WisDOT Cold In-Place Recycling Pavement Rehabilitation

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Presentation Outline

- Introduction to Cold In-Place Recycling (CIR)
- Types of CIR Equipment
- Benefit of CIR
- Pavement distresses addressed by CIR
- Overview of WisDOT CIR Projects
- CIR Projects Short Term Performance Data
- Public Relations

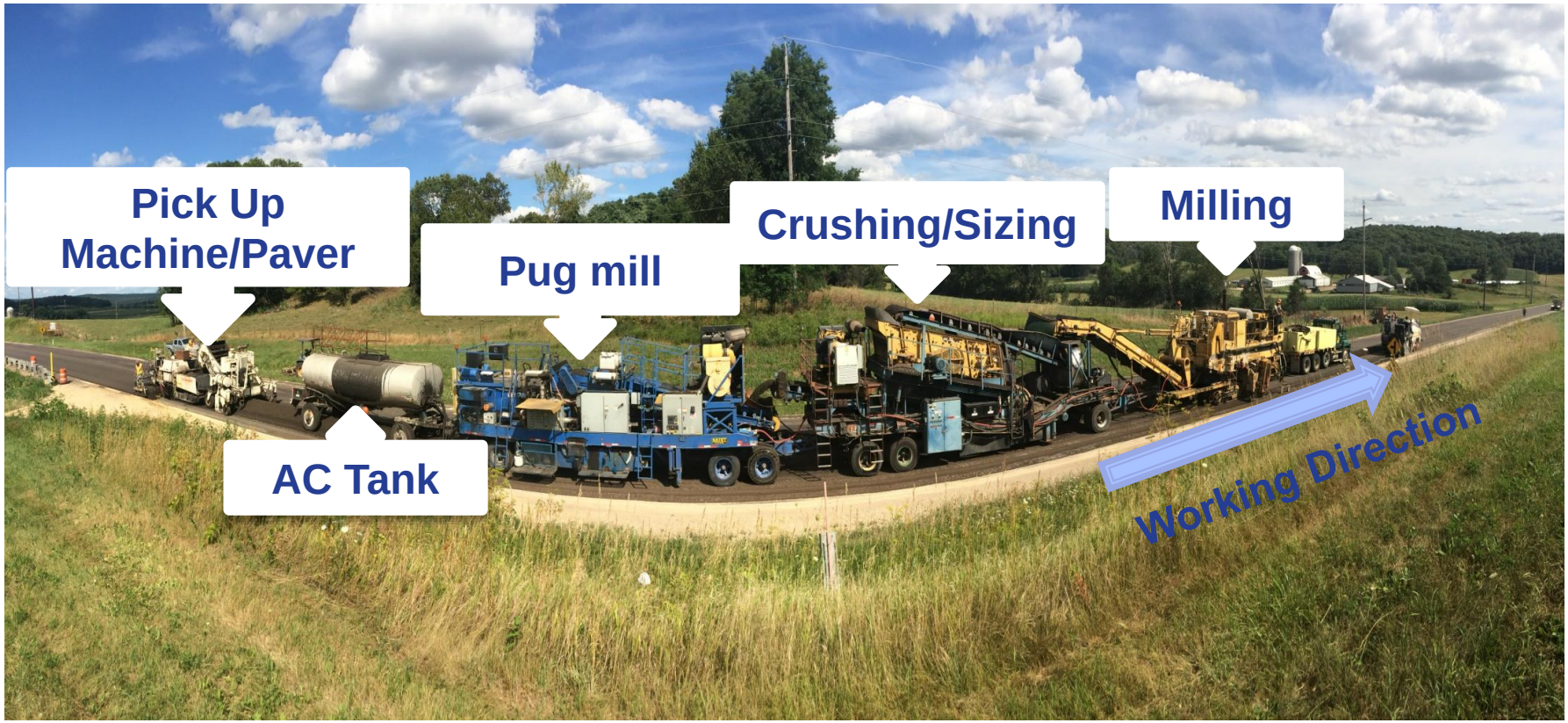
Cold In-Place Recycling (CIR)

- CIR uses mechanical process to produce RAP from the existing pavement, add a stabilizing agent, relay & compact into a stabilized base.

- Typical CIR process treatment depth - 3 to 4”

Types of CIR Equipment

Multi – Unit CIR Train



Types of CIR Equipment

Single-Unit CIR Train

Benefit of CIR

- Cost Savings
  - ✓ Potential cost savings compared to equivalent mill/overlay rehabilitation methods.
- Engineering
  - ✓ Addresses actual distress rather than symptoms.
  - ✓ Cracks eliminated/reduced – CIR act as crack relief layer.

Benefit of CIR

- Construction Time
  - ✓ CIR layer can be opened to traffic within a couple of hours.
  - ✓ Minimal Traffic disruption and user delay.
- Environmental Benefit
  - ✓ Using in-place materials minimizes hauling cost & use of virgin material.

Pavement Distresses addressed by CIR

Distresses addressed by CIR

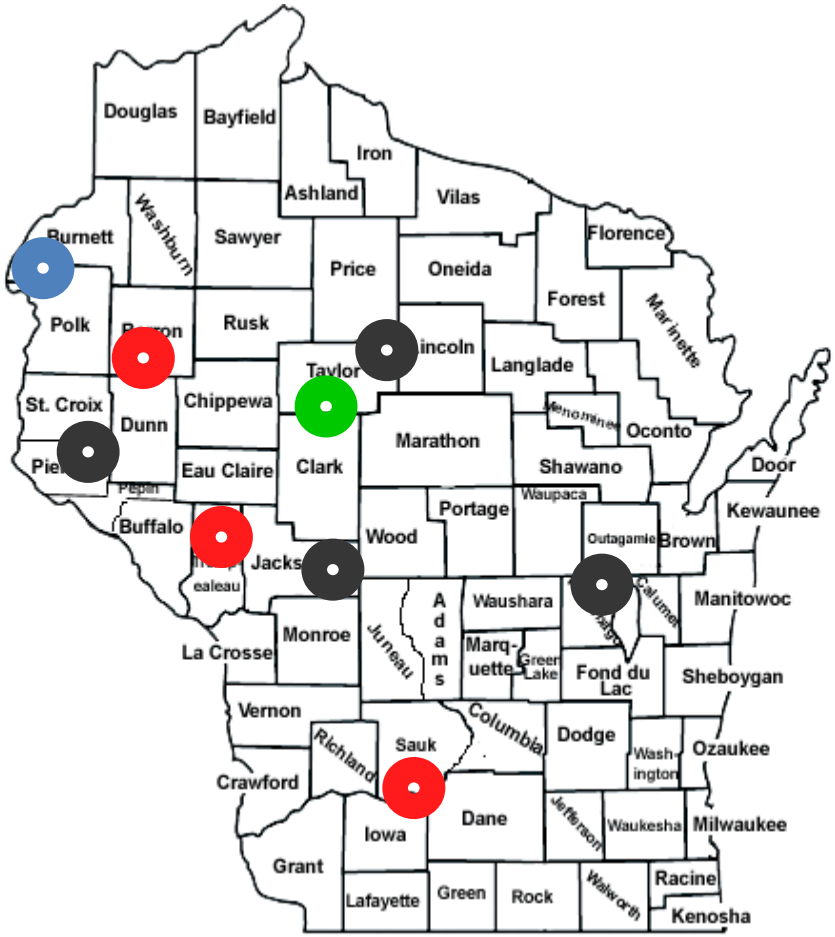
Ruts	< ½ in	√
	> ½ in	?[1]
Crack	Fatigue	?[1]
	Longitudinal	√
	Transverse	√
	Reflective	√
	Block	√
Potholes (surface only)		√

Poor Ride	√
Poor Drainage	no
Structural Deficiency	?[2]
Base/subgrade Failure	no

Questions?

1. Provided not base, subbase or subgrade related.
2. In conjunction with Overlay to increase structural capacity

CIR Projects Map (Since 2012)



Construction Year	Project Length (Lane-Mile)
2012	26
2014	24
2015	50
2016	58
Total	**158**

STH 27(Sparta – Black River Falls)

CIR Construction – 2016

- ✓ Design AADT 11,000, 15.2% Truck
- ✓ ESALs 20 years – 1,598,700
- ✓ 4” CIR Layer + 2.5” HMA Overlay
- ✓ Project Length = 8.402 miles



STH 27 - Placing/Compaction

STH 48 (Grantsburg – Frederic)

Pavement History – Before CIR

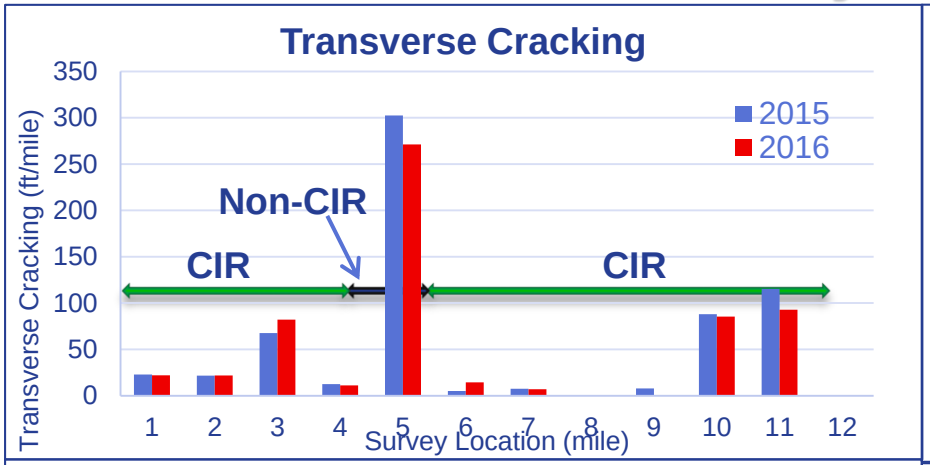
- ✓ Last Resurfaced 3”- 4” inch 1994
- ✓ Various Maintenance activities

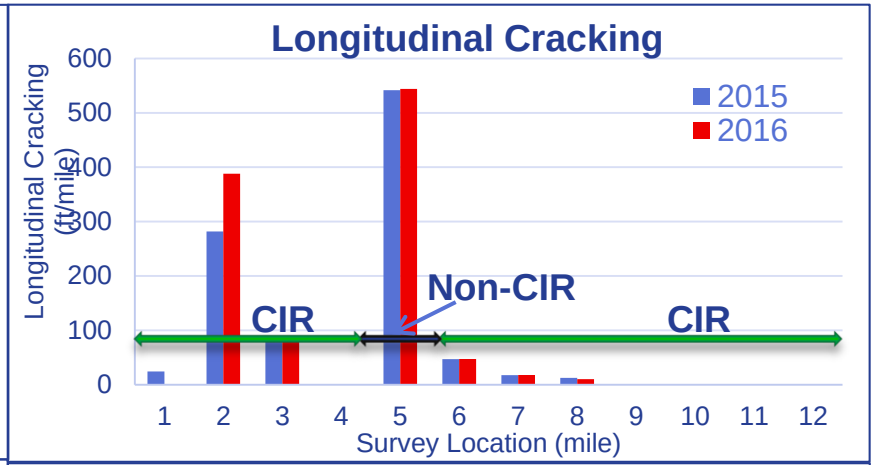
CIR Construction – 2012

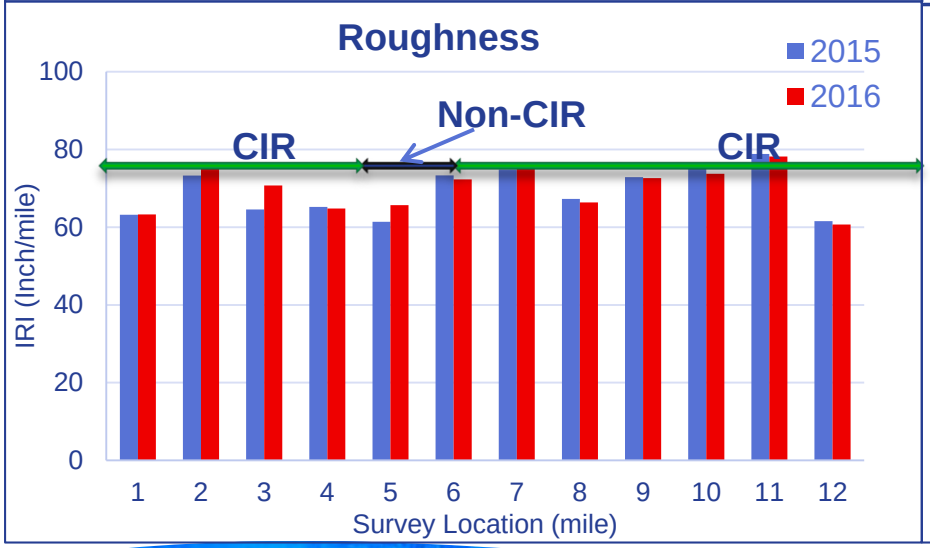
- ✓ Design AADT 1,100, 5.2% Truck
- ✓ ESALs-20 years – 131,400
- ✓ 4” CIR + 2” HMA Overlay
- ✓ Project Length = 12.56 Miles

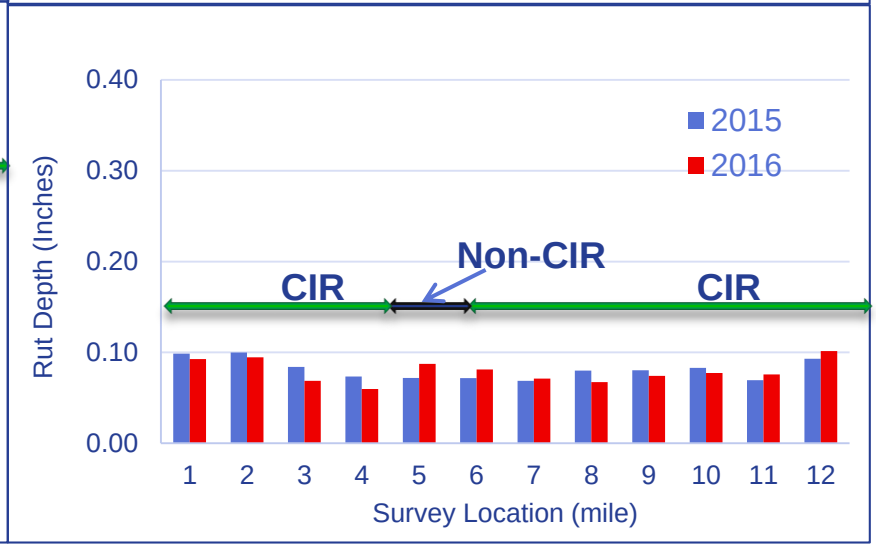
STH 48 (Grantsburg – Frederic)

STH 48 (Grantsburg – Frederic) Performance Data
Four years in service







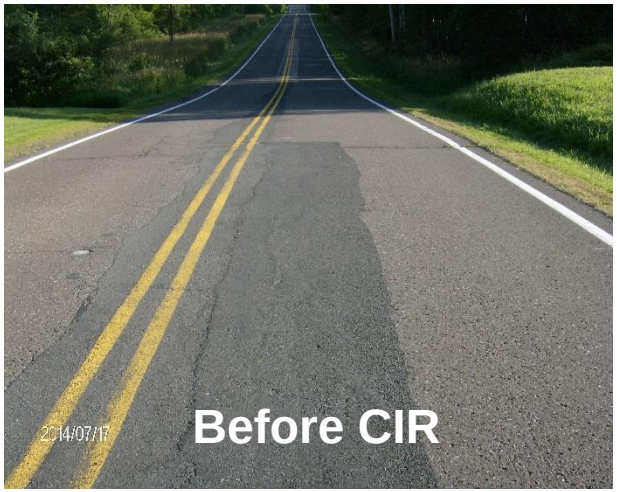


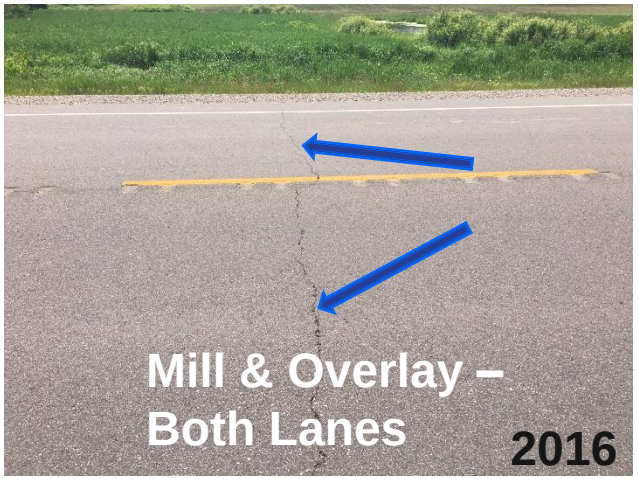
STH 64 (Gilman-Medford)

CIR Construction – 2014

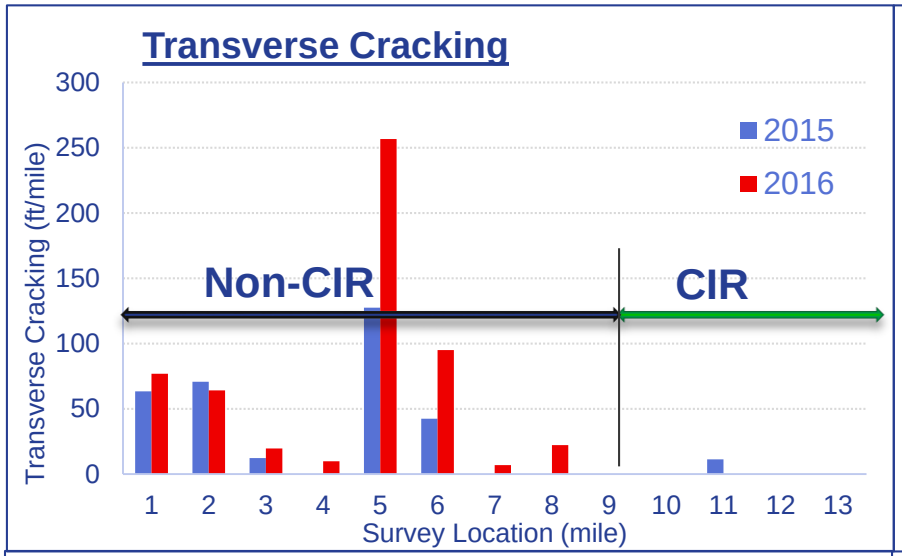
- ✓ Design AADT 10,800, 17.5% Truck
- ✓ ESALs = 1,708,200
- ✓ 4” CIR + 2” HMA Overlay
- ✓ Initial Project Plan 13.3 miles (appr. 30% CIR completed)

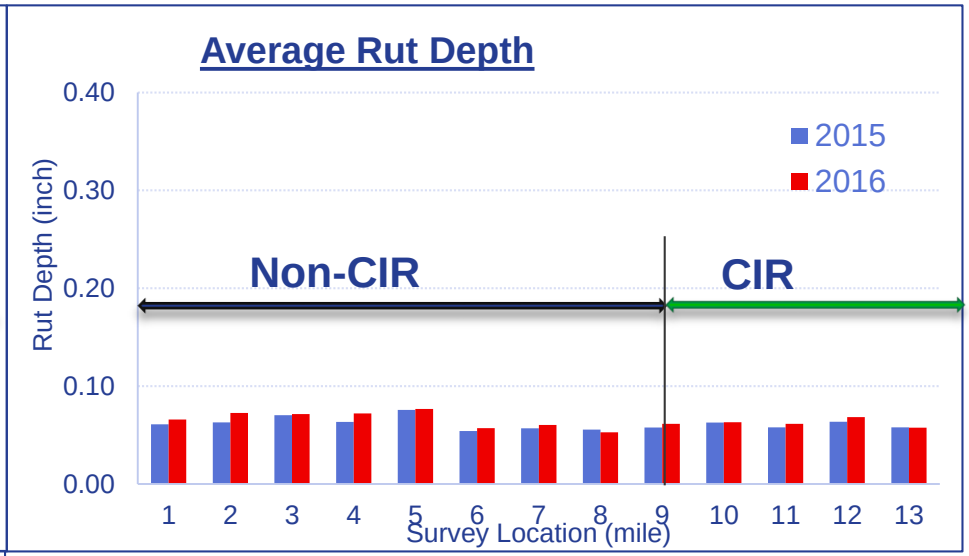
STH 64 (Gilman - Medford)

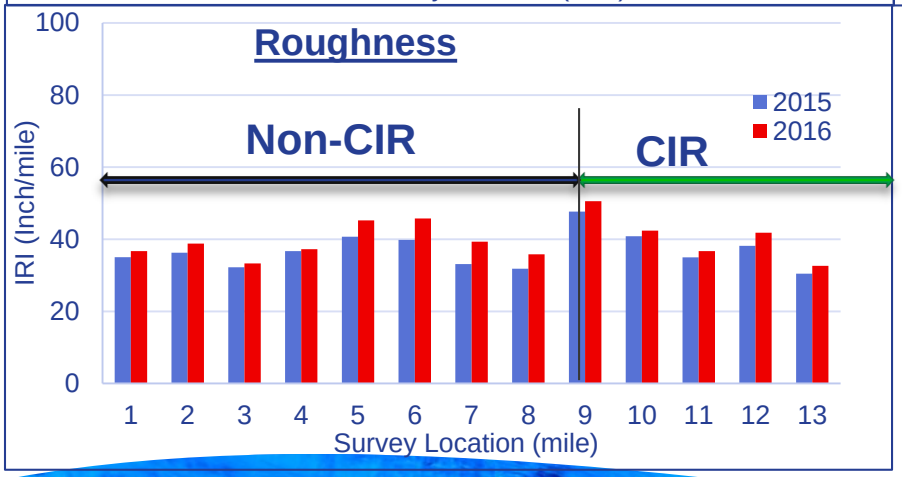




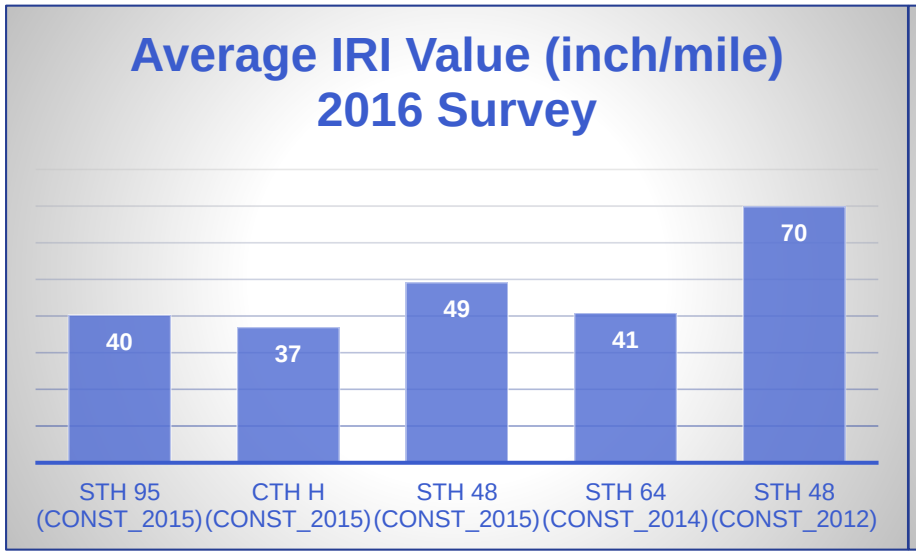
STH 64 (Gilman – Medford) Performance Data two year in service

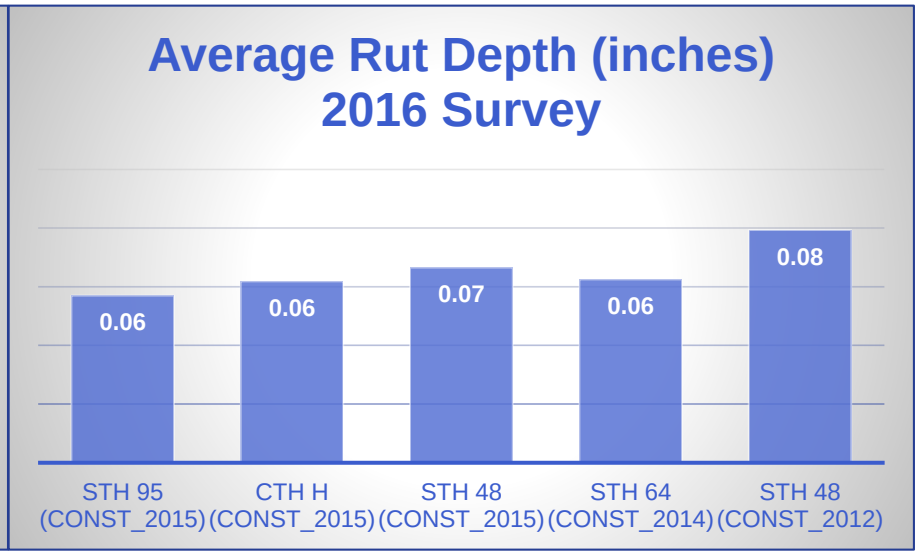






Summary of CIR Projects IRI and Rut Depth Values





Design Criteria & Considerations

- Distressed Layer & Distress Types
- Traffic Volume
- Historical Information
- Geometric Considerations
- Roadway, Subgrade & Drainage
- Layer Coefficient - 0.30-0.35
- Mix Design Considerations
- Curing Time

WisDOT Experience

- 17% Let savings vs 4” mill & overlay
- 10x reduction in cracking compared to mill & overlay
- Minimal disturbance to traveling public

Public Benefits

Public Benefits

93,450 tons of road surface recycled in 2016.
Enough to fill 4,600 quad-axle dump trucks.

Public Benefits

Wisconsin Department of Transportation

MAPSS Performance Improvement

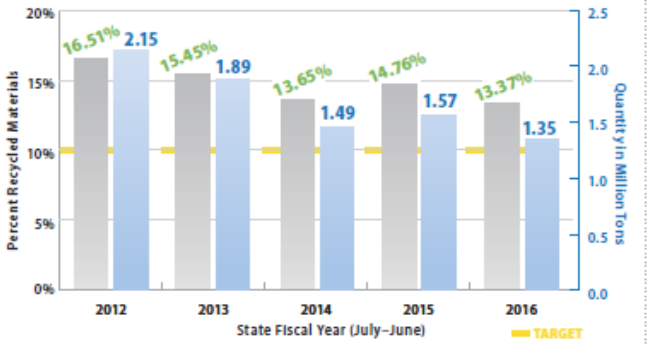
Preservation: Material recycling

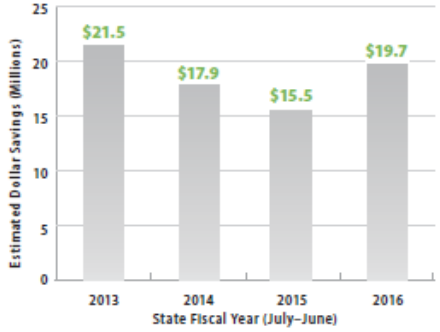
Report Date: January 2017 | **Data Frequency:** Annual (State Fiscal Year) | **Division:** Transportation System Development

Why is it important? The department strives to incorporate environmental sustainability or green initiatives in its vision for providing a safe and efficient transportation system. This includes incorporating the use of recycled materials in improvement projects to lessen the impact on Wisconsin's environment and to preserve resources for future generations.

Performance measure target: The department's goal is to make sure recycled materials are incorporated into projects. The goal based on the new measuring methodology is to have 10 percent of virgin materials replaced with recycled materials in construction projects.

Figures: Recycled materials used in pavement and bridge construction





How do we measure it? Recycled material quantities are calculated based on total tonnage of construction bid items for the fiscal year where recycled material are commonly used. Steel that is extracted and recycled by the construction contractor is also included in the total tonnage. The use of recycled materials is measured by the percentage of virgin material replacement in some key construction materials. By reporting the use of recycled materials by percentage of the product being placed, we will be able to better track usage based on design and material policies.

Questions/Contact

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