REDEFINING VALUE
SUSTAINABILITY AND RESILIENCE

ILLINOIS BITUMINOUS CONFERENCE
DECEMBER 8-9, 2020

JOSEPH SHACAT, DIRECTOR OF SUSTAINABLE PAVEMENTS

NATIONAL ASPHALT
PAVEMENT ASSOCIATION

NAPA Overview

Mix Producers

Paving Contractors, Equipment Producers, & Suppliers

1,100 Member Companies

Research & Engineering
Education & Member Services

Federal Advocacy
- Highway & Airport Investment
- EH&S Regulatory Issues

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Let's start with Sustainability

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Sustainability is not a new concept

"He plants his trees to serve a race to come"

- Statius, *Comrades,* as reported by Cicero, 44 B.C.

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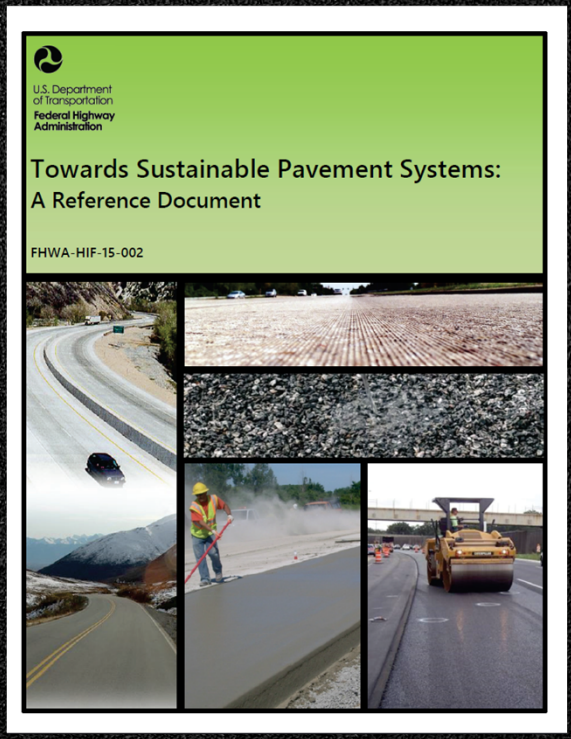
What is a sustainable pavement? FHWA says…

Sustainable pavements should:

- Achieve the engineering goals for which they were constructed
- Preserve and (ideally) restore surrounding ecosystems
- Use financial, human, and environmental resources economically
- Meet human needs such as health, safety, equity, employment, comfort, and happiness



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Triple Bottom Line of Sustainability

As applied to pavements:

Economic

- Agency costs
- User costs

Social

- Safety (skid resistance)
- Work force

Environmental

- Emissions
- Runoff
- Materials (Circularity)

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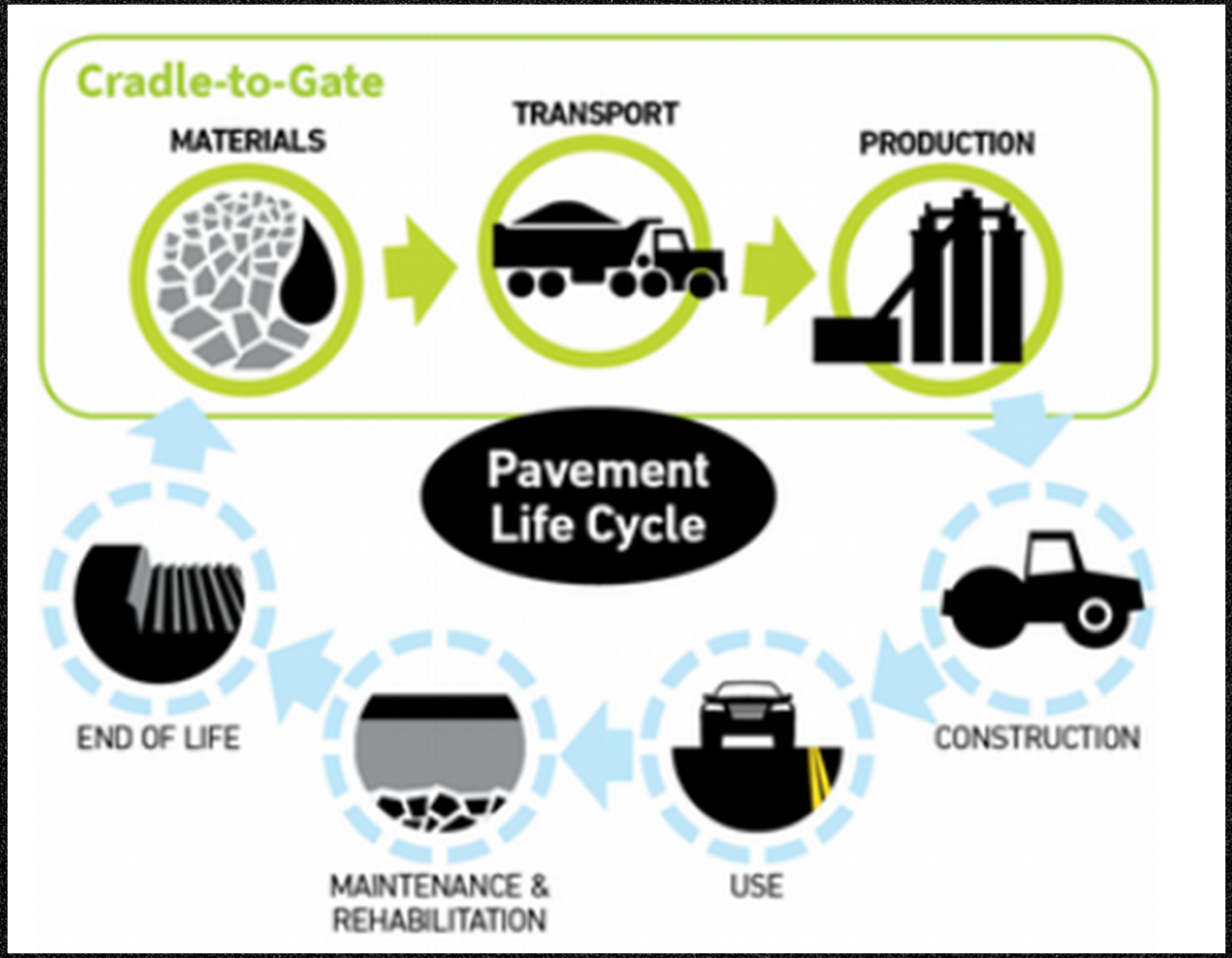
Pavement Life Cycle



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Sustainability Strategies for Pavements

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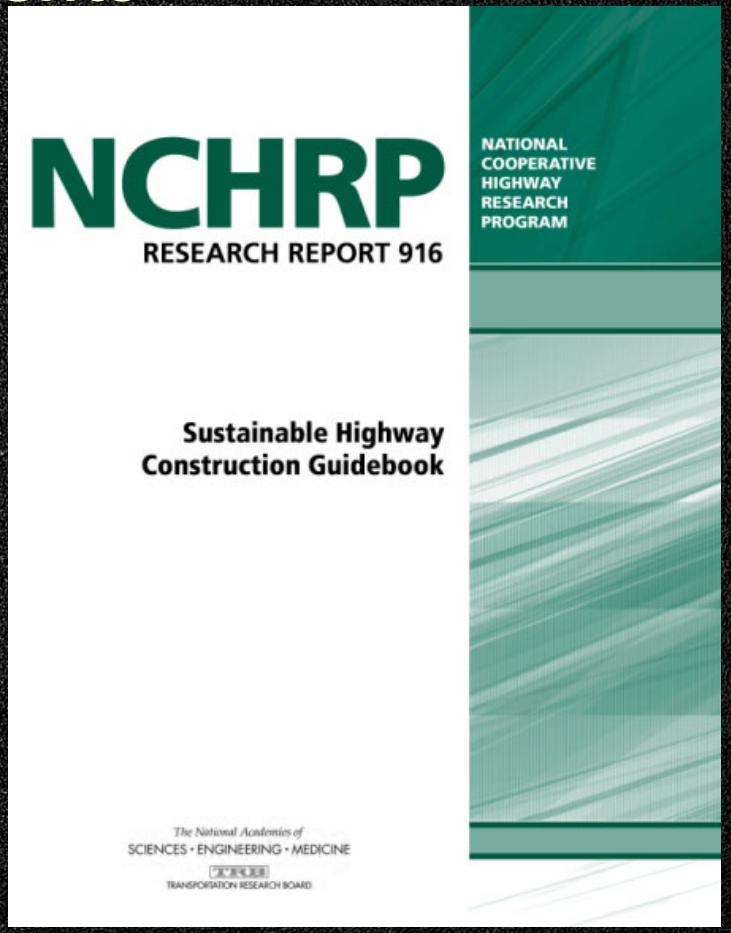
Sustainable Construction Practices for Asphalt Pavements

- **Smoothness**
- **Quality/Long Life**
- **Recycled Materials (RAP)**
- **Density (WMA as compaction aid)**
- Longitudinal Joints
- Eliminate Segregation
- Tack Coat Application



https://www.nap.edu/catalog/25698/sustainable-highway-construction-guidebook

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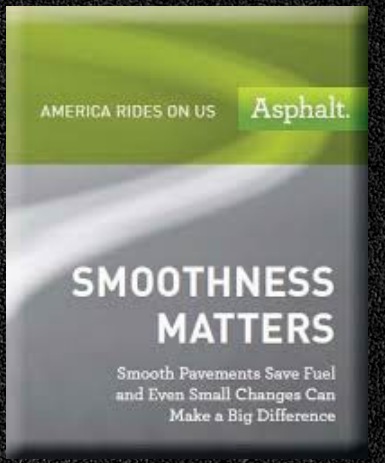
Pavement Smoothness

- Vehicle wear and tear
- Pavement wear and tear
- Fuel efficiency (Rolling Resistance)
- Noise
- Safety



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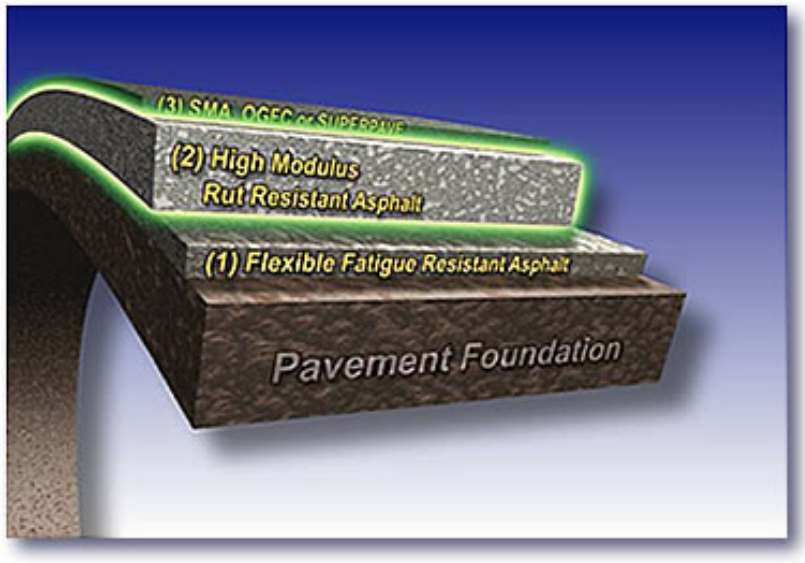
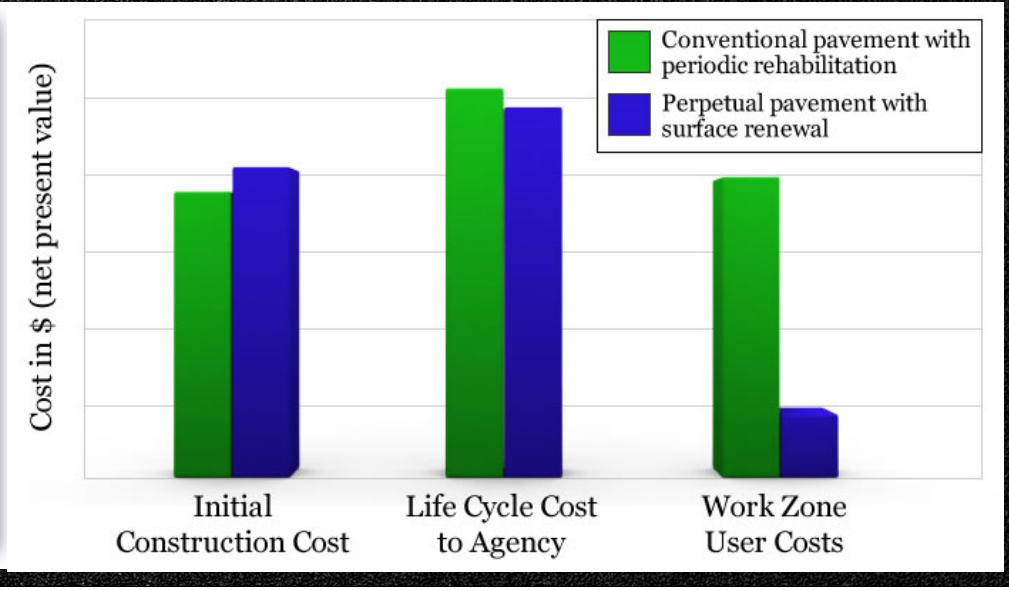
Perpetual Pavements

- Designed to never experience structural rutting or cracking
- Higher initial cost typically offset by lower life cycle cost





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Asphalt Pavement Industry Survey on

Recycled Materials and Warm-Mix Asphalt Usage 2019

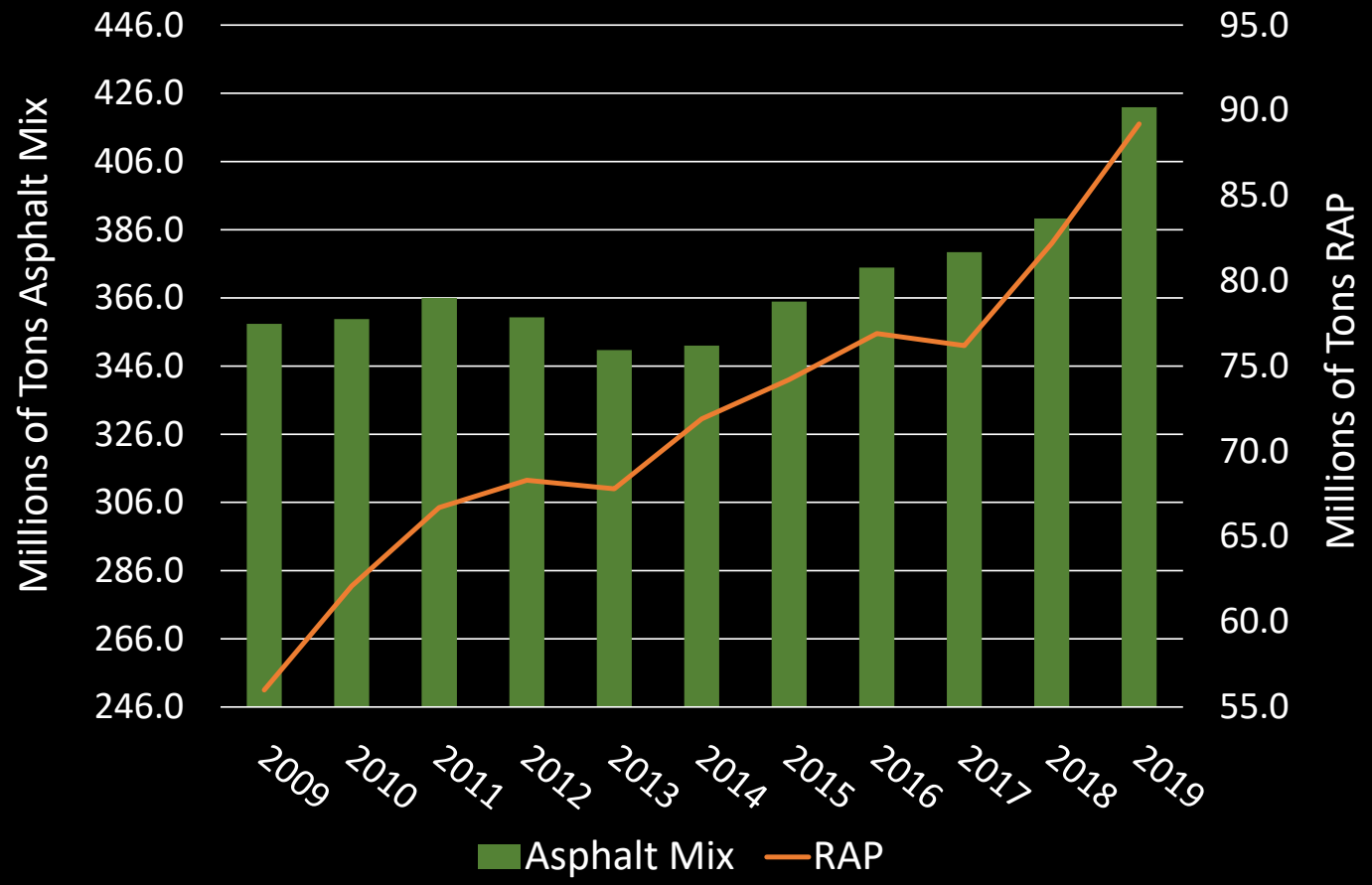
Information Series 138

ASPHALT PAVEMENT IS **RECYCLED** AT A RATE GREATER THAN ANY OTHER PRODUCT

APA DriveAsphalt.org

Asphalt Mix & RAP Tonnage

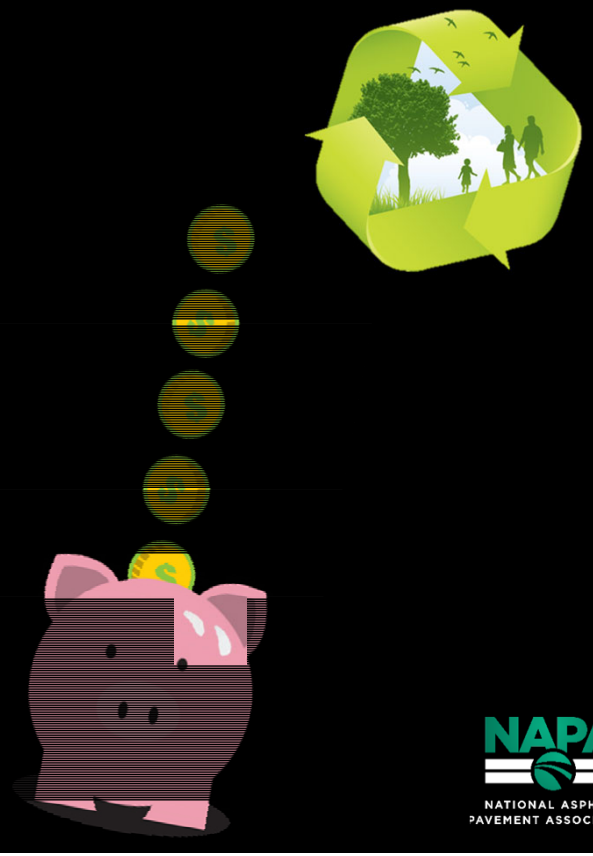
Sustainability



Impact of RAP Utilization

2019 Estimates

- 24 million barrels of liquid asphalt binder
- 84 million tons of aggregate
- **2.4 million tons reduction in GHG emissions (≈ 520,000 cars)**
- **$3.2 Billion in SAVINGS**



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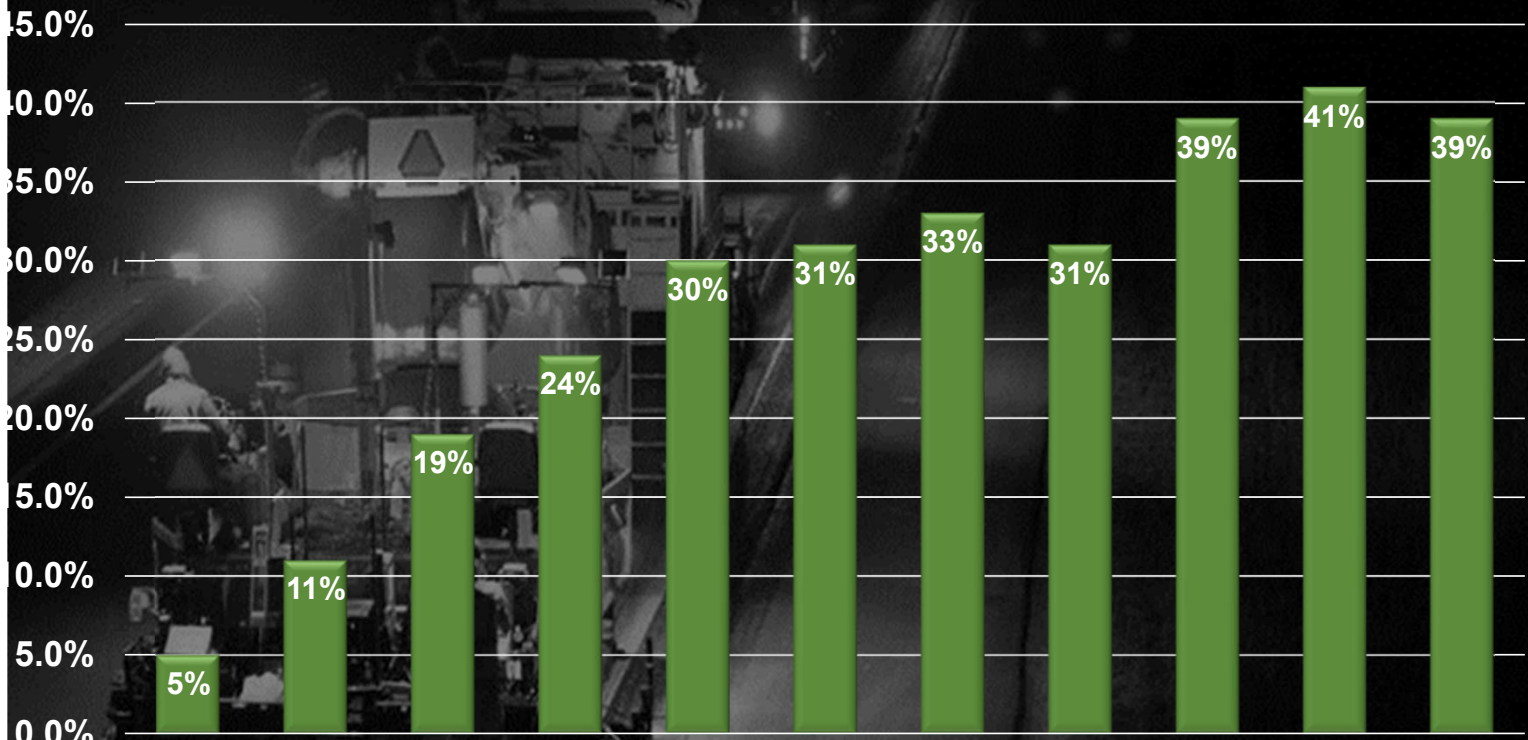
WMA Usage

Percentage of Total Asphalt Production in US



Current Survey

- FHWA continues to support the survey effort

- Recycle/WMA Survey
  - 2020 Construction Season Data
  - Survey will collect responses between 01/01/2021 and 04/01/2021
  - Available on SurveyMonkey @ https://www.surveymonkey.com/r/RMWMASurvey2020
  - 2020 report completed 4th quarter of 2021

- Report accuracy counts on strong industry support / participation

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NAPA Sustainability Resources

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Paving awards are given for quality, safety, community, and ecology/environment. Sustainability.

- Paving Awards
  - Sheldon G. Hayes Award for Highest Quality in Construction
  - Ray Brown Airport Pavement Award – Highest Quality
  - Larry H. Lemon Quality in Construction Awards
  - Quality in Construction Awards

- Operational Excellence Awards
  - Asphalt Operations Safety Innovations
  - Community Involvement Award
  - Ecological Award → Environmental Excellence Award

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Diamond Commendations are given for above-and-beyond efforts. Sustainability.

Diamond Achievement Commendation

Diamond Sustainable Commendation

Diamond Terminal Commendation

Diamond Paving Commendation

Diamond Quality Commendation

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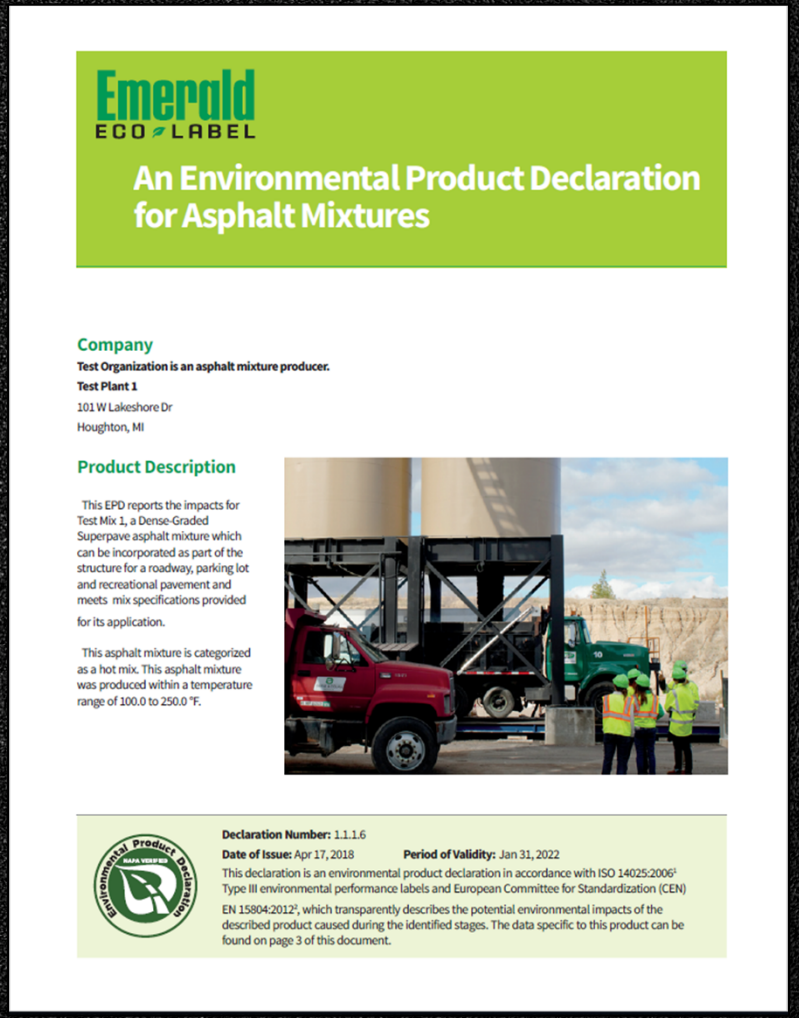
Emerald Eco-Label – NAPA's Tool for Environmental Product Declarations (EPDs)

- Evaluate environmental impacts of plant operations and supply chains
- Quantify improvement of your products' environmental impacts over time
- Create new marketing opportunities
- Help customers earn credit under LEED v4 and other green rating systems



Emerald ECO LABEL

An Environmental Product Declaration for Asphalt Mixtures

Company

Test Organization is an asphalt mixture producer.
Test Plant 1
101 W Lakeshore Dr
Houghton, MI

Product Description

This EPD reports the impacts for Test Mix 1, a Dense-Graded Superpave asphalt mixture which can be incorporated as part of the structure for a roadway, parking lot and recreational pavement and meets mix specifications provided for its application.

This asphalt mixture is categorized as a hot mix. This asphalt mixture was produced within a temperature range of 100.0 to 250.0 °F.

Environmental Product Declaration

Declaration Number: 1.1.1.6
Date of Issue: Apr 17, 2018 **Period of Validity:** Jan 31, 2022
This declaration is an environmental product declaration in accordance with ISO 14025:2006[1] Type III environmental performance labels and European Committee for Standardization (CEN) EN 15804:2012[2], which transparently describes the potential environmental impacts of the described product caused during the identified stages. The data specific to this product can be found on page 3 of this document.

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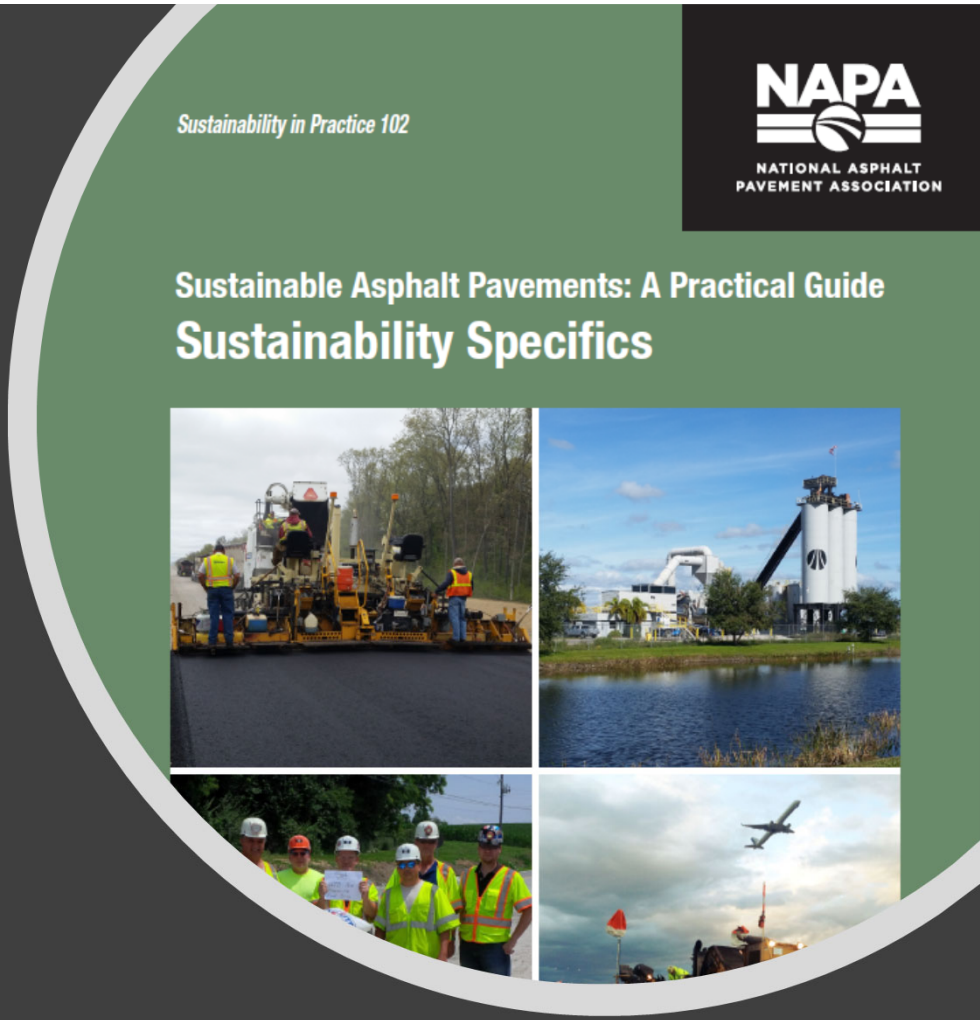
Other NAPA Resources

www.asphaltpavement.org

- Practical Guide to Sustainable Asphalt Pavements
- Porous Pavement Guidance
- LEED v4 Guidance
- Greenhouse Gas Calculator
- Recycled Materials & Warm Mix Survey
- Publications on energy efficiency, RAP, RAS, SMA, OGFC, etc.
- Webinars – live and recorded



Resiliency and Asphalt Pavements

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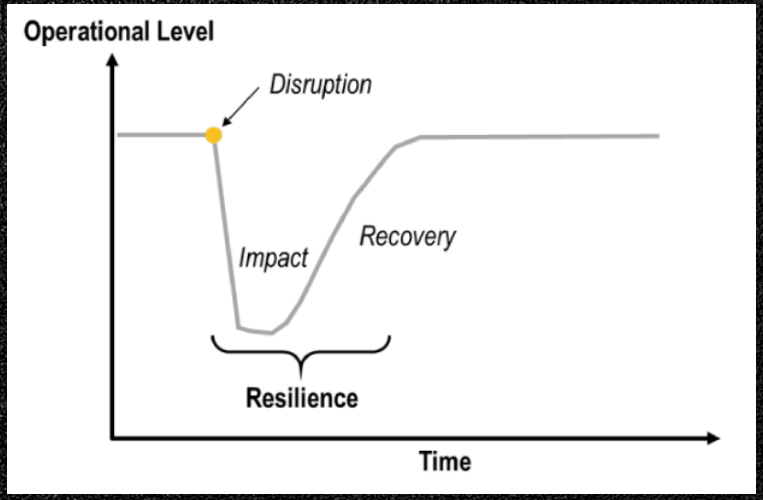
What is Resilience?

The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions

- FHWA Directive 5520



https://transportgeography.org/?page_id=10994

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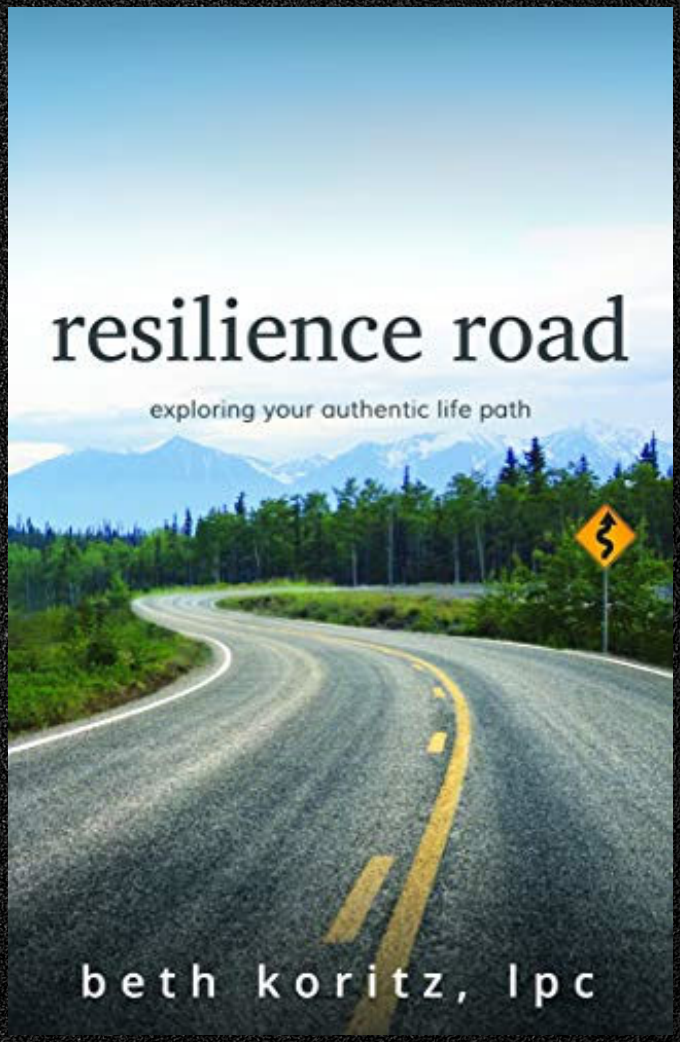
Resilience and Asphalt Pavements

Natural disasters

- Hurricanes, floods, earthquakes, landslides, tornadoes
- Damaged roads affect **mobility**
  - Emergency services
  - Access to medical care
  - Food supplies
  - Commerce
- With unexpected events, the key is to **quickly restore service**



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Resilience – Earthquake Response

- 8 major transportation corridors severely damaged
- All 8 major roads repaired within 5 days

- Anchorage, AK
- December 1, 2018

https://www.theverge.com/2018/12/8/18128983/alaska-earthquake-roads-fixed-anchorage-damage

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Resilience – Speed of Construction

- Hurricane Michael severely damaged U.S. 98 in Franklin County, Florida (October 2018)
- 40-mile stretch of highway affected, 15 miles badly damaged
- Lanes were reopened to traffic after every shift

https://www.tallahassee.com/story/news/2018/10/11/u-s-98-closed-east-lanark-village/1601275002/

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Resilience – Warm Mix to the Rescue
U.S. 34, Colorado, 2013

- 3-hr. haul distances
- Late season paving at high elevation
- Steep canyons with little sun and high winds
- Warm mix was key to getting the job done

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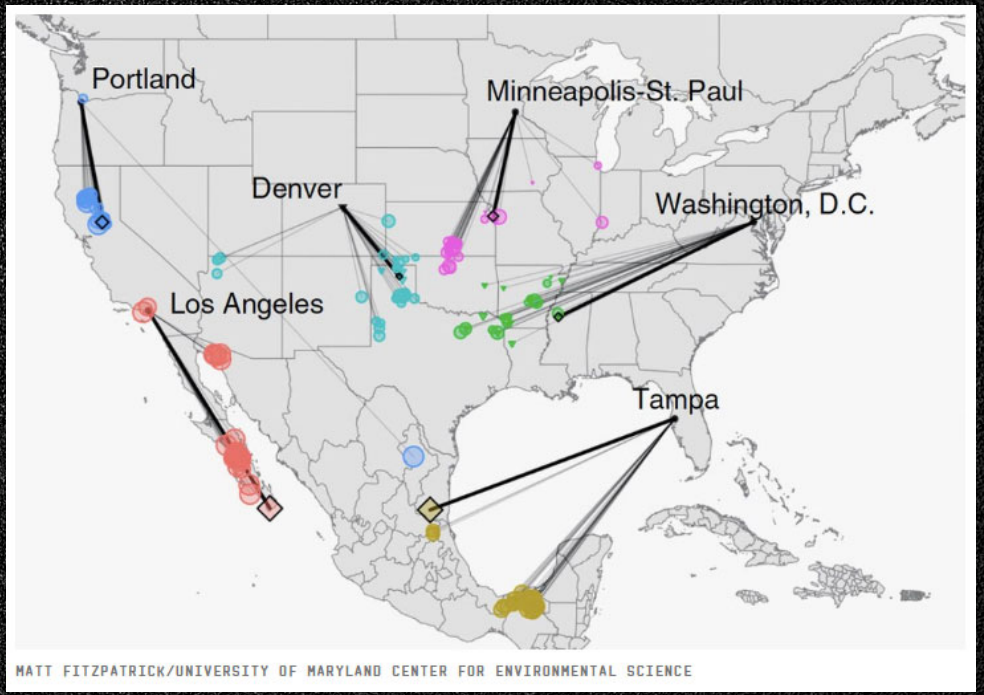
https://www.roadsbridges.com/asphalt-paving-able-reconnect

https://www.cpr.org/2016/09/29/brace-yourself-northern-colorado-us-34-big-thompson-canyon-closure-is-almost-here/

Resilience – Hotter Temperatures

- Use climate forecasts rather than historical data for pavement design
- Integrate design changes into routine maintenance overlays
- Can be cost effective if planned appropriately



https://www.wired.com/story/this-scary-map-shows-how-climate-change-will-transform-your-city/?verso=true

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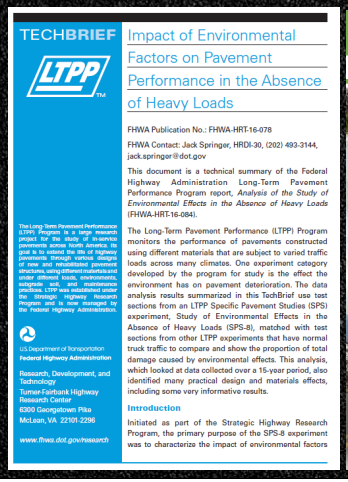
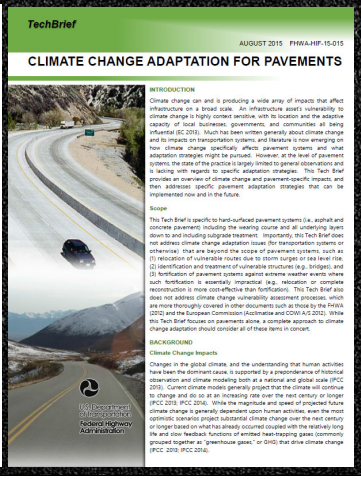
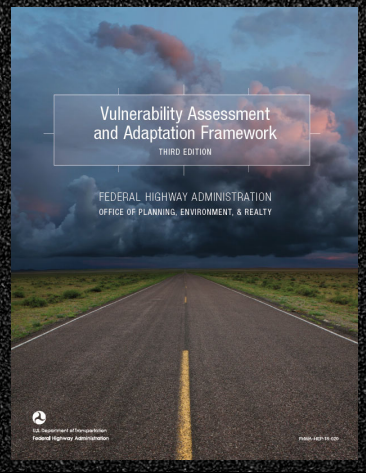
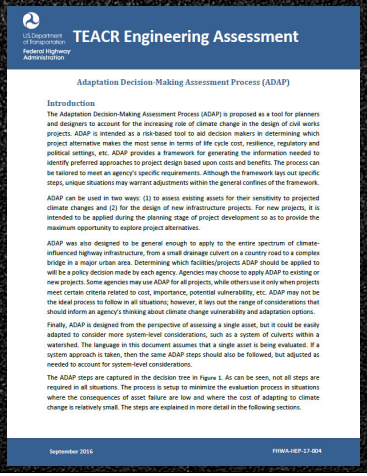
FHWA references for pavement resilience

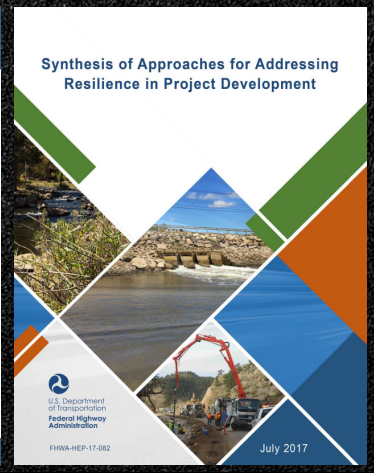
Impact of Environmental Factors on Pavement Performance in the Absence of Heavy Loads (FHWA-HRT-16-078)
www.fhwa.dot.gov/publications/research/infrastructure/pavements/ltpp/16078/16078.pdf
Climate Change Adaptation for Pavements (FHWA-HIF-15-015)
www.fhwa.dot.gov/pavement/sustainability/hif15015.pdf
Vulnerability Assessment and Adaptation Framework, Third Edition (FHWA-HEP-18-020)
www.fhwa.dot.gov/environment/sustainability/resilience/adaptation_framework
Adaptation Decision-Making Assessment Process (ADAP) (FHWA-HEP-17-004)
www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/teacr/adap
Synthesis of Approaches for Addressing Resilience in Project Development (FHWA-HEP-17-082)
www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/teacr/synthesis











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Questions?

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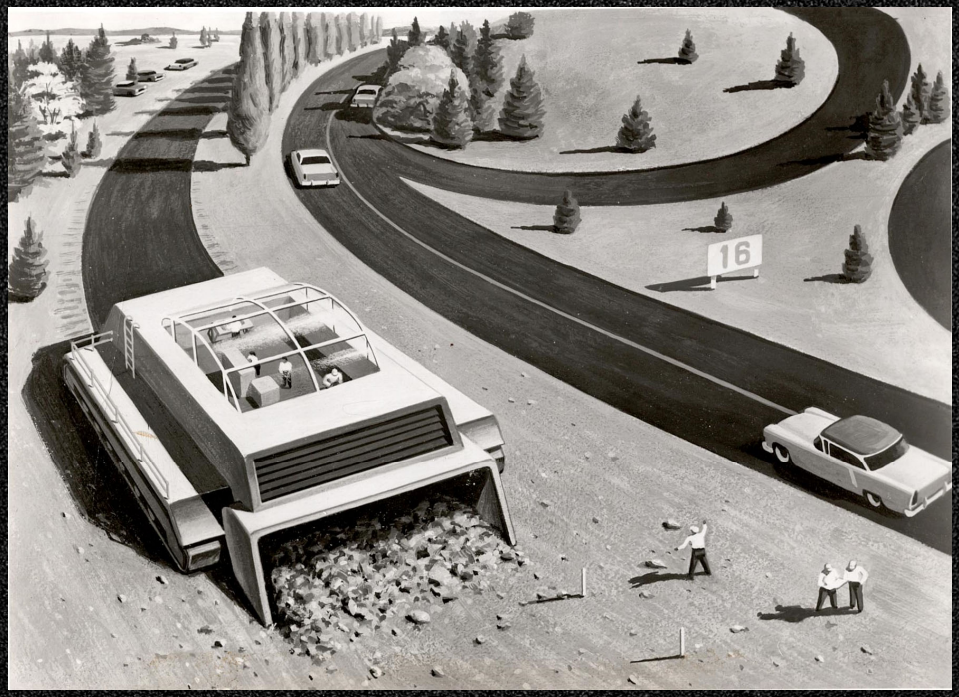

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