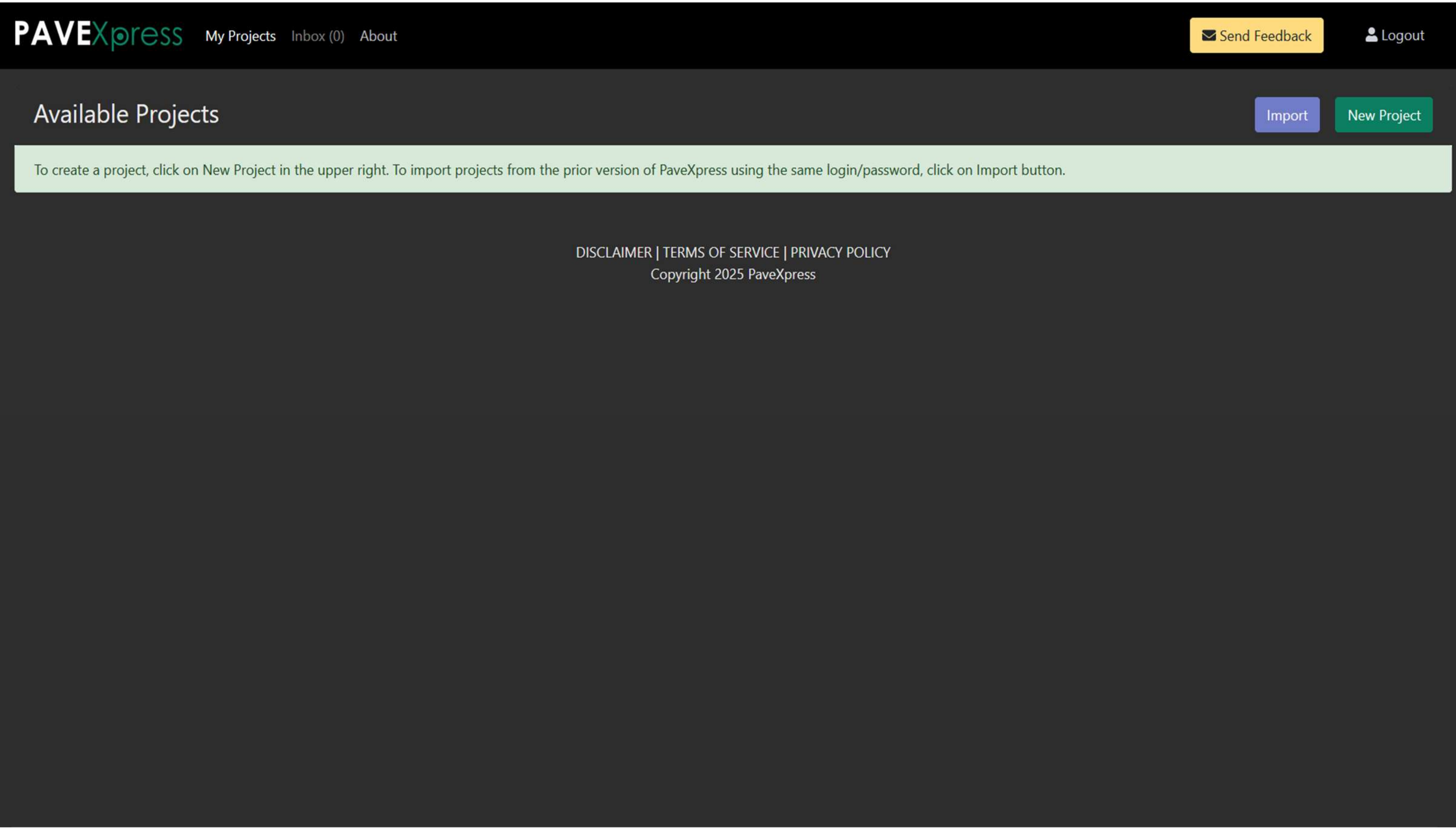


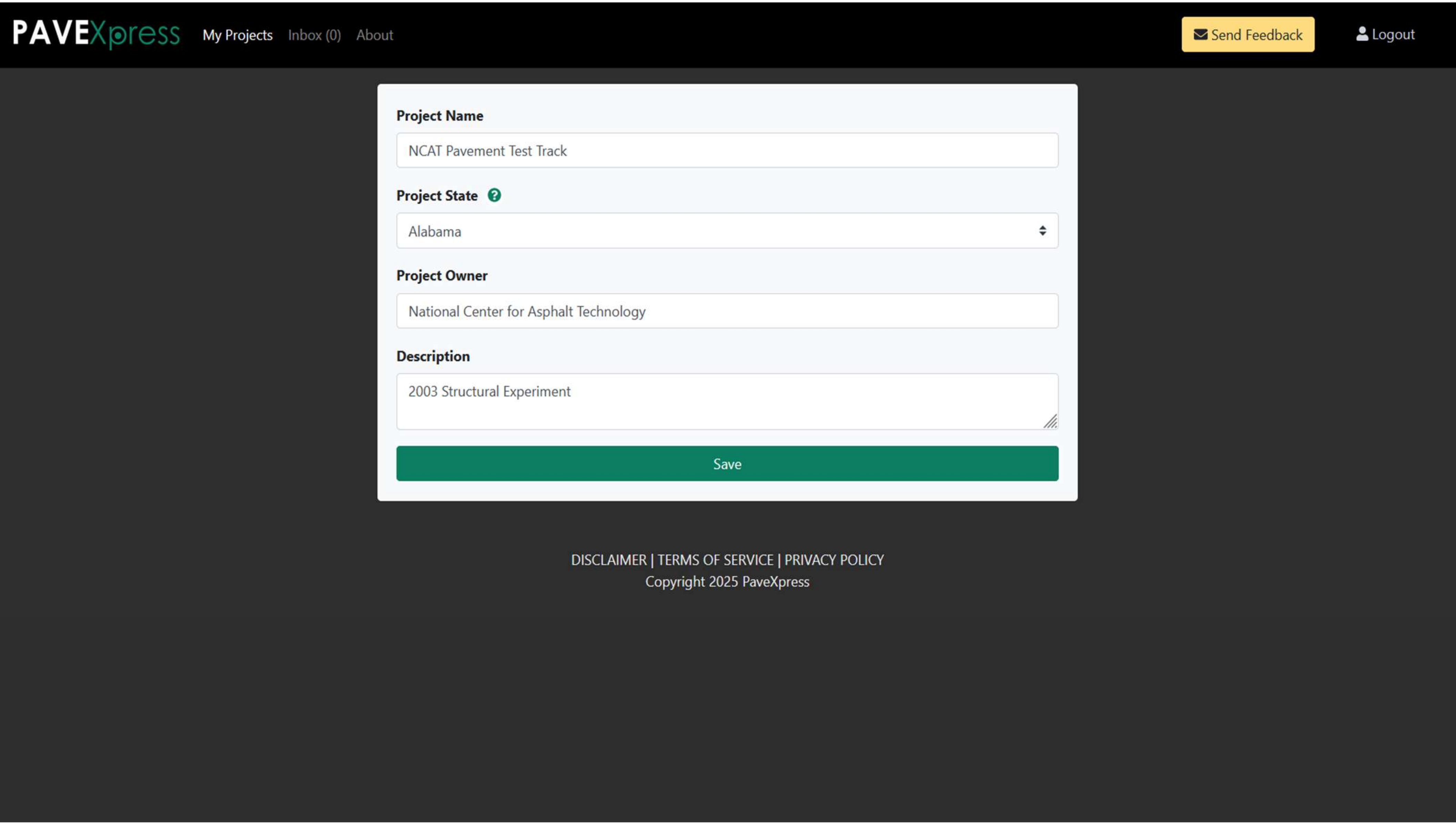
ASPHALT PAVEMENT ALLIANCE

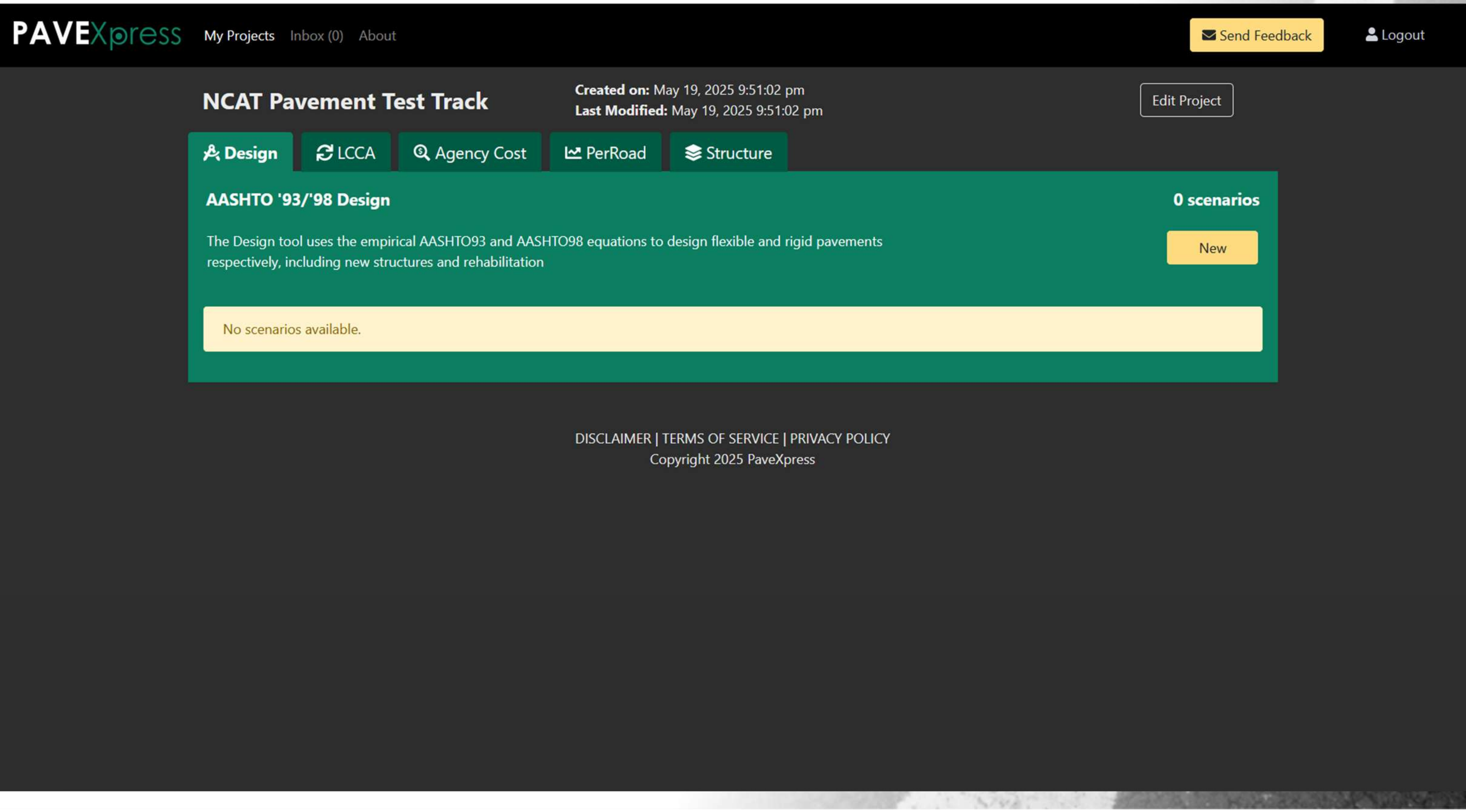


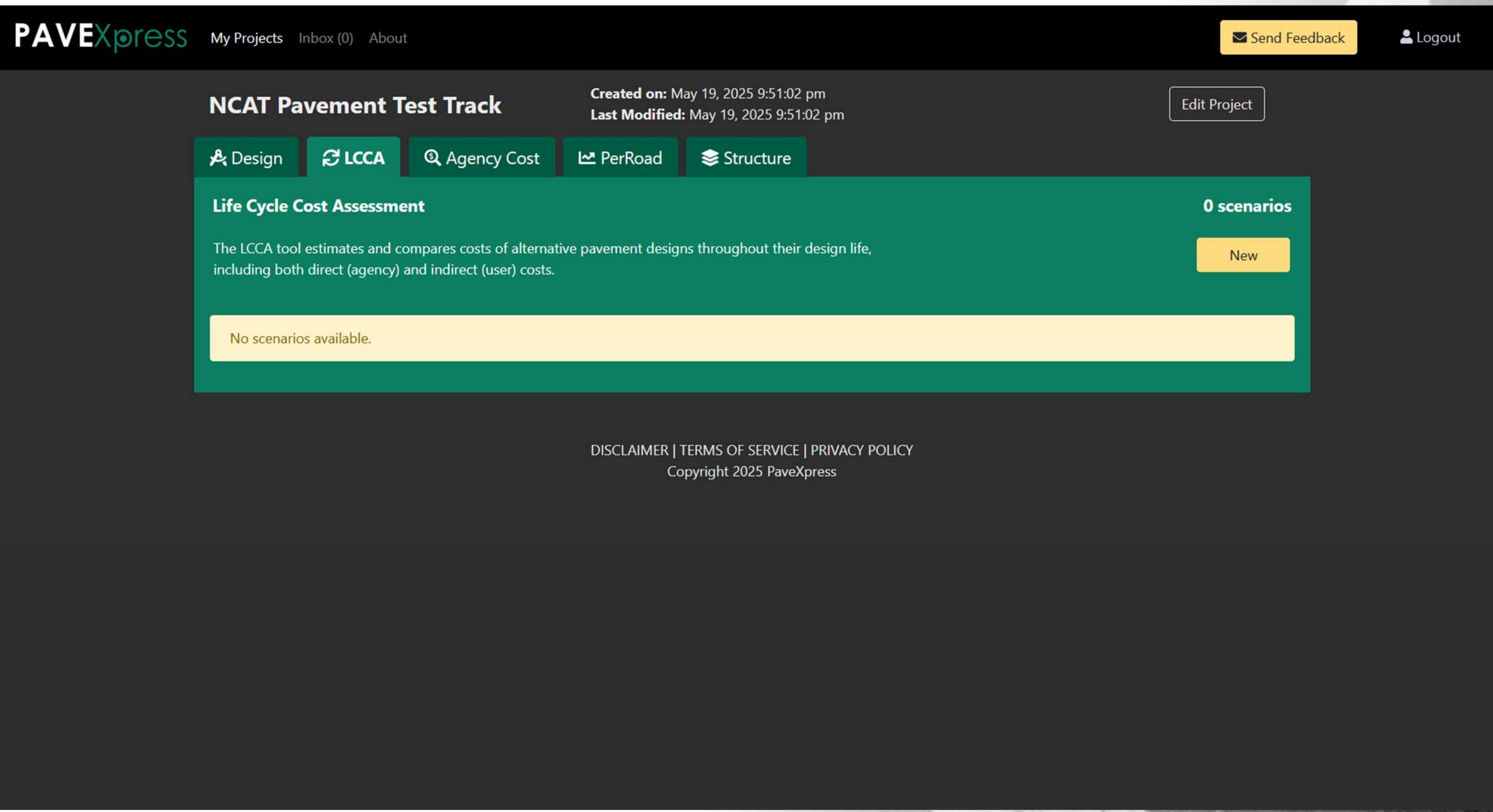
PAVEInstruct

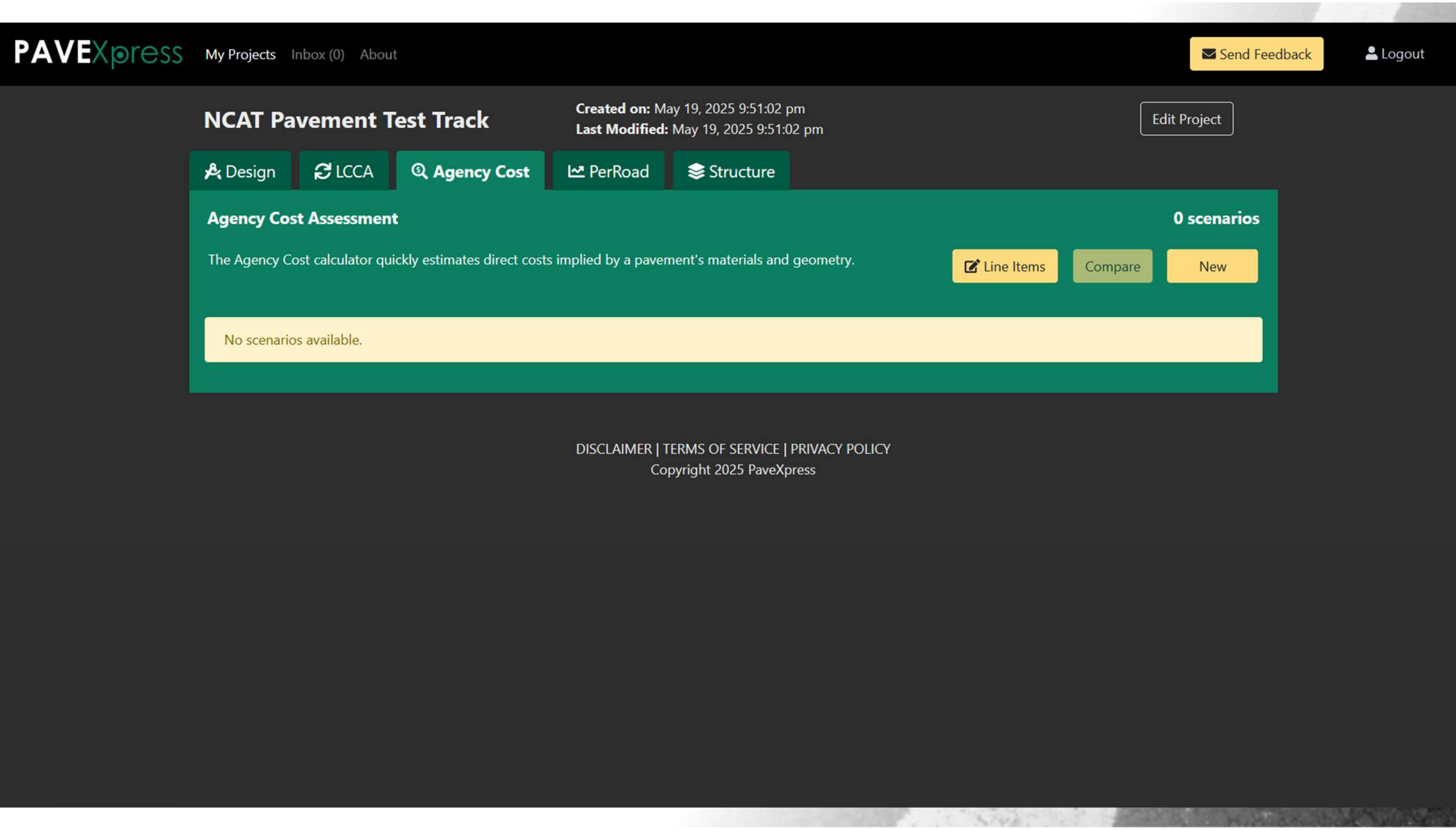

Welcome to PAVEXpress
Login
Create Account

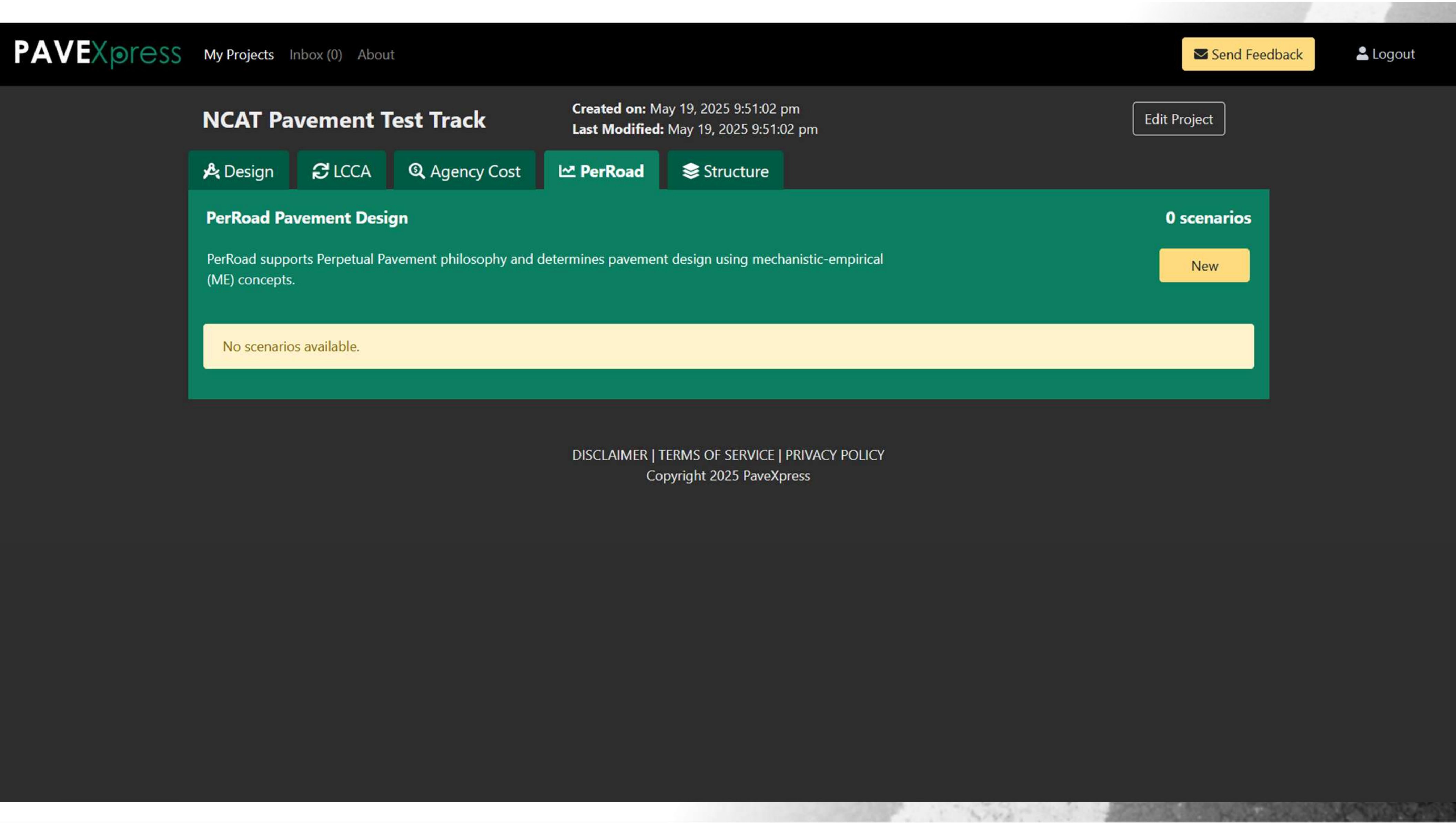

PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
Available Projects
Import
New Project
To create a project, click on New Project in the upper right. To import projects from the prior version of PaveXpress using the same login/password, click on Import button.
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress

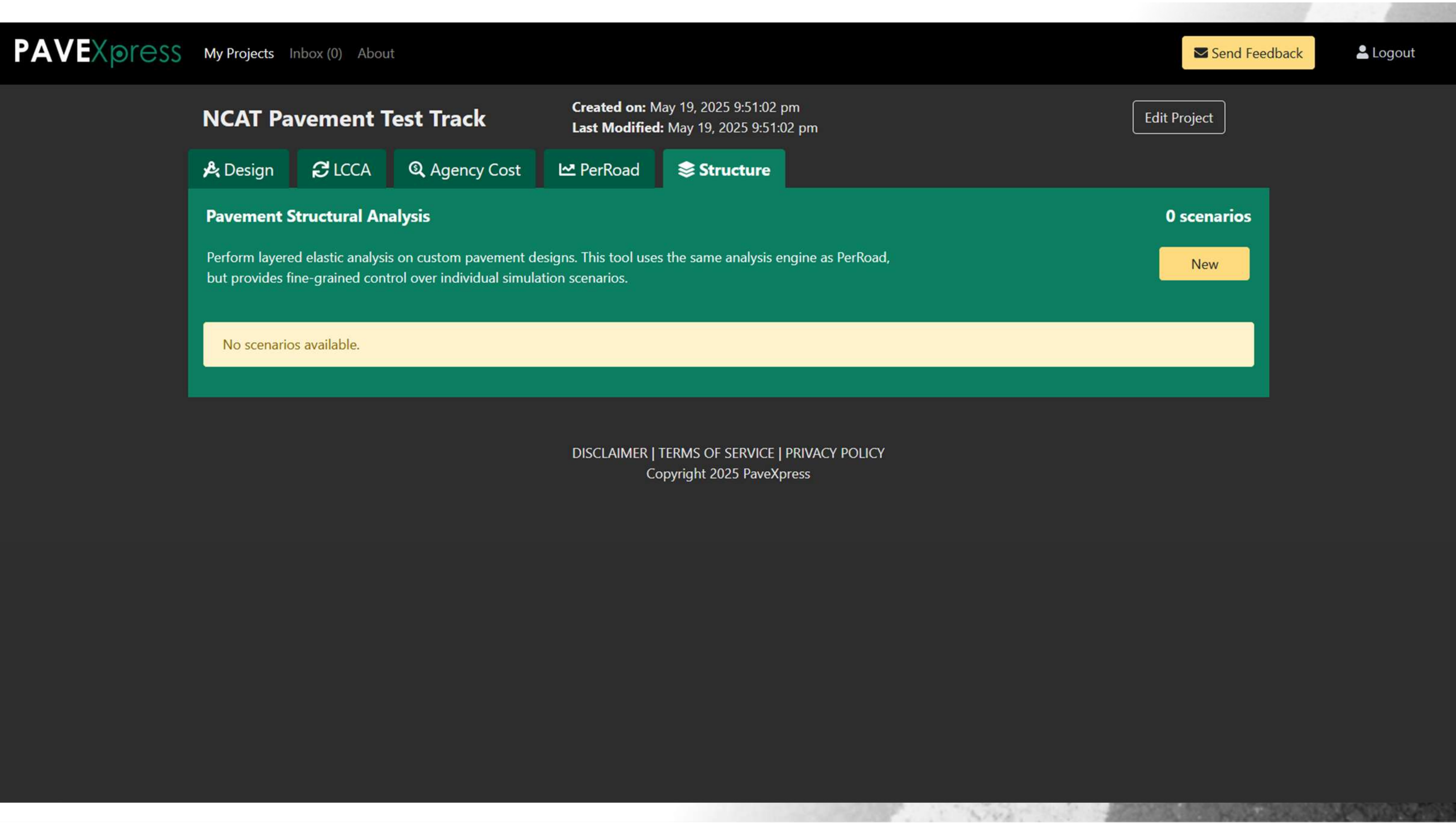

PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
Project Name
NCAT Pavement Test Track
Project State
Alabama
Project Owner
National Center for Asphalt Technology
Description
2003 Structural Experiment
Save
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress


PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
NCAT Pavement Test Track
Created on: May 19, 2025 9:51:02 pm
Last Modified: May 19, 2025 9:51:02 pm
Edit Project
Design
LCCA
Agency Cost
PerRoad
Structure
AASHTO '93/'98 Design
0 scenarios
The Design tool uses the empirical AASHTO93 and AASHTO98 equations to design flexible and rigid pavements respectively, including new structures and rehabilitation
New
No scenarios available.
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress

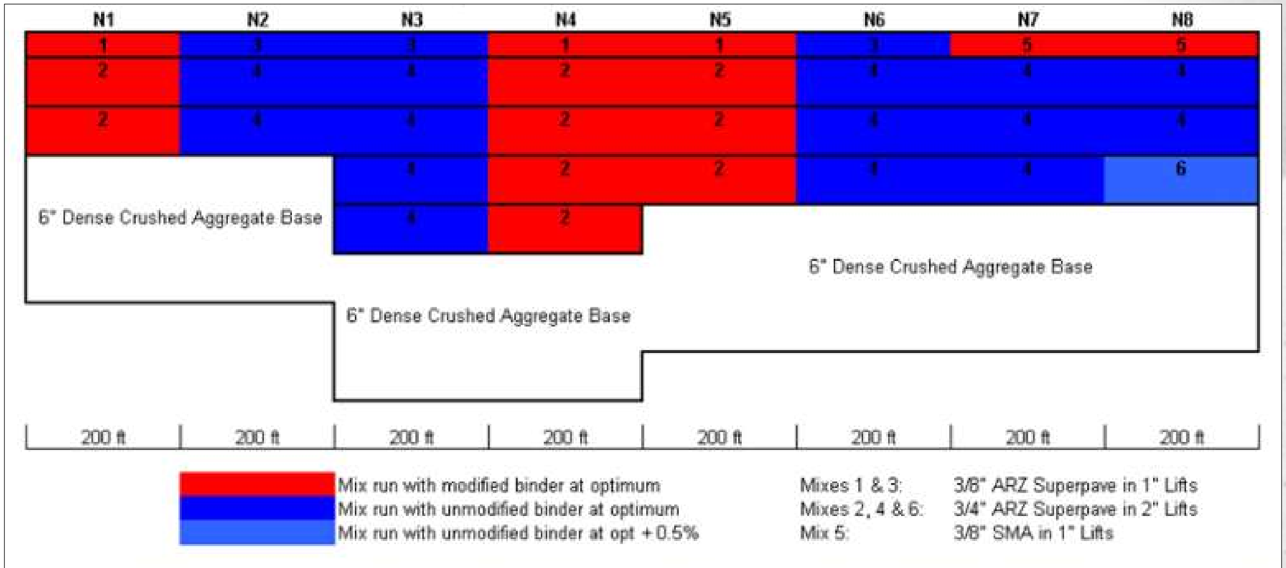

PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
NCAT Pavement Test Track
Created on: May 19, 2025 9:51:02 pm
Last Modified: May 19, 2025 9:51:02 pm
Edit Project
Design
LCCA
Agency Cost
PerRoad
Structure
Life Cycle Cost Assessment
0 scenarios
The LCCA tool estimates and compares costs of alternative pavement designs throughout their design life, including both direct (agency) and indirect (user) costs.
New
No scenarios available.
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress


PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
NCAT Pavement Test Track
Created on: May 19, 2025 9:51:02 pm
Last Modified: May 19, 2025 9:51:02 pm
Edit Project
Design
LCCA
Agency Cost
PerRoad
Structure
Agency Cost Assessment
0 scenarios
The Agency Cost calculator quickly estimates direct costs implied by a pavement's materials and geometry.
Line Items
Compare
New
No scenarios available.
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress

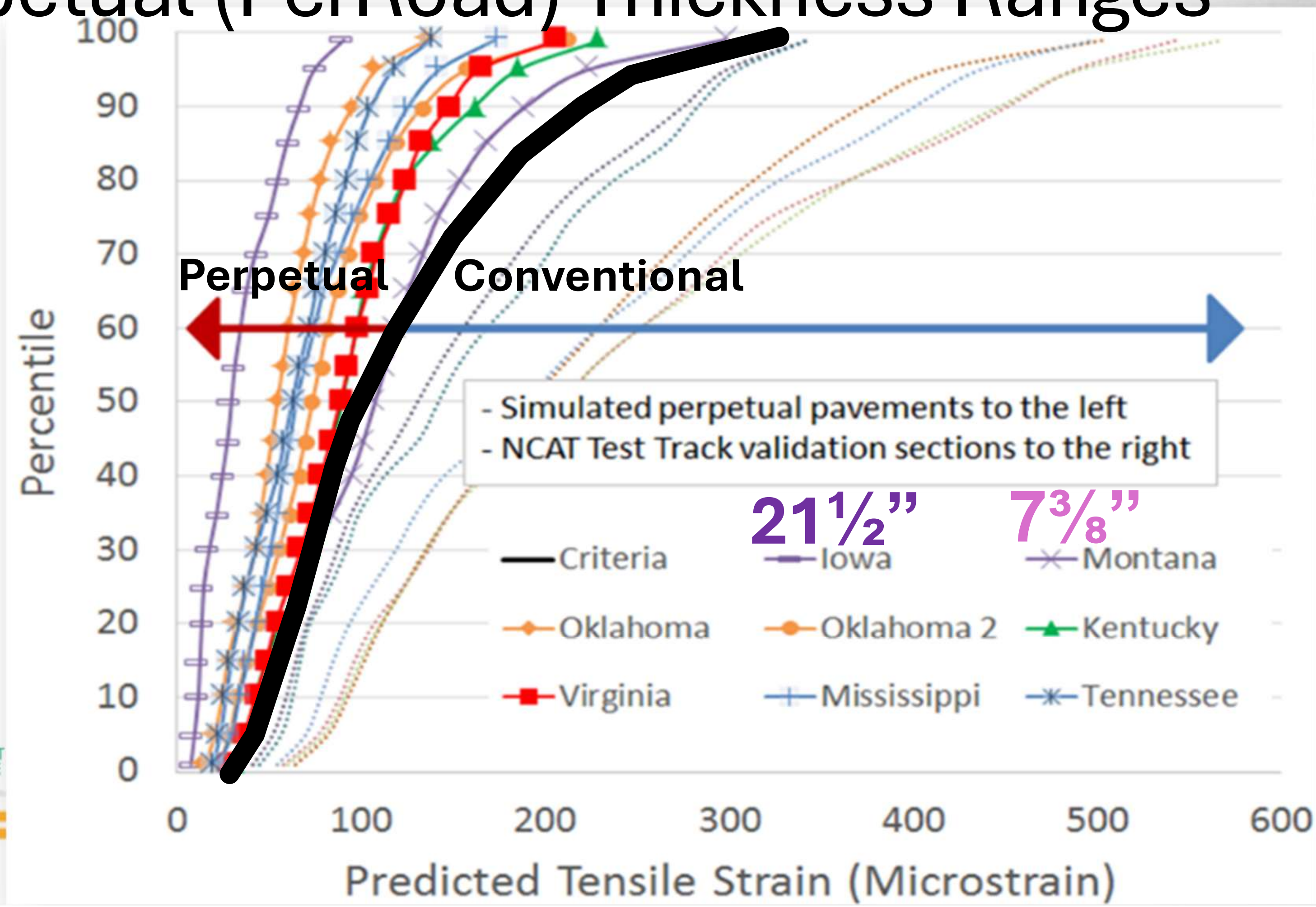

PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
NCAT Pavement Test Track
Created on: May 19, 2025 9:51:02 pm
Last Modified: May 19, 2025 9:51:02 pm
Edit Project
Design
LCCA
Agency Cost
PerRoad
Structure
PerRoad Pavement Design
0 scenarios
PerRoad supports Perpetual Pavement philosophy and determines pavement design using mechanistic-empirical (ME) concepts.
New
No scenarios available.
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress


PAVEXpress
My Projects
Inbox (0)
About
Send Feedback
Logout
NCAT Pavement Test Track
Created on: May 19, 2025 9:51:02 pm
Last Modified: May 19, 2025 9:51:02 pm
Edit Project
Design
LCCA
Agency Cost
PerRoad
Structure
Pavement Structural Analysis
0 scenarios
Perform layered elastic analysis on custom pavement designs. This tool uses the same analysis engine as PerRoad, but provides fine-grained control over individual simulation scenarios.
New
No scenarios available.
DISCLAIMER | TERMS OF SERVICE | PRIVACY POLICY
Copyright 2025 PaveXpress

2003 NCAT Pavement Test Track



Perpetual (PerRoad) Thickness Ranges



Perpetual (PerRoad) Thickness Ranges

Subgrade Mr (ksi)	Base Mr (ksi)	Calculated AC Thickness (in.)				Range of Maximum Thicknesses (in.)
		Minneapolis (PG 64-34)	Phoenix (PG 70-22)	Baltimore (PG 64-22)	Average	
5	30	12.5	15.5	14	14.0	12.5-15.5
5	50	12	15	14	13.7	12-15
5	100	12	14	13.5	13.2	12-14
10	30	10.5	14	12	12.2	10.5-14
10	50	10.5	13	12	11.8	10.5-13
10	100	10	12	11	11.0	10-12
20	30	9	12.5	10	10.5	9-12.5
20	50	8.5	12.5	9.5	10.2	8.5-12.5
20	100	8	12	9	9.7	8-12

APA PAVEMENT ALLIANCE

2025 PaveXpress for Asphalt Pavement Design Workshop

PaveXpress for Asphalt Pavement Design Workshop

Announcements

- Evaluation Survey
- Certificate of Attendance
- Zoom chat and Q&A
- Closed Captioning
- Slides
- Recording
- YouTube Videos

Asphalt Pavement Design Series

PLEASE NOTE: THESE EVENTS ARE VIRTUAL

The Basics of Asphalt Pavement Design

Event Date: January 9, 2025
Event Time: 12:00 PM - 1:00 PM (ET)
Event Cost: FREE
Registration Deadline: January 8, 2025
Intended Audience:

- Local agency planners
- Managers
- Engineers
- Anyone who might need to make decisions or answer questions from the public about asphalt pavement design projects.

An overview about typical asphalt pavement sections, what information you need before you do an asphalt pavement design and where that information comes from (traffic studies, geotechnical data, existing pavement, etc), what the parameters mean, what typical values are, design life, ESALs, AADT, etc. This session is meant to answer common questions you or residents in your jurisdiction may have about about the asphalt pavement design process.

PaveXpress for Asphalt Pavement Design Workshop

Event Date: January 22, 2025
Event Time: 9:00 AM - 11:00 AM (ET)
Event Cost: FREE
Registration Deadline: January 21, 2025
Intended Audience:

- Local agency engineers
- Engineers-in-training
- Consultants who would like to know more about PaveXpress and how to use it for asphalt pavement design projects.

An overview of PaveXpress (https://pavexpress.com/) including and explanation of the asphalt pavement design methodology, data required to do an asphalt pavement design, and a demonstration walking through an asphalt pavement design step by step. Lots of time for questions!

PAVEXpress

Instructor: Chuck Mills, P.E. - Director of Engineering
Chuck joined the Asphalt Pavement Association in 2005 as the Director of Engineering. Chuck works closely with MDOT, other public and private pavement owners and APAM members to provide high quality asphalt pavements. Chuck received his Bachelor of Science in Civil Engineering from Michigan State University. Prior to joining APAM, Mr. Mills served jointly as Director of Technical Services for the Michigan Infrastructure & Transportation Association (MITA) and the Michigan Pavement Association (MPA). https://www.apa-mi.org/our_staff.php

You can find videos from the previous Asphalt Design series at the following link:
https://www.youtube.com/@ctttraining4091

QUESTIONS?
Email ctt@mtu.edu

Registration is required for fulfillment of continuing education. Read the Center for Technology & Training policy here.
No-shows/cancellations within three business days of the event are charged the full registration fee; substitutions accepted.
Michigan Technological University is an Equal Opportunity Educational Institution/Equal Opportunity Employer that provides equal opportunity for all, including protected veterans and individuals with disabilities.
Accommodation requests related to a disability should be made at least ten business days prior to the event by emailing ctt@mtu.edu

Center for Technology & Training
Michigan's Local Technical Assistance Program
ASPHALT

when smoothness matters!

2025-01-22 09:03:49

0:03 / 1:58:53

Scroll for details

Technical Resources

- www.DriveAsphalt.org – Asphalt Pavement Alliance (APA)
- www.AsphaltPavement.org – National Asphalt Pavement Association
- www.NCAT.us – National Center for Asphalt Technology (NCAT)
- www.AsphaltInstitute.org – Asphalt Institute (MS-22 Reference)
- www.RoadResource.org - Pavement Preservation & Recycling Alliance
- www.PaveXpress.com – Online access to pavement design tool
- youtu.be/qzq6WK3CJzc?si=V9OK1mtq9t81jxRE – PaveXpress Webinar
- www.ChatGPT.com – general information about roads and highways
- www.HeyNAPA.com – specific information about asphalt pavement.

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.

What are the keys to quality asphalt pavement?

APA ASPHALT PAVEMENT ALLIANCE

HeyNAPA Response

- Balanced mix design (BMD)
- Performance testing (IDEAL-CT & Hot-IDT)
- Materials and mix design specifications
- Proper compaction
- Pavement preservation
- Collaborative efforts
- Proper subgrade preparation
- Testing and quality control
- Adherence to best practices.

APA ASPHALT PAVEMENT ALLIANCE

Management by Dave Johnson