Recycle and Reuse of Asphalt Products

AASHTO Committee on Construction Conference
Franklin, Tennessee
August 11 - 15, 2019
Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage 2017

Information Series 138

8th Annual Survey
Asphalt Mix & RAP Tonnage

Trending Sustainability

<table>
<thead>
<tr>
<th>Year</th>
<th>Millions of Tons Asphalt Mix</th>
<th>Millions of Tons RAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>346.0</td>
<td>246.0</td>
</tr>
<tr>
<td>2010</td>
<td>346.0</td>
<td>266.0</td>
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<tr>
<td>2011</td>
<td>346.0</td>
<td>286.0</td>
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<tr>
<td>2012</td>
<td>346.0</td>
<td>306.0</td>
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<td>2013</td>
<td>346.0</td>
<td>326.0</td>
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<tr>
<td>2014</td>
<td>346.0</td>
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<tr>
<td>2015</td>
<td>346.0</td>
<td>366.0</td>
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<tr>
<td>2016</td>
<td>346.0</td>
<td>386.0</td>
</tr>
<tr>
<td>2017</td>
<td>346.0</td>
<td>406.0</td>
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</table>
% RAP Utilization in Asphalt

Utilization by Sector

% RAP Utilization in Asphalt Mixtures

- DOT
- Other Agency
- Commercial & Residential
- Average

Impact of RAP Utilization

2017 Estimates

• 21.5 million barrels of liquid asphalt binder

• 72 million tons of aggregate

• $2.2 Billion in SAVINGS
Recycling, by tonnage

- Asphalt pavement: 80.3
- Scrap steel: 70
- Newsprint: 6.2
- Concrete pavement: 3.3
- Glass bottles: 2.9
- Aluminum cans: 0.9
- Lead-acid batteries: 0.8
- Magazines: 0.5
- Plastic containers: 0.3

(millions of tons)
Recycled Asphalt Shingles

RAS in Asphalt Pavement & Respondent Company Utilization

- 20%
- 25%
- 30%
- 35%
- 40%
- 45%

- 0.000
- 0.200
- 0.400
- 0.600
- 0.800
- 1.000
- 1.200
- 1.400
- 1.600
- 1.800
- 2.000

- 0%
- 20%
- 30%
- 40%
- 45%

- RAS Tons
- Companies Utilizing RAS

Millions of Tons RAS in Asphalt Pavements

% of Respondent Companies Utilizing RAS

Other Recycled Materials

More than 1,400,000 Tons Recycled into Asphalt Pavements

- Blast Furnace Slag: 56%
- Steel Slag: 42%
- Fibers: <1%
- Fly Ash: 1%
- GTR: 1%
Summary

• Asphalt Industry remains the country’s most diligent recycler
  • 99% of RAP being put into new pavements

• RAP use equated to saving $2.2 Billion

• 944,000 tons of RAS utilized in asphalt mix in 2017

• Industry continues to recycle other materials
  • Utilized more than 1.9m scrap tires in 2016
Recycling & Reclaiming Technologies

Pavement Preservation & Recycling Alliance

www.roadresource.org

Why Recycling and Reclamation?

Go The Distance

Make your resources go the distance with engineered solutions.

With today's failing infrastructure, a critical tool in the pavement manager's toolbox is the reuse of valuable existing resources. Research shows that powerful technologies behind recycling and reclamation treatments offer triple benefits of major economic savings, reduced environmental impact, and precision engineering for stronger, smarter roads.
Treatment Resource Center

**Apply Treatments With Confidence & Success**

This resource is a combined effort from experts across the industry. It includes the most current guidelines, process information, research, success stories, and in-depth quality assurance recommendations to equip you with the tools you need to ensure treatment success.

The PPRA Treatment Resource Center is an index of common treatments under various progressive pavement management disciplines. For specific questions contact a contractor or supplier in your region.

<table>
<thead>
<tr>
<th>Surface Treatments</th>
<th>Pre-Treatments</th>
<th>Recycling &amp; Reclamation</th>
<th>Base Treatments</th>
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</thead>
<tbody>
<tr>
<td>Fog Seal</td>
<td>Tack Coat</td>
<td>Cold Planing &amp; Micro Milling</td>
<td>Base Stabilization</td>
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<td>Rejuvenating Fog Seal</td>
<td>Prime Coat</td>
<td>Hot In-Place Recycling</td>
<td>Soil Stabilization &amp; Soil</td>
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<td>Slurry Seal</td>
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<td>Cold In-Place Recycling</td>
<td>Modification</td>
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<td>Micro Surfacing</td>
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<td>Cold Central Plant Recycling</td>
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<td>Ultra Thin Lift HMA</td>
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<td>Full Depth Reclamation</td>
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<td>Scrub Seal</td>
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Cold Central Plant Recycling
RAP Pile 1 inch, Mixing Plant, Emulsion Tanker, Water tanker

- 100% Coating 3.5% emulsion 1.5% water
Questions?

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