


Climate Challenge Update:

LCA & EPD Implementation
SEAUPG 2023




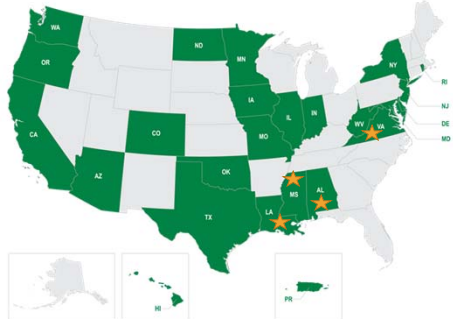
SUSTAINABLE PAVEMENTS PROGRAM FHWA Climate Challenge

Goal

- Explore use of LCA and EPDs for
 - Pavement Material
 - Pavement Design
- Enhancing pavement sustainability with data

Timeline:

- Start:** Earth Day Webinar April 22, 2023
- Informational Phase:** April 27 to July 31, 2023
- Announce Participants:** August 2023
- Project Phase:** September 2023 to September 2024
- Showcase and Implementation Phase:** September 2024
- End:** September 2024

35 Projects
\$7.1 million

Collaborative Effort
\$1.2 Million

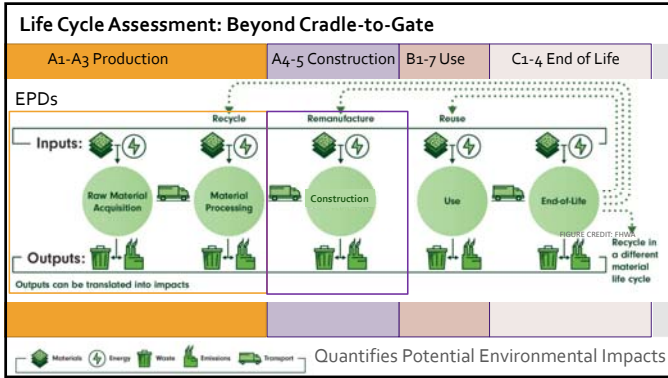


Project Objectives

Educate	Case Studies	Standards	Symposium
DOT Leadership	Current Practices	One Model	Highlight Results
Engineers	Innovative Tech.	State Customized	Lessons Learned
Industry		Data Collection	

Louisiana ✓	<ul style="list-style-type: none"> • Conventional HMA • Plastic • High RAP/BMD – Recycling Agents • GTR, RAS
Alabama ✓	<ul style="list-style-type: none"> • WMA with Temp reductions
Virginia ✓	<ul style="list-style-type: none"> • FDR Cement (4) • FDR Foaming • High Polymer Bridge Deck • High RAP – Recycling Agents (2) • Recycled Plastics (2) • WMA (Temps Reduced)
Mississippi	<ul style="list-style-type: none"> • CIR • CCPR • FDR





Data Collection

A1-A3 PRODUCT STAGE

- Asphalt Mixture EPDs
- Concrete EPDs
- Aggregate EPDs

A4-5 CONSTRUCTION PROCESS

- Materials Quantities & Distance to Site
- Equipment Type, Power Rating, Fuel Used
- Water Used
- Waste/Recycled Materials Quantities & Distance

FIGURE CREDIT: AUGIE J.

Alabama Case Study

Mix ID	Planned production temperature, °F	Average temp. achieved during production, °F
Control	325	313
Warm Mix-1	275	295
Warm Mix-2	275	X

X: not yet paved, scheduled to be paved in couple of weeks

- Drag issues were observed at 275°F production temp.
- Production temp. was increased to 295°F for warm mix
- No compaction issues were observed at paving site for warm mix

Lower temperature, lower emissions

Burner Fuel Consumption

- Average production temp: Control-313°F & Warm Mix-1: 295°F
- No significant differences in burner fuel consumption were observed

Lower temperature, improved cracking performance

■ Mix(325°F), STA(2 hrs, 275°F)
■ Mix(275°F), STA(2 hrs, 240°F)

- Higher IDEAL CT_{index} with lower mixing and compaction temperatures
- This can likely be due to lower aging and/or binder absorption

One Model

COMMUNITY OF SCHOLARS

WELCOME

The objective of this platform is to support state DOTs and other public agencies replace the use of life cycle assessment (LCA) and Environmental Product Declarations (EPDs) as a standard practice to inform pavement material and design selection for enhancing sustainable pavement practices and quantify the emissions and impacts of those practices.

Specific objectives of the Community of Scholars is to foster synergy in research and development.

Education: Providing education and training to assist researchers' implementation of the Pavement LCA Framework including use of open-source and models.
Data Collection: Coordinating protocols and practices for consistent construction stage data collection, organization and reporting to improve our MODEL (LCA Reporting Model) by the Road LCA Commons.
Research Outcomes: Setting the methodological foundation for developing life cycle benchmarks that can support decision-making frameworks and support further development of other MODEL tools such as LCA Plans.

Heather Dylla, Ph.D., VP Sustainability, Construction Partners

LCA PAVE
DOT State Tool

Design Alternative Definition (Step 2 of 3)

Level 1: Alternative
Level 2: Pavement Facility
Level 3: Pavement Life-Cycle Stage
Level 4: Activities
Level 5: Processes associated with the activity selected

VDOT – Roadmap to incorporating sustainability into pavement management decisions

Additional Benefits

Low Carbon Transportation Materials (IRA § 60506)

- \$2 Billion
- Wide Range Of Eligible Recipients
- September 2026
- Reimburse (Incremental costs of using) or Incentive (2% of cost)

Source: FHWA Climate Challenge Update, Oct. 23, 2023

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