Green Pavements: have we gone too far? Getting Back to Basics
Continuing to improve asphalt’s environmental sustainability

- RAP
- Shingles
- Porous
- Smooth
- Perpetual

Reduce / Reuse / Recycle
Porous pavements manage stormwater
Not just for parking lots anymore
Benefits of OGFC

I-35 San Antonio

- Friction improved 200%
- Smoothness improved 60%
- Noise cut by up to 14 decibels
- Major accidents cut in HALF!
Reclaimed Asphalt Pavement “RAP”
Removed and/or reprocessed pavement material containing asphalt and aggregates.

Over 80 percent of the asphalt pavement removed each year is re-used.

Represents close to 80 million tons/year.

RAP is the Nation’s No. 1 recycled material in both total amount & percentage recycled.
Reduce / reuse / recycle

30,000 Tons of RAP

= 70 - 6,000 Gallon Transport Trailers and 28,200 Tons of Clean Aggregate
Shingles
Crumb / Tire Rubber
Glass
Slag
Foundry sand

Different stages of utilization / evaluation
- At least 15% production energy savings
- Savings on application / compaction
- Other construction benefits
- Allows for higher RAP content
- Technologies continue to reduce energy
- Performance appears superior
- Will be the norm in near future
Reducing carbon footprint

- reduce
- reuse
- recycle

GHG Emissions Reductions

<table>
<thead>
<tr>
<th>Material</th>
<th>Emissions Reduction over HMA (%)</th>
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<tbody>
<tr>
<td>HMA</td>
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<tr>
<td>HMA 5% RAS</td>
<td>7.2</td>
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<tr>
<td>HMA 20% RAP</td>
<td>8.5</td>
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<tr>
<td>HMA 40% RAP</td>
<td>16.8</td>
</tr>
<tr>
<td>WMA 5% RAS</td>
<td>10.1</td>
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<tr>
<td>WMA 20% RAP</td>
<td>17.3</td>
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<tr>
<td>WMA 40% RAP</td>
<td>19.5</td>
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<tr>
<td>WMA 40% RAP</td>
<td>26.9</td>
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</tbody>
</table>

Courtesy of: Robert Lee, TX-DOT
Sustainable Asphalt, Now and Tomorrow
Environmental metric tool
Currently focuses on “carbon footprint”
– Raw mts / construction / maintenance
– “use” phase”
pavement carbon footprint
Semantics on definition

No doubt: vehicle emissions are huge

– But are they created by USING the pavement?
– Much smaller delta for pavement impacts

MIT: roughness accounts for 5 – 25 percent overall carbon footprint

– vs. 40 – 60 percent on initial construction

pavement flexibility: not validated
Smooth pavements save fuel

Designed and maintained smoother

Intuitive; ground in decades of science

Working with stakeholders

Field studies show: smoothness, not pavement type
Keep it simple: Reduce / Reuse / Recycle

RAP: Perpetual Pavement

Warm Mix: reduces energy consumption

OGFC: safe, quiet, cool

Porous pavements manage stormwater

Small carbon footprint

NAPA: Nation's No. 1 recycled material

ASPHALT: environmentally sustainable pavement
Keep it simple: reduce / reuse / recycle

LCAs: carbon footprint vs other env impacts

Tangible benefits now
- RAP / RAS / WMA
- smoother pavements

Asphalt pavement sustainability info:
- www.pavegreen.com
- www.asphaltroads.org