CDOT’s Performance and Life Cycle Cost of Recycling

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- Projects
- Performance
- Life Cycle Cost
Projects

Since January 1, 2000 to the beginning of July 2014, CDOT has constructed projects which recycled almost 27 million square yards (3,819 lane-miles).

- 20 Heater scarifying projects recycling 3,890,412 sq. yds.
- 49 Heater remixing projects recycling 10,448,936 sq. yds.
- 3 Heater repaving projects recycling 570,156 sq. yds.
- 31 Cold in-place recycling projects 6,342,534 sq. yds.
- 54 Full depth recycling projects 5,620,699 sq. yds.
Projects

Performance

Life Cycle Cost
Smoothness Performance

- Cold In-Place Recycling
- Full Depth Recycling
- Heater Remixing
- Heater Repaving
- Heater Scarifying

Threshold Value

Inches per Mile vs. Years After Construction
Permanent Deformation (Rut) Performance

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<thead>
<tr>
<th>Years After Construction</th>
<th>Threshold Value = 0.55 Inches</th>
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- Cold In-Place Recycling
- Full Depth Recycling
- Heater Remixing
- Heater Repaving
- Heater Scarifying

Inches

0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Fatigue Cracking Performance

The graph illustrates the performance of different methods over time in terms of square yards per tenth mile. The methods compared include Cold In-Place Recycling, Full Depth Recycling, Heater Remixing, Heater Scarifying, and Heater Repaving. The threshold value is indicated by a horizontal line at the top of the graph. The x-axis represents years after construction, ranging from 0 to 10.
Transverse Cracking Performance

The graph illustrates the number of cracks per tenth mile over the years after construction for different recycling techniques:

- **Cold In-Place Recycling**
- **Full Depth Recycling**
- **Heater Remixing**
- **Heater Scarifying**

The threshold value for transverse cracking is set at 52 cracks per tenth mile. The data shows trends over time for each technique, with Cold In-Place Recycling generally maintaining a lower number of cracks compared to the others.
Longitudinal Cracking Performance

- Cold In-Place Recycling
- Full Depth Recycling
- Heater Remixing
- Heater Repaving
- Heater Scarifying

Threshold Value

Linear Feet/Tenth Mile

Years After Construction

0 1 2 3 4 5 6 7 8 9 10
# Performance Life

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<thead>
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<th>Method</th>
<th>IRI</th>
<th>Permanent Deformation (Rutting)</th>
<th>Fatigue Cracking</th>
<th>Average Years</th>
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<td>Fatigue Cracking</td>
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Projects
Performance
Life Cycle Cost
Full Depth Reclamation

Weighted Average = $1.99/Square Yard

Does Not Include 4.0" HMA Overlay
Bid Prices

Cold In-Place Recycling

Weighted Average = $1.90/Sq. Yd.

Cold In-Place Recycling (Hydrated Lime)

Weighted Average = $130.62 / Ton

Cold In-Place Recycling (Rejuvenating Agent)

Weighted Average = $1.95 / Gallon

Does Not Include 3.0” HMA Overlay
Bid Prices

**Heater Remixing (Process Mat)**

- Weighted Average = $4.28/Square Yard

**Heater Remixing (Rejuvenating Agent)**

- Weighted Average = $2.22/Gallon

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Does Not Include

- 10 pounds of HMA/Square Yard

- 2.0” HMA Overlay
Bid Prices

**Heater Scarifying (Process Mat)**

- Weighted Average = $1.57/Square Yard

Does Not Include 2.0” HMA Overlay

**Heater Scarifying (Rejuvenating Agent)**

- Weighted Average = $1.98/Gallon
Bid Prices

Heater Repaving

Does Not Include 1.25” HMA/Square Yard

Heater Repaving (Rejuvenating Agent)

Weighted Average = $2.09 / Gallon
Annual Maintenance Cost

- Cold In-Place Recycling
- Full Depth Recycling
- Heater Remixing
- Heater Repaving
- Heater Scarifying

Dollars per Lane-Mile

Years After Construction
Equivalent Uniform Annual Cost

- 10 Lane-mile project (70,400 Square Yards) and $75/ton for HMA
- Full Depth Reclamation (15) - $90,100/year
- Heater Scarifying (9) - $91,800/year
- Cold In-Place Recycling (12) - $100,900/year
- Heater Remixing (9) - $117,200/year
- Heater Repaving (5) - $123,400/year
Questions?