THE DRIVE TO MEET CUSTOMER NEEDS

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Northeast Asphalt User Producer Group Meeting
Framingham, MA
October 22-23, 2014
Let’s Talk About…

What our customers want

Research projects and implementation

A partnership for innovation in asphalt pavements
Built Upon Science

**Research & Technology**

**PEC Activities**
- Pavement Design
- Pavement Type Selection
- Environmental Sustainability
- Best Quality & Competitiveness
- Pavement Preservation
- Legislative

**Other Research**
- Asphalt Institute
- NCAT

**Future Research**

**Market Research & Communications**
- Market Research & Plan Development
- Communications Plan
- Advertising Campaigns
- Website(s)
- APA Brand Management
- APA Product Finalization & Archives (Asphalt Vault & Toolkits)
- Agency Contract(s) Management
- Editorial Placement
- Creation of Marketing Materials

**Deployment Activities**
- Customer (SAPA) Support (including non-SAPA States)
- National Accounts Program
- Field Resource Team Leadership & Coordination
- Trade Shows
- Speaking Engagements
- Perpetual Pavement Awards
- Deploy Research and Marketing Materials

**Accelerated Deployment of Proven Technologies**
A Survey of Pavement Officials And the Driving Public

What Do Our Customers Want?

The APA is a partnership of the Asphalt Institute, National Asphalt Pavement Association and the State Asphalt Pavement Associations.
## Survey Participants

<table>
<thead>
<tr>
<th>Survey</th>
<th>Who</th>
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<tbody>
<tr>
<td>Driver Preference Survey</td>
<td>US Drivers, 18+</td>
</tr>
<tr>
<td></td>
<td>Regional Oversamples</td>
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<tr>
<td></td>
<td>Trucker Oversample</td>
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<tr>
<td>Driver Survey</td>
<td>US Drivers, 18+ who drive 50+ miles per week</td>
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<tr>
<td>In-Depth Interviews DOT’s, Public Works</td>
<td>Appointed Officials, Engineers, Architects, Developers, Owners and Concessionaries, and Other Key Stakeholders</td>
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<tr>
<td>Survey DOT’s, Public Works</td>
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WHAT MATTERS TO DRIVERS?
Common Roadway Issues Experienced in the Past Year

- Potholed, cracked, broken or crumbling pavement: 79%
- Road Noise: 48%
- Water in the roadway: 47%
- Joints: 46%
- Ruts: 38%
- None of these: 10%

APA ASPHALT PAVEMENT ALLIANCE
Drivers – Satisfaction Indicators

- Smooth: 58%
- Quiet: 11%
- Better grip: 6%
- Lasts longer: 5%
- Easier to maintain: 5%
Maintenance Preferences

Lanes receive repairs during off peak hours

Truckers
- Off-peak repairs (73%)
- Fully shut down (20%)
- Not sure (6%)

Lanes fully shut down for maintenance

84%

6%

9%

Not sure
Priorities When Building/Rebuilding Roads

- Costs with reg. maintenance: 58%
- Public safety: 56%
- Ability to be repaired quickly: 42%
- Smooth road surface: 28%

18% Effective storm water mgmt.
14% Cost of reconstruction
13% Sustainable construction
11% Likelihood for pavement failure
11% Ability to be built quickly
10% Ability to quickly add lanes
7% Locally produced products
6% Low road noise
Priorities When Building/Rebuilding Roads

- Lasts with regular maintenance: 58%
- Public safety: 56%
- Ability to be repaired quickly: 42%
- Smooth road surface: 28%
Roadway Spending Priorities

1. PERFORMING MAINTENANCE & REPAIRS
   Gen Pop: 79% most important
   Truckers: 68% most important

2. INCREASING CAPACITY
   Gen Pop: 63% second most important
   Truckers: 56% second most important

3. BUILDING NEW ROADS
   Gen Pop: 68% least important
   Truckers: 56% least important

Maintaining Existing Roads  Building New Roads
WHAT MATTERS TO DECISION MAKERS?
Key Findings – In-Depth Interviews

- Shrinking infrastructure funding.
- Pavement innovation is key to reducing costs.
- Speed of construction was a primary asphalt differentiator.
- Pavement decision makers have positive perceptions of asphalt pavement industry.
- Agencies take into account driver and stakeholder opinions.
Challenges to Meeting Priorities

- Funding: 48%
- Affordability: 13%
- Poor workmanship: 11%
- Long-term performance: 10%
Pavement Attributes Associated With Drivability

- **Less traffic delay for installation**: 87% (Asphalt: 13%, Equal: 16%, Concrete: 17%)
- **Less pavement noise**: 83% (Asphalt: 16%, Equal: 17%, Concrete: 18%)
- **Lower initial cost**: 81% (Asphalt: 14%, Equal: 5%, Concrete: 2%)
- **Smother surface**: 77% (Asphalt: 14%, Equal: 14%, Concrete: 5%)
- **Lower rehabilitation costs**: 72% (Asphalt: 19%, Equal: 43%, Concrete: 37%)
- **Lower maintenance costs**: 39% (Asphalt: 30%, Equal: 37%, Concrete: 7%)
- **Lower life-cycle cost**: 30% (Asphalt: 33%, Equal: 37%, Concrete: 7%)
- **Better safety**: 16% (Asphalt: 77%, Equal: 7%, Concrete: 5%)

Legend:
- **Green**: Asphalt
- **Dark Gray**: Equal
- **Light Gray**: Concrete
Our Customers Want

• Durable, Long-Lasting pavements.

• Reduced Costs Through Pavement Innovations.

• A Smooth, Quiet and Safe Pavement that can be Maintained.

• To Minimize Construction-Related Delays.

• Funding for Maintenance and Capacity Expansion.
America depends on high-performing, safe roads.
Asphalt Industry’s Investment

Six NAPA–SAPA Task Groups

- Best Quality & Competitiveness
- Environmental Sustainability
- Legislative
- Pavement Design
- Pavement Preservation
- Pavement Type Selection
LCCA Issues in Washington

- MAP-21
  - Mandate LCCA, Alternative Bid, and MEPDG
- Financial Services Appropriations Bill
  - Mandate Material-Specific Discount Rates
- Water Resources Development Act
  - Mandate LCCA on Corps Projects
- MAP-21 Reauthorization
  - LCCA on all Federal-Aid Highway Projects
- Ready Mixed Concrete Check-Off
Pavement Type Selection & Pavement Design Deliverables

- Optimized Pavement Design & Materials Selection
- Determining Service Life based on Comparable IRI Values
- www.ncat.us
Sustainable Asphalt Technologies

Porous Asphalt

Reclaimed Asphalt Pavement (RAP)

Warm Mix Asphalt (WMA)

Ground Tire Rubber (GTR)

Recycled Asphalt Shingles (RAS)

Perpetual Asphalt Pavement
Environmental Product Declarations

Environmental Facts

Functional unit: 1 metric ton of asphalt concrete

<table>
<thead>
<tr>
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<th>Value</th>
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<tbody>
<tr>
<td>Primary Energy Demand [MJ]</td>
<td>3.9x10^3</td>
</tr>
<tr>
<td>Renewable [MJ]</td>
<td>3.9x10^3</td>
</tr>
<tr>
<td>Non-Renewable [MJ]</td>
<td>3.5x10^2</td>
</tr>
<tr>
<td>Global Warming Potential [kg CO2-eq]</td>
<td>79</td>
</tr>
<tr>
<td>Acidification Potential [kg SO2-eq]</td>
<td>0.23</td>
</tr>
<tr>
<td>Eutrophication Potential [kg N-eq]</td>
<td>0.012</td>
</tr>
<tr>
<td>Ozone Depletion Potential [kg CFC-11-eq]</td>
<td>7.3x10^-9</td>
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<tr>
<td>Smog Potential [kg O3-eq]</td>
<td>4.4</td>
</tr>
</tbody>
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Boundaries: Cradle-to-Gate
Company: XYZ Asphalt
RAP: 10%

Source: PE International, Values are for illustration purposes only.
Learn more about:

- Program Goals and Objectives
- Product Category Rules
- PCRs Under Development by NAPA/SAPAs
  - Asphalt Mixtures
PVI Analysis & Review

- Review of Model-Based Pavement-Vehicle Interaction Simulation for Life Cycle Assessment of Pavements from a Pavement Design Perspective
- NAPA Webinar: Where the Rubber Hits the Road: PVI Re-examined
IRI Database for Smoothness & Emissions

Emissions Estimator

The Project Emission Estimator (PEE) will have the capability of benchmarking life cycle emission estimates associated with construction maintenance and use of the roadway. This page outlines the steps taken to illustrate the concept of a pavement life cycle along with the inputs needed to create one in PEE.

Calculator

General Information

Generalized Roadway Speed:
- 50 mph
- 70 mph

Average Daily Traffic (ADT):

Project Length (in miles):

Number of Lanes:

Build Life Cycle

Instructions
1. Define the first intervention strategy:
   - This will define the initial construction (materials, batch plants, and hauling/construction equipment) and work zone emissions in year 1.
   - Currently, choices limited to any one of the reconstruction, rehabilitation, or maintenance projects investigated by researchers at Michigan Technological University (MTU).
   - Duration days of the project will also be defined to estimate relative work zone traffic emissions.
2. Define the second intervention strategy (intervention year):
   - Repeat step 2, until preservation strategy is achieved and end of life has been attained.
   - Use phase will be measured yearly throughout the life cycle and quantified in the life cycle emission report.

Job:
- MT
- HMA Cold Milling and Overlay

Intervention Year:

Project Duration:

Add Intervention

Output

Year

Annualized Emissions

Total CO2 Emissions

CO2 Emissions
Reflective Pavements and Urban Heat Island

Do reflective pavement mandates make sense?

Legislative efforts to mandate reflective pavements have been introduced in some areas, but the scientific evidence doesn’t clearly support the use of reflective pavements to address the urban heat island effect. While these pavements do redirect some energy from a pavement’s surface, much of it ends up interacting with buildings, pedestrians, and cars – leading to potential unintended negative consequences.

ROOFS
Most of the science surrounding reflectivity and UHI focuses on roofs, which are at the top of the urban environment. Pavements are not roofs.

Unintended Consequences
A Research Synthesis Examining the Use of Reflective Pavements to Mitigate the Urban Heat Island Effect

by: Jiachuan Yang, Zhihua Wang, Ph.D.; and Kamal E. Kaloust, Ph.D., PE.
Arizona State University National Center of Excellence for SMART Innovations
Best Quality and Competitiveness Deliverables

- High Binder Replacement for Recycled Materials
  - Draft Synthesis
  - Webinar: Improved Sustainability & Performance with High RAP and RAS Usage

- Education and Training Program
  - LCCA and Innovative Technologies
Pavement Preservation

http://www.asphaltpavement.org/ThinIsIn
Other PEC Projects

- Develop Thinlays with High Recycled Content
- Asphalt’s Speed of Construction for Cost Effectiveness

Download a copy: http://goaspha.it/1grtLij
Partnership for Innovation in Asphalt Pavements
• FY2014–15 Deliverables Include
  ▪ Recycled Materials & WMA Survey (2013)
  ▪ RAP Management Best Practices
  ▪ Recycled Tire Rubber Best Practices
  ▪ High Binder Replacement Mixtures Synthesis
  ▪ Pavement Economics & LCCA Webinar
The State of Reuse in our Roads

Industry Survey of Recycled Materials and WMA
21 MILLION.

The estimated barrels of asphalt conserved.

ESTIMATED SAVINGS OF $2.3 BILLION
106 MILLION. The total tons of WMA placed in 2013.

THAT’S 22% MORE THAN THE LAST YEAR. OH, AND OVER 530% MORE THAN 2009
WMA Usage

Percentage of Total Asphalt Production in US

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>%</td>
<td>5%</td>
<td>11%</td>
<td>19%</td>
<td>24%</td>
<td>30%</td>
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</table>
## Ground Tire Rubber

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tons of Mix Using GTR</td>
<td>691,589</td>
<td>1,195,594</td>
</tr>
<tr>
<td>Tons of GTR Used</td>
<td>1,047</td>
<td>6,989</td>
</tr>
</tbody>
</table>
Available Soon!
PaveXpress: A Simplified, Online Pavement Design Tool

Available Online:

- LCCA for Pavements
- What, How, and Why of EPDs
- Porous Asphalt Pavement
- Thinlays for Pavement Preservation
- Sustainability 101: The What, Why, And How of Sustainability for the Asphalt Industry
JUST ADDED:
Tour the New Orleans Lager & Ale Brewing Co.
- a Sustainable Brewery!
THANK YOU

asphaltpavement.org

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2013 Industry Survey Results - Preliminary

- Total Estimated Tonnage: 351 million
- Tons of RAP Used in Asphalt Mixtures: 68 million
- National Average RAP Use: 20%
- Tons of RAS Used in Asphalt Mixtures: 2.3 million
- Tons of WMA: 106 million
  - Chemical Additive: 12%
  - Plant Foaming: 87%
What do we value?

- **Decision Makers**
  - Cost over life-cycle
  - Performance
  - Long-life – quality of ride over life

- **Driver Perception Survey**
  - Smooth, Safe, Quiet
  - Service
    - Well-maintained
    - Delays & construction timing
  - Quality of drive
THE BIG THINGS - NOW

- PAVEMENT TYPE SELECTION
- PAVEMENT DESIGN & MATERIALS
- SUSTAINABLE PAVEMENTS
- PRESERVATION