

PaveXpress – A Simplified Pavement Design Tool!

Trenton M. Clark, P.E.

President – Virginia Asphalt Association

October 22, 2020

1:00 pm MDT

Asphalt.

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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

Recalibration Procedures For The Structural Asphalt Layer Coefficient In The 1993 AASHTO Pavement Design Guide

NCAT Report 14-08

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AASHTO 93/98 Design

The Design tool uses the empirical AASHTO93 and AASHTO98 equations to design flexible and rigid pavements respectively, including new structures and rehabilitation.



Life-Cycle Cost Analysis (LCCA)

The LCCA tool estimates and compares costs of alternative pavement designs throughout their design life, including both direct (agency) and indirect (user) costs.



Agency Cost

The Agency Cost calculator quickly estimates direct costs implied by a pavement's materials and geometry.



PerRoad

PerRoad supports Perpetual Pavement philosophy and determines pavement design using mechanistic-empirical (ME) concepts.

History of PaveXpress

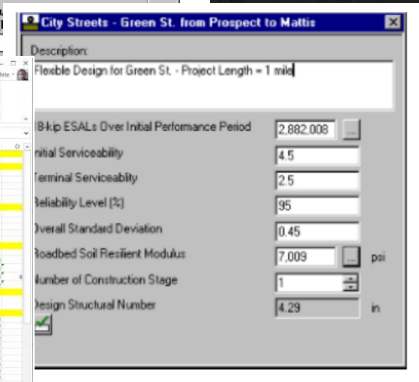
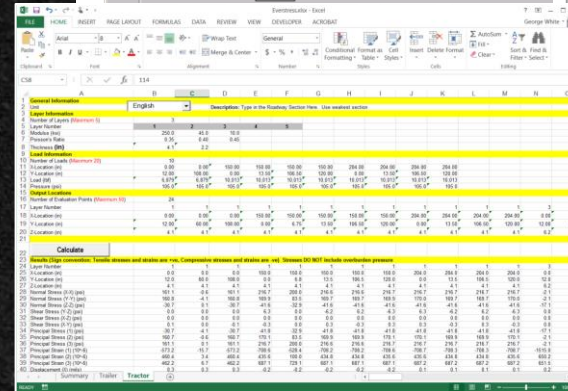
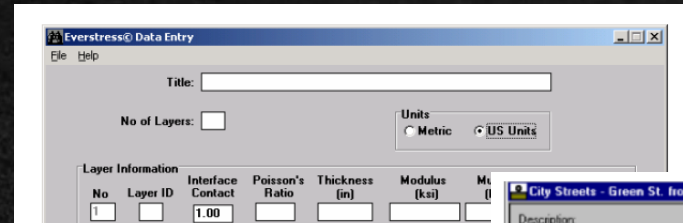
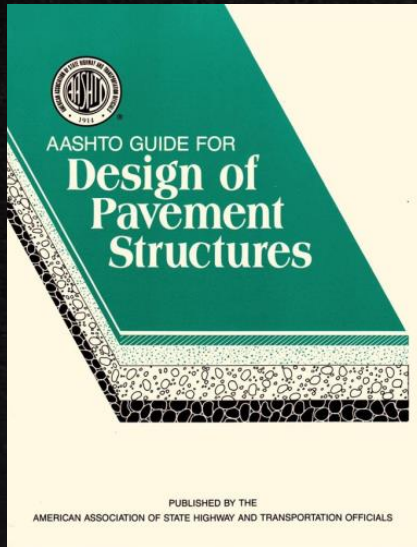
What Is PaveXpress?

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



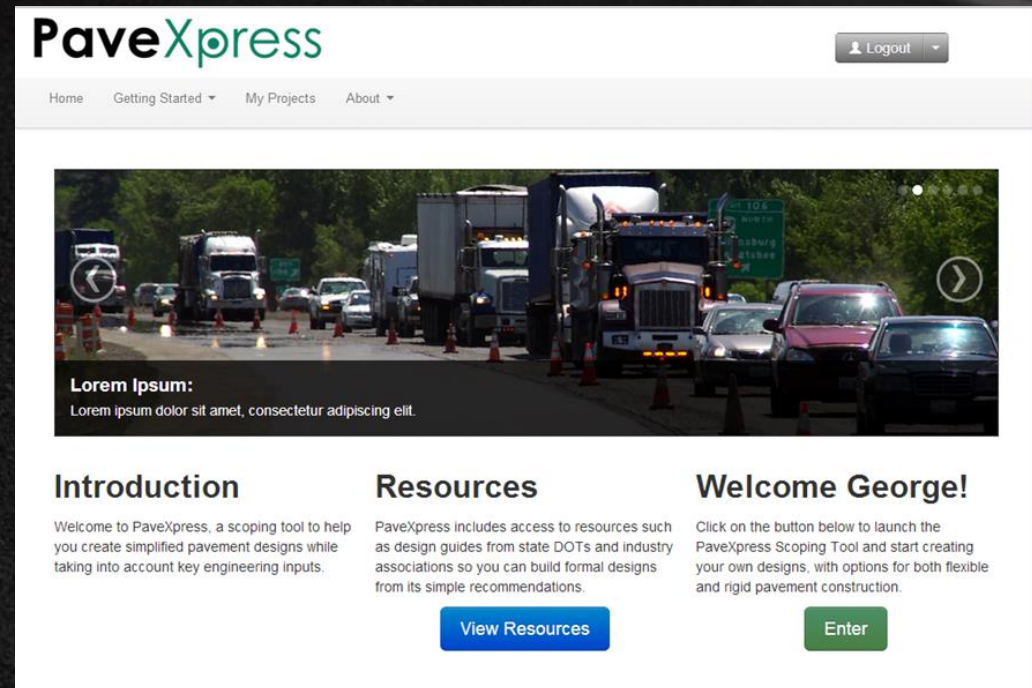
Don't we already have tools for this?



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



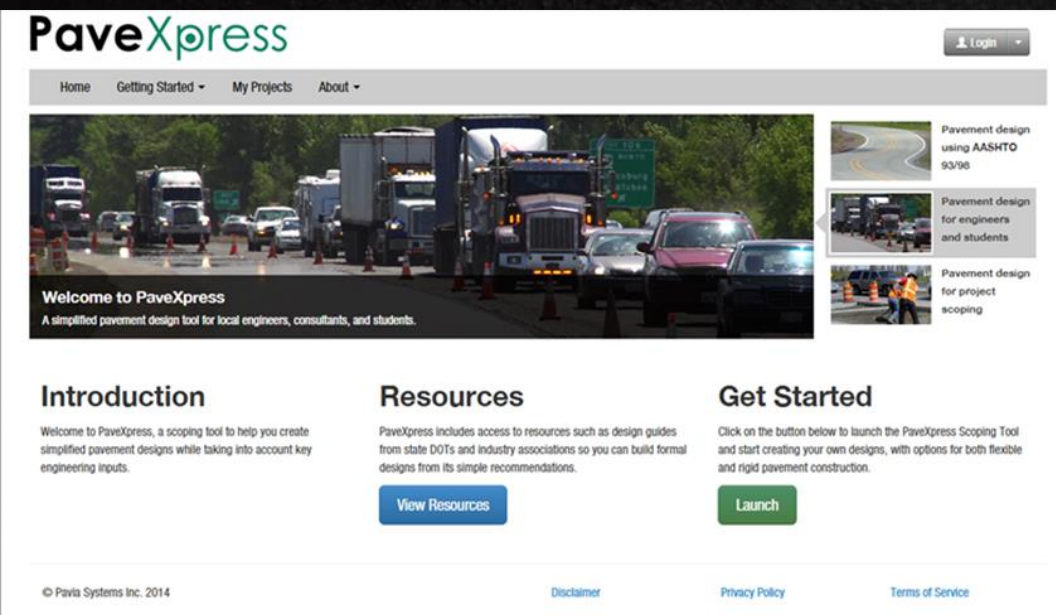
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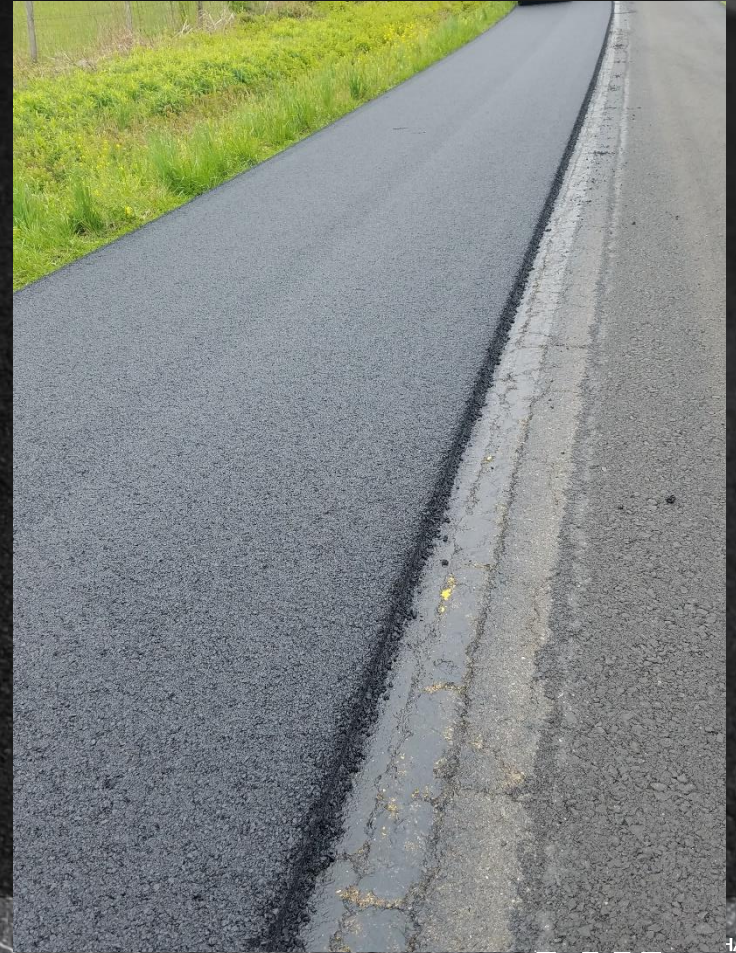


The Evolution of PaveXpress

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



Parking Lots and Overlays



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Additional Modules

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

PAVEXpress Statistics

Sessions

97,716

% of Total: 100.00% (97,716)



Users

56,002

% of Total: 100.00% (56,002)



Avg. Session Duration



00:04:31

Avg for View: 00:04:31 (0.00%)



% New Sessions

56.82%

Avg for View: 56.82% (0.00%)



Pages / Session

2.30

Avg for View: 2.30 (0.00%)



Pageviews

224,394

% of Total: 100.00% (224,394)



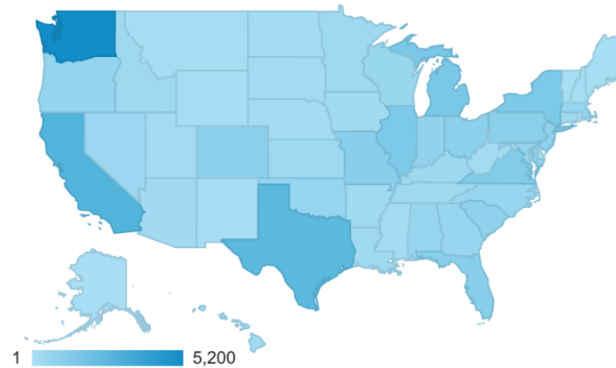
Unique Pageviews

131,996

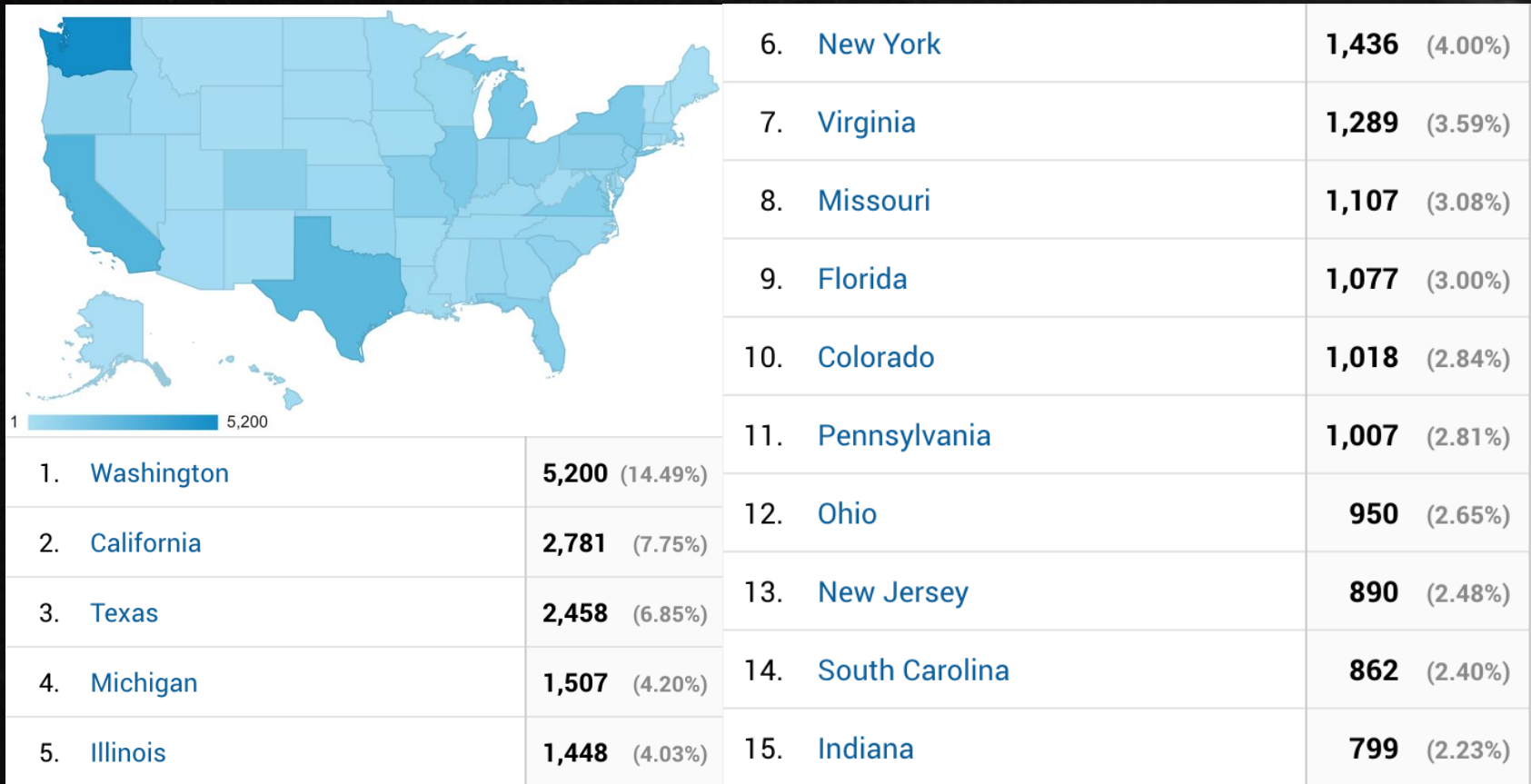
% of Total: 100.00% (131,996)



Users



States with heaviest usage



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

PAVEXpress


PRODUCTS ▾ LEARNING CENTER ▾ RESOURCES ▾


LAUNCH


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- **AASHTO 93/98 Design**

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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

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