

WHO CARES?

Dan Staebell
Asphalt Pavement Alliance

SUSTAINABILITY

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1

Sustainability: What is it?

Economy Society Environment

sus·tain·able
adjective \sə-'stā-nə-bəl\ : able to be used without being completely used up or destroyed
: involving methods that do not completely use up or destroy natural resources
: able to last or continue for a long time

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Reuse / Recycle

- America's leading Recycler
- The asphalt industry reuses and recycles nearly 75 million tons every year.
- United States Taxpayer saves nearly \$2.0 billion* dollars annually.
- Shingles, Tires, Glass, Fly ash, Steel Slag, etc. being recycled.

*NAPA Annual RAP Survey

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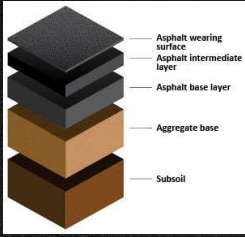
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Performance Perpetual


: "able to last or continue for a long time"

Perpetual Pavements are the Ultimate Sustainable Pavement

- Strength in layers
- "Because it's All about that Base"
- Surface maintain only
- Top layer remove and replace as needed.
- Reuse / recycle / Perpetual



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Asphalt Facts = Sustainable

Quiet
Renewable
100% Recyclable
Smooth =
Reduced Fuel Use


FACT #109
SUSTAINABILITY
POROUS ASPHALT IS AN ENVIRONMENTALLY FRIENDLY TOOL FOR STORMWATER MANAGEMENT.

FACT #128
SUSTAINABILITY
ASPHALT IS THE QUIET PAVEMENT.

FACT #25
SUSTAINABILITY
THE SMOOTHER THE PAVEMENT, THE LOWER A VEHICLE'S FUEL CONSUMPTION.



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Economic Benefits

99%+
of the material removed from old asphalt pavements is reused in new pavements.

\$2.8B+ SAVINGS
from recycled materials compared to the cost of raw materials.

WARM-MIX ASPHALT
technologies have the benefit of reducing energy consumption which decreases the production of greenhouse gases.

32%+
Nearly a third of all asphalt pavement mixtures are produced using warm-mix technologies.



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Is this Sustainability?

The Urban Heat Island Effect and Reflective Pavements Unintended Consequences

Mandating Pavement Brightness is Bad Public Policy

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Emission Reductions

- Asphalt Plants are environmentally sound, reducing greenhouse gases.
- Since 1970, Lowered emissions by 97% while increasing production 250%.
- EPA has removed Asphalt plants from Major Air Haz. Source.

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It's All about the Message!

What is OUR Message!!

9

9

Growing Public Demand

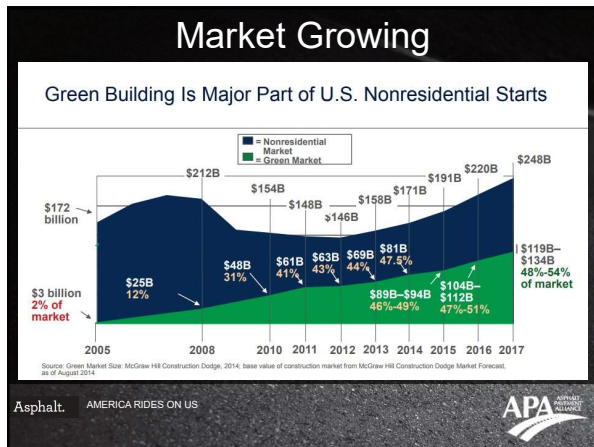
81% Executive Corporate Leaders believe they need to adopt sustainability principals
McGraw-Hill Construction

>50% of State DOT's have adopted sustainability principles
NCHRP 20-83

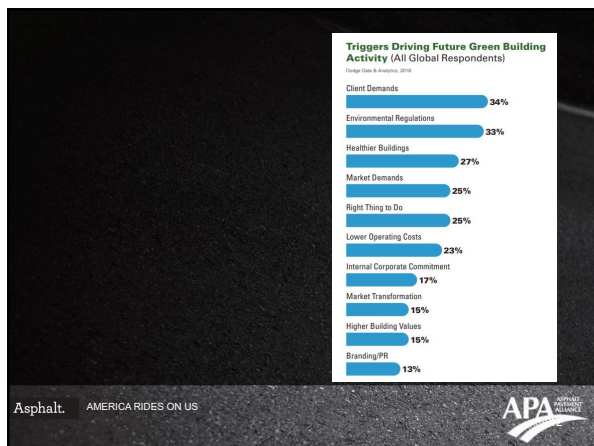
44% Green nonresidential construction = \$66 Billion
McGraw-Hill Construction

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11



12

Sustainable Pavements Technical Working Group

FHWA SP TWG

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Infrastructure Green Rating Systems

- National, State, Local
- Rating Tool
 - Best practices
 - Earn Credits
 - Indicator of sustainability

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New Era of Transparency

Material Credits

LEED 2009

- Recycled or Reuse Materials

LEEDv.4

- Environmental Product Declarations

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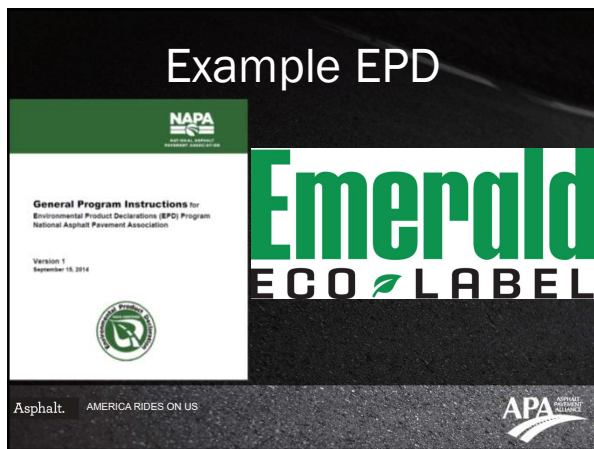
18



19



20




21

Iowa LEED v4 Projects

Miron Construction Cedar Rapids Office	Cedar Rapids	v4
ISURP - Hub Office	Ames	v4
Iowa Renewable Energy Training Center Building 440	Hiawatha	v4
	Des Moines	v4

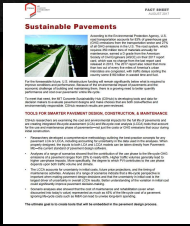
<https://www.usgbc.org/projects>


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Cause and Effect!

- Environmentally could we get better
 - Can't change what we haven't measured!
- Customer asks the question, "How environmentally friendly are you?"
- Competition provides information and data?
 - Ours is better than yours?

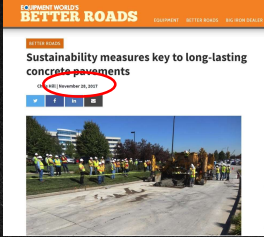



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Other Viewpoints

"Life-cycle analysis (LCA) is emerging as a leading method of determining the environmental impact at both a macro and micro level in transportation projects in context of sustainability. The concrete pavement industry in particular is pushing for the increased use of this approach."




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What is Resilience?

- No common definition
 - AASHTO cited 8 definitions related to transportation infrastructure
- Resilience.
 - ability to anticipate, prepare for, and adapt to changing conditions
 - withstand, respond to, and recover rapidly from disruptions. *FHWA Ref*
- Many faces of resilience
 - But none, by itself, represents the whole

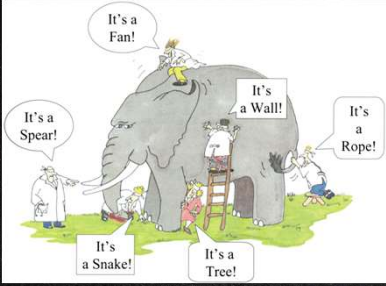


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The elephant and the 6 blind humans

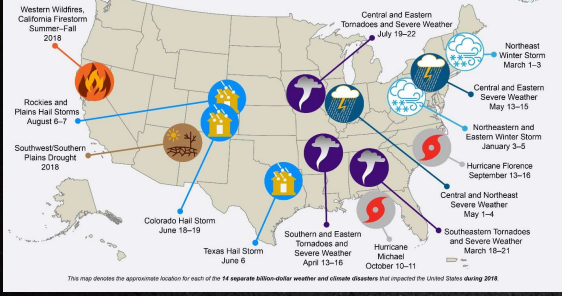


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U.S. 2018 Billion-Dollar Weather and Climate Disasters



NOAA Weather Disasters

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FAST FACTS

Weather Disasters and Costs

30	\$1.6 trillion	12.6
The number of weather and climate disasters in the U.S. in 2017 and 2018 with losses exceeding \$1 billion.	The total approximate cost of damages from weather and climate disasters in the U.S. since 1980.	The annual average number of weather and climate events from 2014 to 2018. In 2018 alone, the U.S. experienced 14 billion-dollar disasters.

Hurricane Michael
10/2018



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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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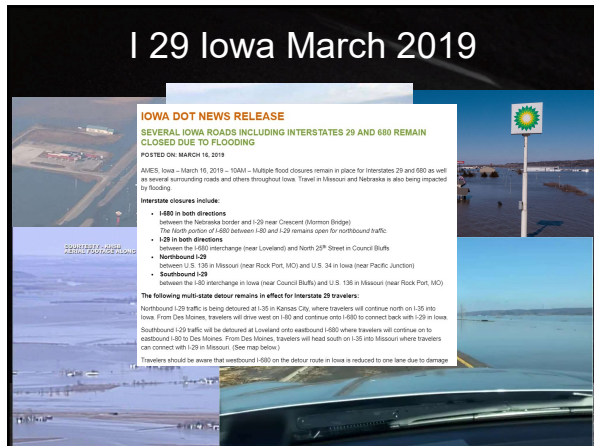
I 29 Iowa March 2019



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33



34



35



36

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- Get to Work!
 - Debris Removal
 - Damage Assessment
 - Repair
 - Communicate
- Governor’s Proclamation
 - Waive low bid procurement
- I-680 Crescent/I-29
 - Closed 3/14/19
 - Water Receded 3/27/19
 - Contractor Mobilized 3/30/19
 - Open 4/2/19

37

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Asphalt saves the day!

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IOWA DOT

The Iowa Department of Transportation has announced that I-29 between U.S. 34 and the Missouri border will be opening at 10 am today! Congratulations and thank you to C.J. McCreary, IOWA DOT, for getting this job done and the Iowa DOT for getting this job done. #IOWAFASTTRACKING #ASPHALT

I-29 is now open to limited traffic between U.S. 34 and Missouri. The Iowa 2 interchange (Exit 10) is open for traveler services and eastbound access. Remember to slow down, follow signs, and don't drive around barricades.

For more information visit www.iowa.gov or call 1-800-339-3377. www.iowa.gov www.iowa.gov www.iowa.gov

39

Closed for 2nd time since repairs



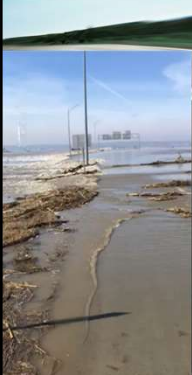
This photo from traffic cameras in Nebraska City, taken Wednesday morning, shows Missouri River floodwaters once again inundating I-29 between Interstate 29 and Nebraska City.

NEBRASKA DEPARTMENT OF TRANSPORTATION


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USGS 06895600 Missouri River at Plattsmouth, NE



Date	Height (feet)
May 25, 2019	26.0
Jun 01, 2019	28.0
Jun 08, 2019	31.0
Jun 15, 2019	32.0
Jun 22, 2019	29.0
Jun 29, 2019	28.0
Jul 06, 2019	28.0
Jul 13, 2019	28.0

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41

Resilience – Earthquake Response



- 8 major transportation corridors severely damaged* Anchorage, AK
- All 8 major roads repaired within 5 days December 1, 2019

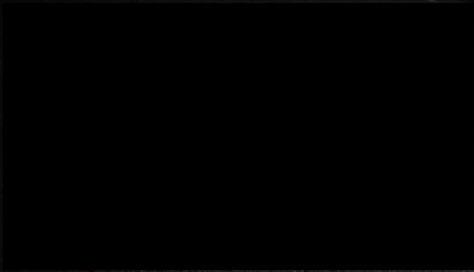
<https://www.theverge.com/2019/12/8/18129883/earthquake-roads-fixed-anchorage>


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Damage Happens



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California – Earthquake Response

- Ridgecrest, CA –
 - July 4 & 5, 2019
- Back-to-back earthquakes damage Highway 178
- Temporary repairs completed within hours
- Permanent repairs completed less than 10 days later, within a single shift




<https://www.stain.com/2019/07/04/5-6-magnitude-earthquake-southwest-of-searles-valley-in-san-bernardino-county-is-felt-throughout-the-southland/>

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Resilience – Hurricanes



- Orange, Texas after Hurricane Harvey
- August 2017


<https://www.nytimes.com/2017/09/19/us/politics/hurricane-harvey-causes-effects.html>

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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/cr-98-closed-surf-lanark-collapse/1601275002/>



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Resilience – Warm Mix to the Rescue


- Haul distances up to **8-10 hours** can be used with warm mix technology
- What happens when local plants can't operate?
- Use of warm mix studied after Hurricane Katrina
- Fine graded mixes are more easily compacted

SERRI Report 70015-011
Full Scale Testing of Hot-Mixed Warm-Compacted Asphalt for Emergency Paving

<http://drivesasphalt.org/resource-library/full-scale-testing-of-hot-mixed-warm-compacted-asphalt-for-emergency-paving/>

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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



<https://www.roadsbridges.com/asphalt-paving-able-reconnect/> <http://www.cpr.org/2016/02/29/brace-yourself-for-thern-colorado-34313g-thompson-canyon-closure-is-almost-here/>

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Resilience – Will Roads require changing material designs?

- Climate models provide long-term expected temperature changes
- Potential...Adjust binder grades to accommodate predicted conditions
- Time scale of changes is **decades**
- Can be a part of **routine maintenance overlays**

<https://www.wired.com/story/this-scary-map-shows-how-climate-change-will-transform-your-city-overcentury/>

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Resilience and Asphalt Pavements

Climate change

- Coastal flooding, groundwater rise, hotter temperatures
- The key is to **plan** for expected changes

<http://report.southwestoil.com/energy-and-climate-science-and-research/energy-policy/energy-science-and-climate-change/20160401/>

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Similar Message

U.S. Department of Transportation
Federal Highway Administration

SUSTAINABLE HIGHWAYS INITIATIVE

NEW LIFE

RESILIENCY

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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/tpp16078/16078.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/bsacr/adap
 Synthesis of Approaches for Addressing Resilience in Project Development (FHWA-HEP-17-062)
www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/bsacr/synh

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52

Message Forward & Asphalt Industry

Moving Forward using Asphalt!!

1. Something WILL happen!
2. Nothing withstands loss of subgrade
3. Some fixes seen as temporary
4. Be Prepared
5. Speed of recovery *Critical*
6. Toolbox & versatility
7. Value (\$) to repair

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53

Sustainability

Thank You
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54

Safe Travels



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55