PaveXpress – A Simplified Pavement Design Tool!

Trenton M. Clark, P.E.
President – Virginia Asphalt Association

October 22, 2020
1:00 pm MDT

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Who Do You Work For?

1. Local Government Agency
2. A/E/C Firm
3. Idaho DOT
4. FHWA
5. Contractor
6. Other

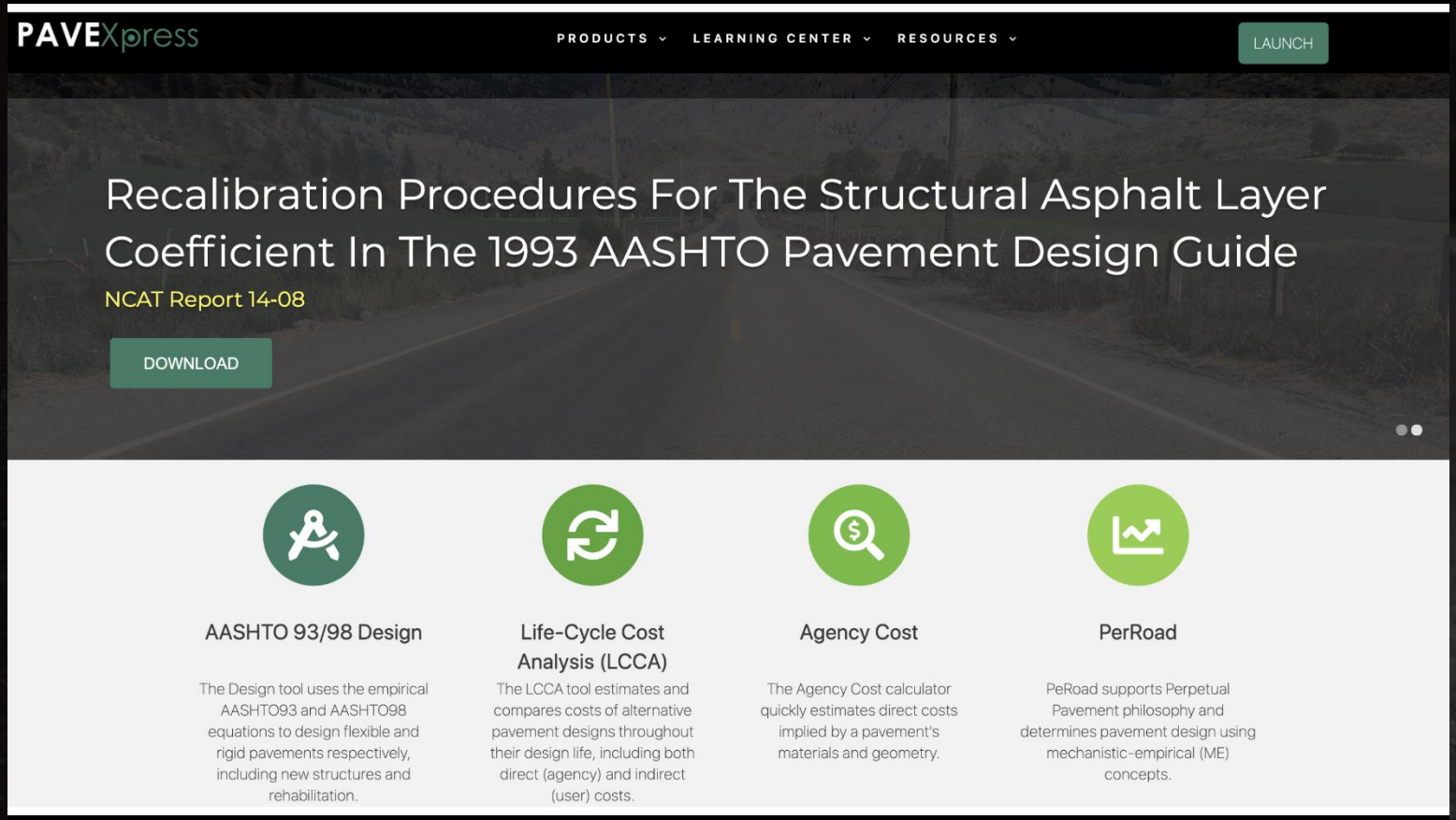
Sli.do Code 81078

What Is Your Knowledge of Pavement Engineering?

1. I am regularly performing pavement designs and analysis
2. I am familiar with the pavement design and analysis process, but rarely do it
3. I know very little or nothing about pavement design and analysis, but want to learn more
4. None and I am being forced to listen to a guy from Virginia that I can barely understand due to his accent.

Basics of Pavement Engineering

- Pavement Design
- Pavement Analysis
- Economic Analysis
- Pavement Management



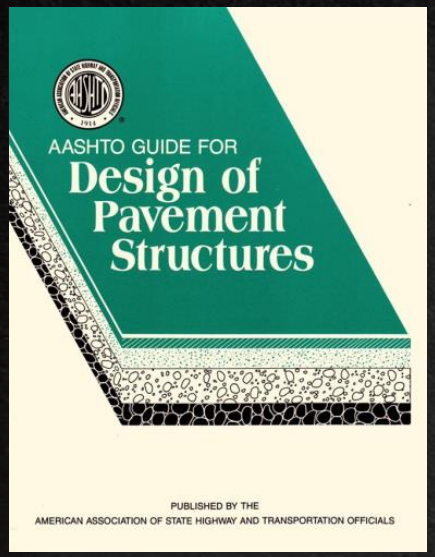
History of PaveXpress

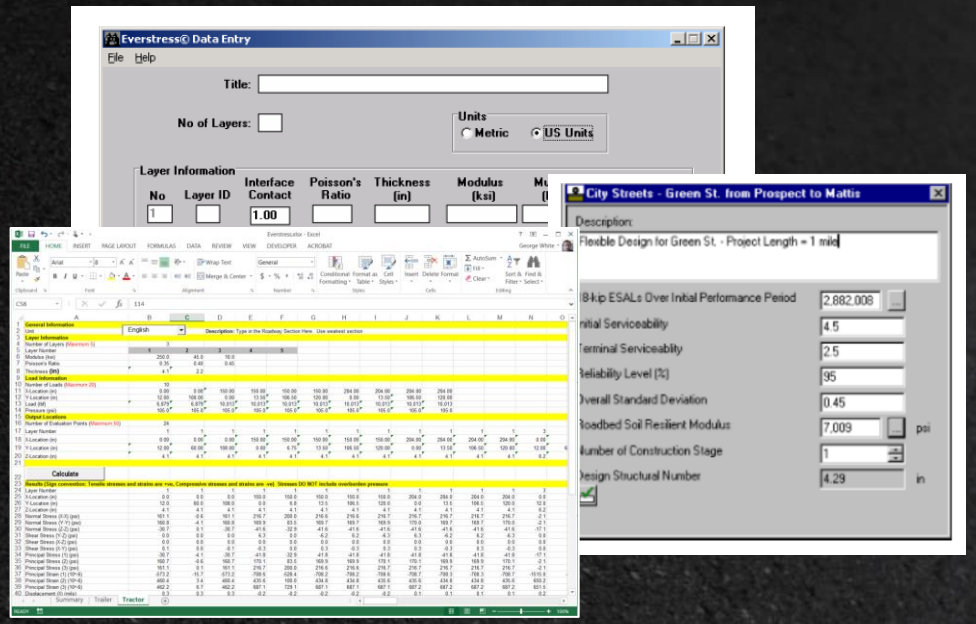
What Is PaveXpress?

A free, online tool to help you create and evaluate pavement designs and overlays using key engineering inputs, based on the empirical and mechanistic-empirical pavement design processes

- ✓ **Free** — no cost to use
- ✓ **Accessible** – via the web and mobile
- ✓ **Standards Based** - AASHTO and/or industry standard practices
- ✓ **User-friendly** – streamlined UI/UX
- ✓ **Collaborative** - share, save, and print
- ✓ **Interactive** – help and resources

Don’t we already have tools for this?





Pavement ME is generally used for high volume roads, and

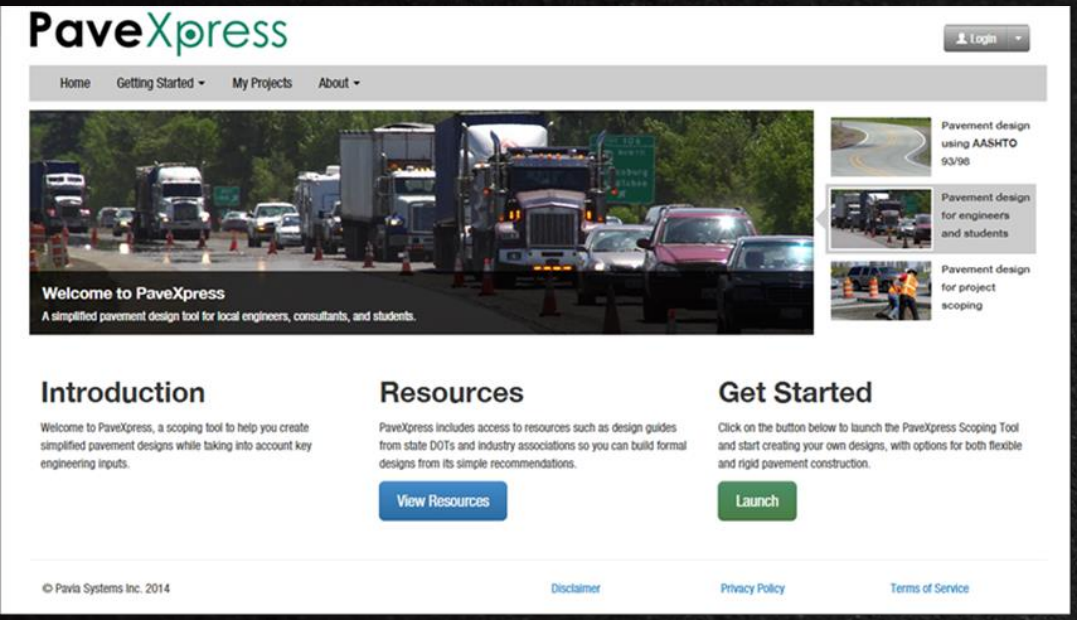
a gap exists for easy to use tools for local and lower volume roads

The Evolution of PaveXpress

- Version 1.0
  - New Asphalt Pavement Designs
  - New Concrete Pavement Designs
  - Parking Lot Design and Guidance

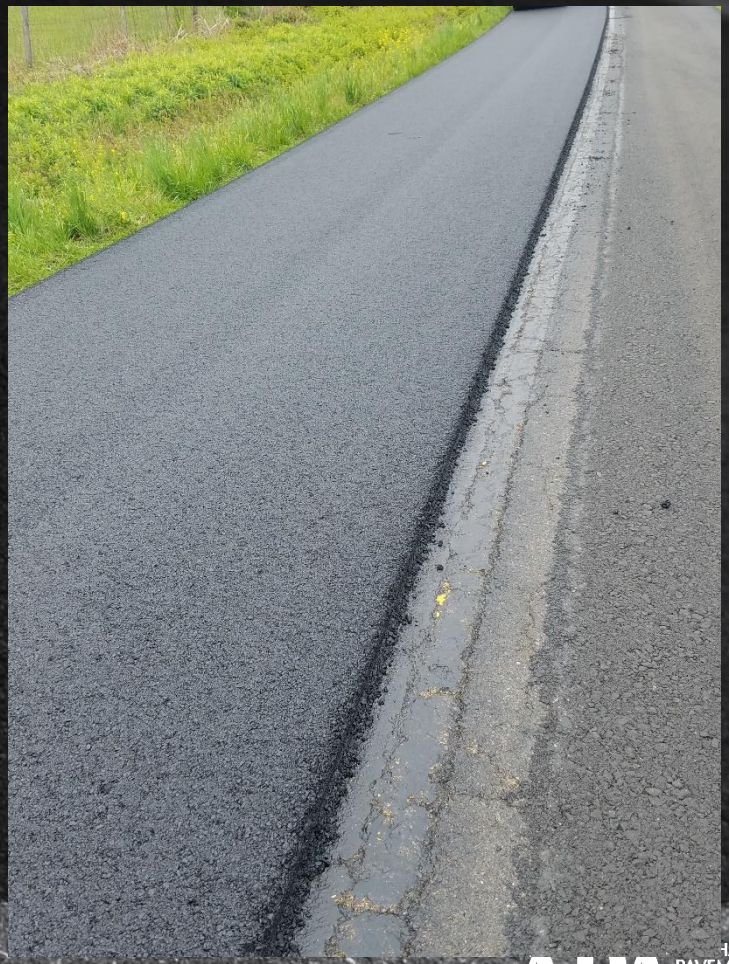
New Construction – Asphalt

The Evolution of PaveXpress



- Version 2.0
  - Rehabilitation and Overlay Design with AC for Flexible Pavements
- Version 3.0
  - Structural Porous Asphalt Pavement

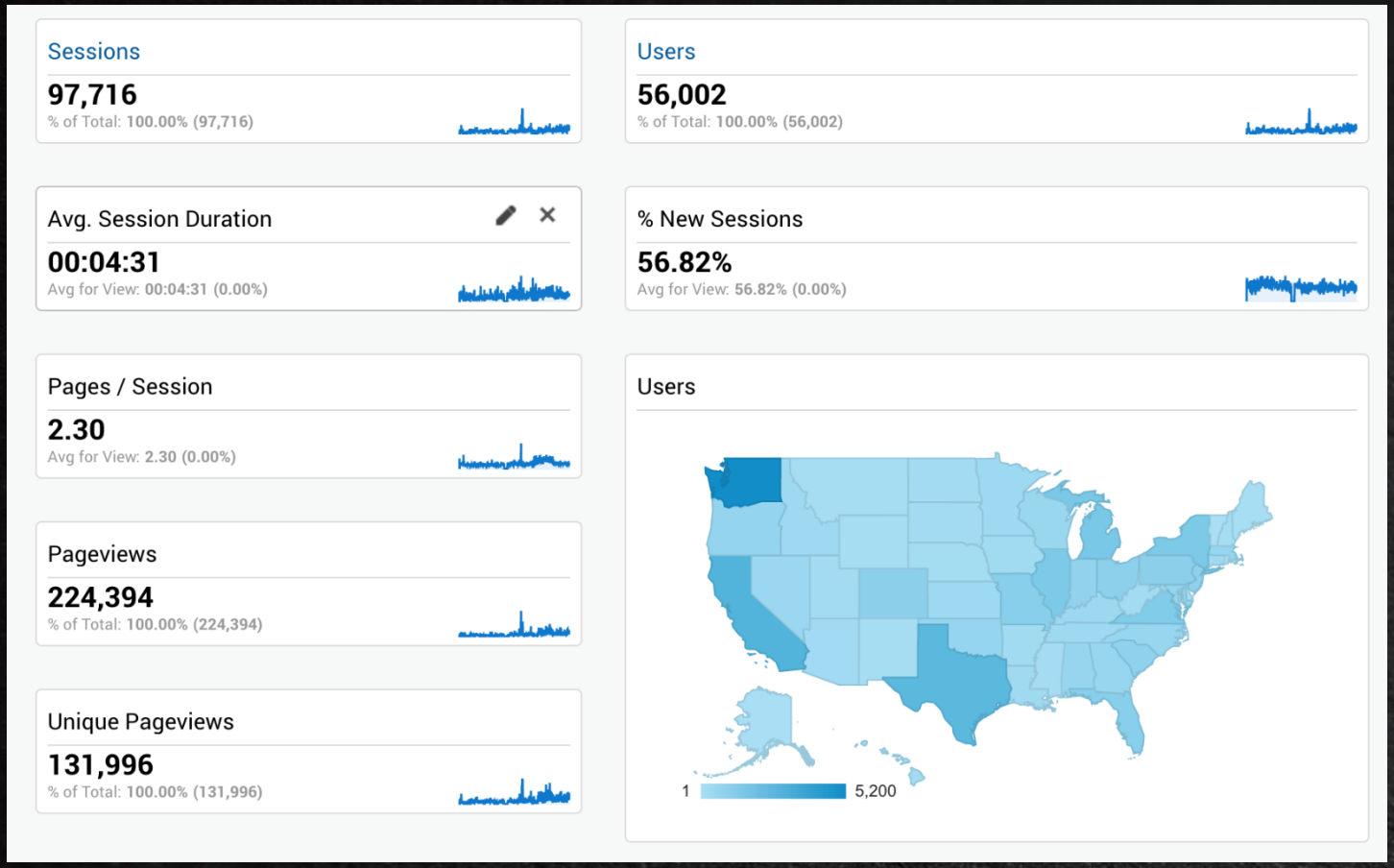
Parking Lots and Overlays



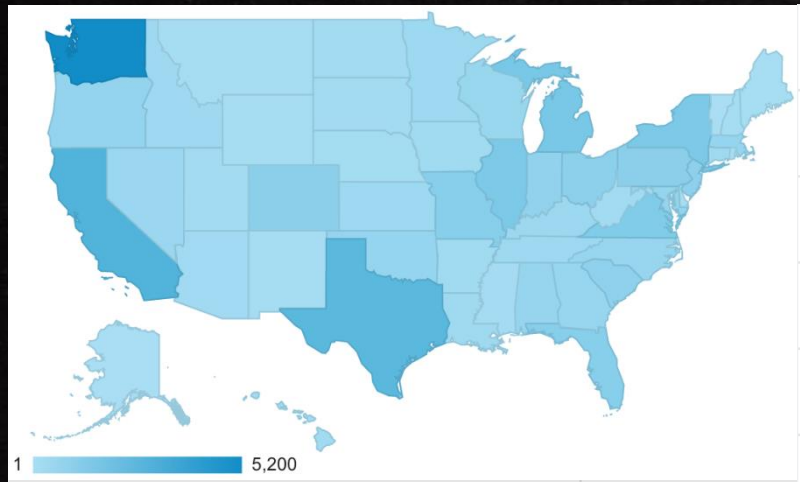
Additional Modules

- Simple Cost Estimating
- Mechanistic Pavement Analysis with EverStress
- LCCA with FHWA's *RealCost*
- PaveInstruct

PAVEXpress Statistics



States with heaviest usage



1.	Washington	5,200	(14.49%)
2.	California	2,781	(7.75%)
3.	Texas	2,458	(6.85%)
4.	Michigan	1,507	(4.20%)
5.	Illinois	1,448	(4.03%)
6.	New York	1,436	(4.00%)
7.	Virginia	1,289	(3.59%)
8.	Missouri	1,107	(3.08%)
9.	Florida	1,077	(3.00%)
10.	Colorado	1,018	(2.84%)
11.	Pennsylvania	1,007	(2.81%)
12.	Ohio	950	(2.65%)
13.	New Jersey	890	(2.48%)
14.	South Carolina	862	(2.40%)
15.	Indiana	799	(2.23%)

User Survey

- 2018 Survey of PaveXpress Users
- Three Common Requests for Enhancements
  - Metric Capability
  - Simplified LCCA for Agencies
  - Mechanistic-Empirical Pavement Design Methodology (i.e., PerRoad)

Metric Capability

- Implemented in 2020
- Allows user to toggle between units
- Beneficial for non-US markets

What Is LCCA?

- “an engineering economic analysis tool that allows transportation officials to quantify the differential costs of alternative investment options for a given project.”
  – FHWA

Source: https://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm

Two Approaches to LCCA

Real Cost

- Includes deterministic and probabilistic modeling
- Incorporates user costs
- Considers impacts of work zones
- Data input intensive

Simplified Agency

- Deterministic modeling
- Focuses on agency costs

LCCA Overview in PaveXpress

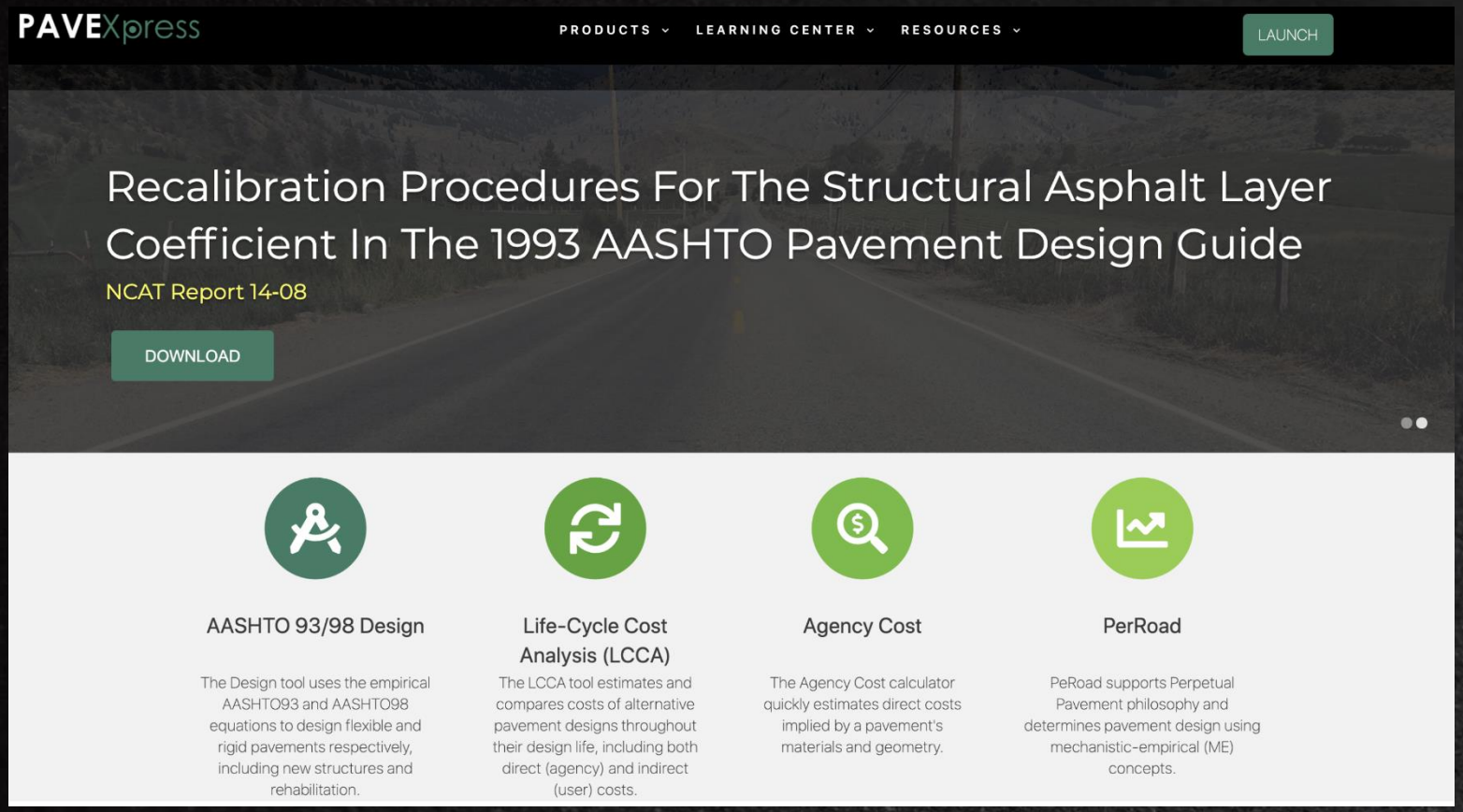
Activities

- New Construction
- Reconstruction
- Rehabilitation
- Resurfacing
- Corrective Maintenance
- Preventive Maintenance

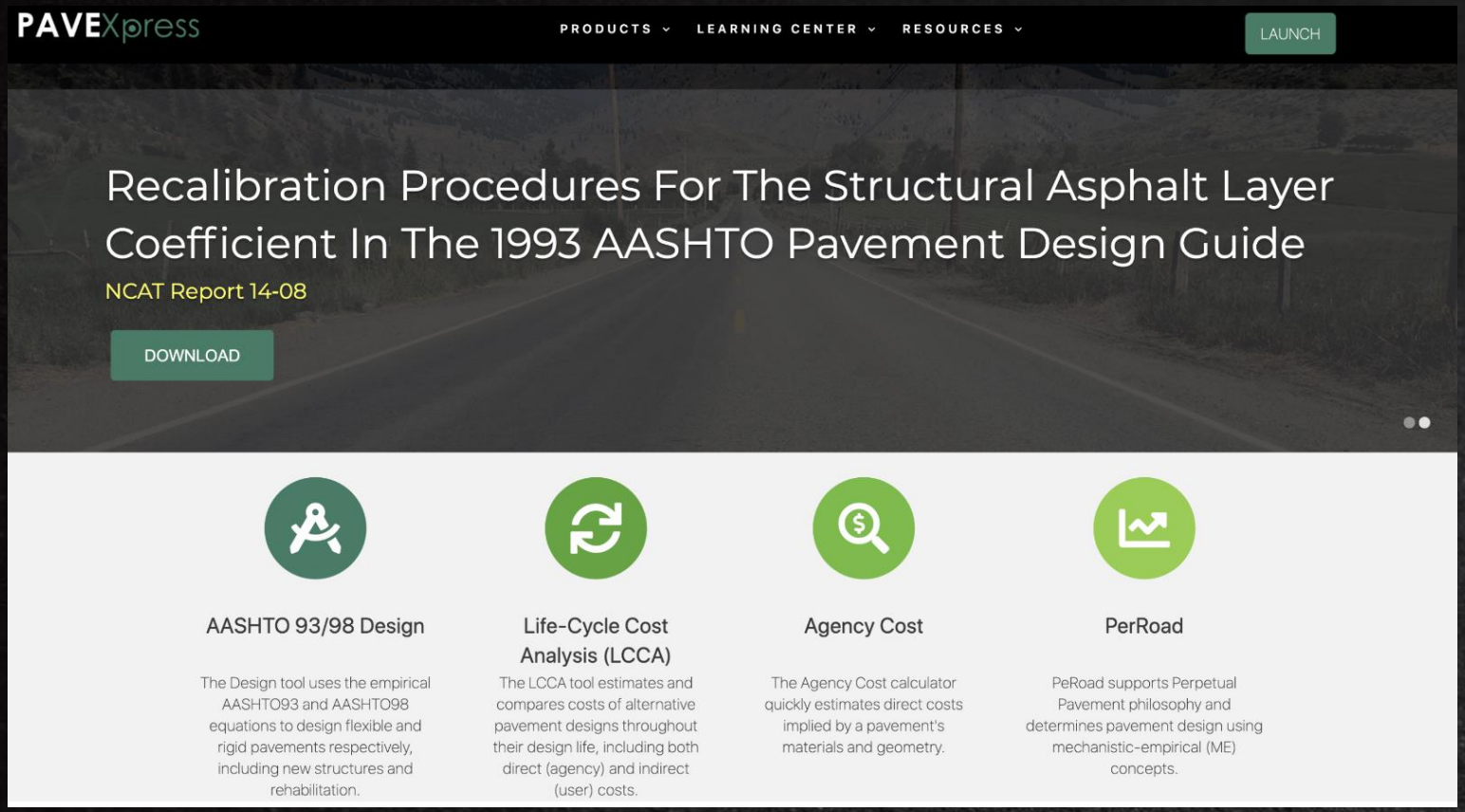
M-E Pavement Design

- Based on PerRoad
- Uses engineering properties of materials
- Focuses on bottom up cracking and subgrade rutting

Let’s walk through PaveXpress together



Visit
http://beta.pavexpress.com



Takeaways

- PaveXpress uses 1993/1998 AASHTO and PerRoad for Designs
- AC Overlays can be designed using current distress and structural condition
- Pavement thickness is influenced by traffic loadings, subgrade strength and material properties
- Users can modify LCCA scenarios and unit costs

QUESTIONS