Recycled Asphalt Shingle use in Minnesota

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Acknowledgements

• Introduction – Materials
  • History & Motivation

• Project Use (Lessons Learned)

• Current Use & Future Direction

• Summary
Outline

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Recycled Asphalt Shingles

**MWSS** - Manufacturer Waste Scrap Shingles

**TOSS** - Tear-Off Scrap Shingles (Post Consumer)

**RAS** - Recycled Asphalt Shingles, includes *both MWSS & TOSS*

**RAP** - Reclaimed Asphalt Pavement
Reclaimed Asphalt Pavement

- 1976: First Use, Research Project
- 2000’s: Used on Virtually all State Hwy Projects (~20%+)
Manufacturer Waste

- 1990’s: First Use
- 1996: Supplemental Specifications
- 2003: Permissive Spec (Contractor Choice), 5% max.
Tear-Off (Post Consumer)

- Mid 1990’s: First Use
- 2007: Specification (Needed Engineer Approval)
- 2010: Permissive Spec (Contractor Choice), 5% max.
Motivation To Use TOSS

- Expensive to Landfill
- Increased Costs of Asphalt Binder
- Possible Legislative Mandate

$\Rightarrow$ Partnered with Minnesota Pollution Control Industry, Suppliers, Agencies and others to Conduct Research and Develop a Comprehensive RAS Spec.
Concerns About TOSS

- Debris & Other Contaminants
- Asbestos?
- Aging/Stiff Binder
Debris Concerns

Insert Picture with "Flags"

1. Pre-Sort: Pull out obvious "big waste"
Processing to Mitigate Debris

Expensive to Landfill

1. Pre-Sort: Pull out obvious “big waste”
Processing to Mitigate Debris

2. Hand Sort: Pull out anything that’s “Not Shingles”
3. Grind, Screen, Magnet (Nails)
Deleterious Materials Spec.

Deleterious Materials: Anything that’s not Shingles

- < 0.5 % by weight of material retained on 4.75mm (No. 4) Sieve (500 - 700 gram sample)

- Applicable to both MWSS & TOSS

- It’s Difficult, but Suppliers are able to consistently meet after making modifications to their operation.
Mitigating Asbestos

- Shingles from non-regulated facilities
  - Single layer reroofs
  - Single family homes

- Processors are licensed waste handlers/facilities

- Processors must have shingles added to their permit

- Random testing for asbestos is required
- Processor Q/C Plan
Asphalt used to manufacture shingles is a stiff grade (Don’t want it to flow).

Exposure to elements for 20+ yrs. makes it stiffer!

<table>
<thead>
<tr>
<th>Material Identification</th>
<th>High PG Temp</th>
<th>Low PG Temp</th>
<th>Continuous PG Grade</th>
<th>PG Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAP</td>
<td>79.9</td>
<td>-17.4</td>
<td>79.9 -17.4</td>
<td>76-16</td>
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<tr>
<td>RAP2</td>
<td>74.3</td>
<td>-28.8</td>
<td>74.3 -28.8</td>
<td>70-28</td>
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<tr>
<td>TOSS</td>
<td>112.7</td>
<td>-11.4</td>
<td>112.7-11.4</td>
<td></td>
</tr>
<tr>
<td>MWSS</td>
<td>107.5</td>
<td>+6.0</td>
<td>107.5+6.0</td>
<td></td>
</tr>
</tbody>
</table>
Aging/Stiff Binder

- 25% RAP & 3 or 5% MWSS (54% “New Oil”)
- Prompted a Spec. Change => Min. 70% New Oil
- RAS: 5% Max ~ Mixture (5% RAS & 10% RAP)
Current RAS Use

- MWSS: Very little enters landfill (Verify)
- TOSS: ~10,000 tons/year (Add DemCon Info)
- Still Landfilling TOSS - Contractors have RAP “Mountains”, due to economy

  - <Insert RAP Mountain Picture>
Base Stabilization

4" RAP, 1.5" RAS (10% MWSS + 90% TOSS) Pulverized with 1" of existing gravel plus 2% new emulsion
RAS for Dust Control

4" RAP, 1.5" RAS (10% MWSS + 90% TOSS) Pulverized with 1" of existing gravel plus 2% new emulsion

>Insert Picture from Study<
Thank You!

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