NEAUPG – Annual Fall Meeting





NATIONAL ASPHALT PAVEMENT ASSOCIATION

Industry Perspectives Sustainable Asphalt Technologies



- What does it mean to be "Sustainable"?
- What asphalt technologies are considered "Sustainable" and why?
- Why do we need to quantify our impact?
- What tools are available for quantification?

What does it mean to be "Sustainable"?



Sustainable

"Meets the needs of the present without compromising the ability of future generations to meet their own"¹

Sustainable Pavements?

No universal definition

"Triple Bottom Line"



Sustainable Asphalt Pavements



NATIONAL ASPHALT PAVEMENT ASSOCIATION







Societal

- Safe
- Quiet
- Smooth Ride Quality
- Minimizes User Delay
- Natural Resource
 Conservation

Economic

- Virgin Material Reuse/Replacement
- Reduced Fuel
- Improved Durability

Environmental

- Storm Water Runoff
- Water Treatment
- Reduce Emissions
- Reduce Landfill



- > 1960-1999, 250% increase in Asphalt Tonnage and
 - 97% reduction in Emissions
- Porous Pavement
- > Warm Mix Asphalt
- Recycled/Reused Asphalt Pavement
 - Recycled Asphalt Shingles
 - **Ground Tire Asphalt**
 - Reclaimed Asphalt Pavement

Porous Asphalt Pavements





- Porous pavements manage stormwater
- Not just for parking lots

Porous Asphalt Pavements







Porous Asphalt Pavements





Warm Mix Asphalt





Warm Mix Asphalt Use

Warm Mix Asphalt



NATIONAL ASPHALT PAVEMENT ASSOCIATION



- Extension of
- Paving Season Improved Ride
- Quality
- Lower User Delay

- Allows higher percent RAP

Environmental

 Reduced Emissions

Recycled Asphalt Shingles (RAS)





NATIONAL ASPHALT PAVEMENT ASSOCIATION



Image Source: fhwa.dot.gov

- 11 Million tons asphalt roofing waste generated
- Asphalt shingles take 300 years to decompose



NATIONAL ASPHALT PAVEMENT ASSOCIATION

How Many Tons of RAS is Used in Asphalt Mixes?



~ 1.2 million tons RAS recycled into pavement

Recycled Asphalt Shingles (RAS)





Ground Tire Rubber





NATIONAL ASPHALT PAVEMENT ASSOCIATIO

- Millions of new tires produced annually
- ➤ > 60 million are stockpiled
- Asphalt-Rubber uses over
 2,000 TIRES per lane-mile
 on a typical 2" overlay.



Ground Tire Rubber



PAVEMENT ASSOCIATION

Source: Rubber Pavements Association



➤In total 220 million pounds, or approximately 12 million tires are used in asphalt rubber

Ground Tire Rubber





Reclaimed Asphalt Pavement (RAP)



NATIONAL ASPHALT PAVEMENT ASSOCIATION



<u>Reused</u> not just recycled



How much RAP is Being Used?

Reclaimed Asphalt Pavement (RAP)

NAPA

NATIONAL ASPHALT PAVEMENT ASSOCIATION



18







NATIONAL ASPHALT PAVEMENT ASSOCIATION



Average Percent RAP in All Mixes

Reclaimed Asphalt Pavement (RAP)



NATIONAL ASPHALT PAVEMENT ASSOCIATION



Closes Life Cycle
 Circle

Need to Quantify Green Pavement Benefits



- Increased awareness of Environmental Impacts
 - Growing Interest in Sustainability Principles
 - >1/2 of DOTs have adopted Sustainability Principles
- Environmental and Social Benefits could be part of pavement selection process
- > Increasing bottom line through green practices
- Helps with Environmental Benchmarking

Must look at Life-Cycle of the Pavement





www.asphaltpavement.org/GHGC















Environmental Product Declarations



NATIONAL ASPHALT PAVEMENT ASSOCIATION

Environmental Facts

Functional unit: 1 metric ton of asphalt concrete

Primary Energy Demand [MJ]	3.9x10 ³
Renewable [мJ]	3.9x10 ³
Non-Renewable [мJ]	3.5x10 ²
Global Warming Potential [kg CO2-eq]	79
Acidification Potential [kg SO2-eq]	0.23
Eutrophication Potential [kg N-eq]	0.012
Ozone Depletion Potential [kg CFC-11-eq]	7.3x10 ⁻⁹
Smog Potential [kg O3-eq]	4.4
Boundaries: Cradle-to-Gate Company: XYZ Asphalt RAP: 10%	

Source: PE International



Environmental Product Declarations (EPDs)

Standardized Life Cycle Assessment defined by the Product Category Rules

Product Category Rules (PCRs)

Defines LCA

- Goal and Scope
- Acceptable Inventory Data
- Impact Categories

Life Cycle Inventory (LCIs)

- Energy Use
- Raw Material Use
- Emissions/Waste

Sustainability Rating Tools

- Rating Tools
 - Best practices
 - Earn Credits
 - Indicator of sustainability
- Move Towards Transparency

0

DIN

CERTIFIED

USGE

LEED







Greenroads









PAVEMENT ASSOCIATION

- Asphalt Industry has well established sustainable paving technologies
 - Use increased over time
 - Ways to increase efforts
- Quantify environmental and social impacts

NAPA Annual Meeting





- February 2-5, 2014
- Boca Raton, Florida ullet



Questions and Thank-you





