

# SR-426, Lewistown Mt. & Tower Jct. Road Yellowstone Cold In Place Recycling - Engineered Emulsion CIR – EE



July 2007



August 2007

# Project Background

- ◆ SR-426, Lewistown Montana
- ◆ Project length: 7.7 mi, MP 19.0 to MP 26.7
- ◆ Roadway width is 26 feet
- ◆ Recycling depth is 2.5"
- ◆ Tower Road Yellowstone
- ◆ Project Length: 5 mi, Tower Jct. west
- ◆ Roadway width: 22 feet
- ◆ Recycling depth is 3"
- ◆ Lay down: Century Companies
- ◆ Recycling: Valentine Surfacing

# Traffic Volumes

- ◆ SR-426: 750 vehicles per day w/30% Trucks +/-
- ◆ Tower Road: Heavy – Mostly cars



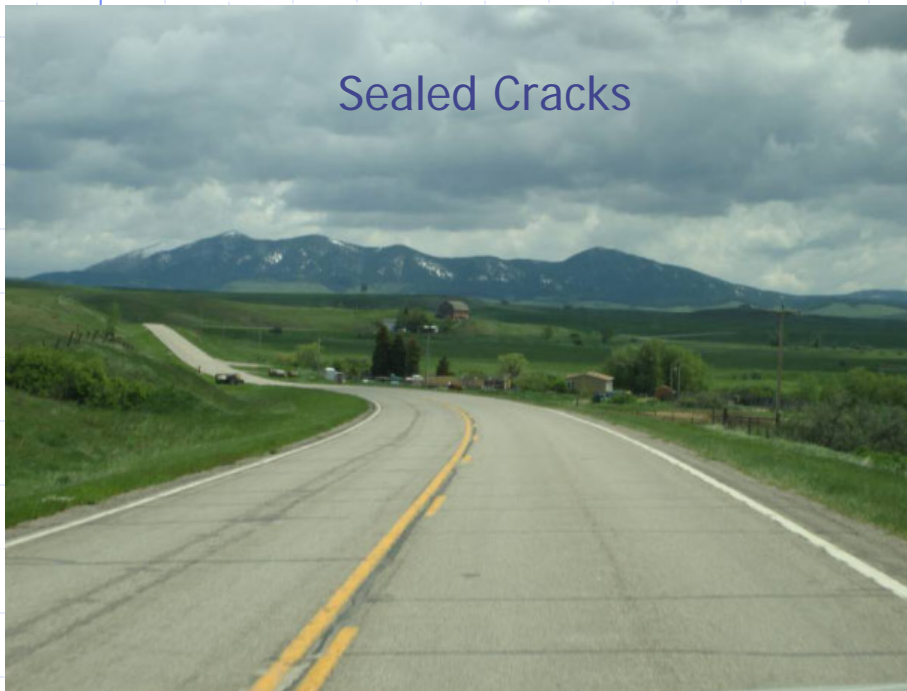


# Existing Pavement Condition

◆ Main distress is cracking

High Extent: 1 crack/15ft

High Severity: width > 3/4"



Sealed Cracks

SR-426

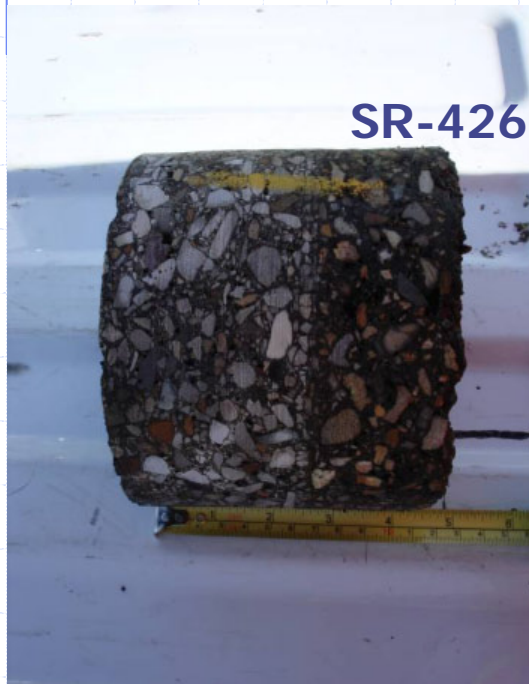


Potholes

Yellowstone

# Mix Design Information

- ◆ 40 + cores were taken from each road
  - Cores were taken at 3 – 6" depth
  - Existing HMA depth of about 4-7"



# Mix Design Information cont...

## ◆ CIR Job Mix Formula:

- 1.4% lime solids (both locations)
- SR-426: 2.0 - 3.0% CIR Engineered Emulsion for coarse to medium RAP gradation; Emulsion rate remained constant within these percentages.
- Yellowstone: 2.25 – 2.75% CIR Engineered Emulsion for coarse to medium RAP gradation; Emulsion rate remained constant within these percentages. (Emulsion was included as lump sum S.Y. price)

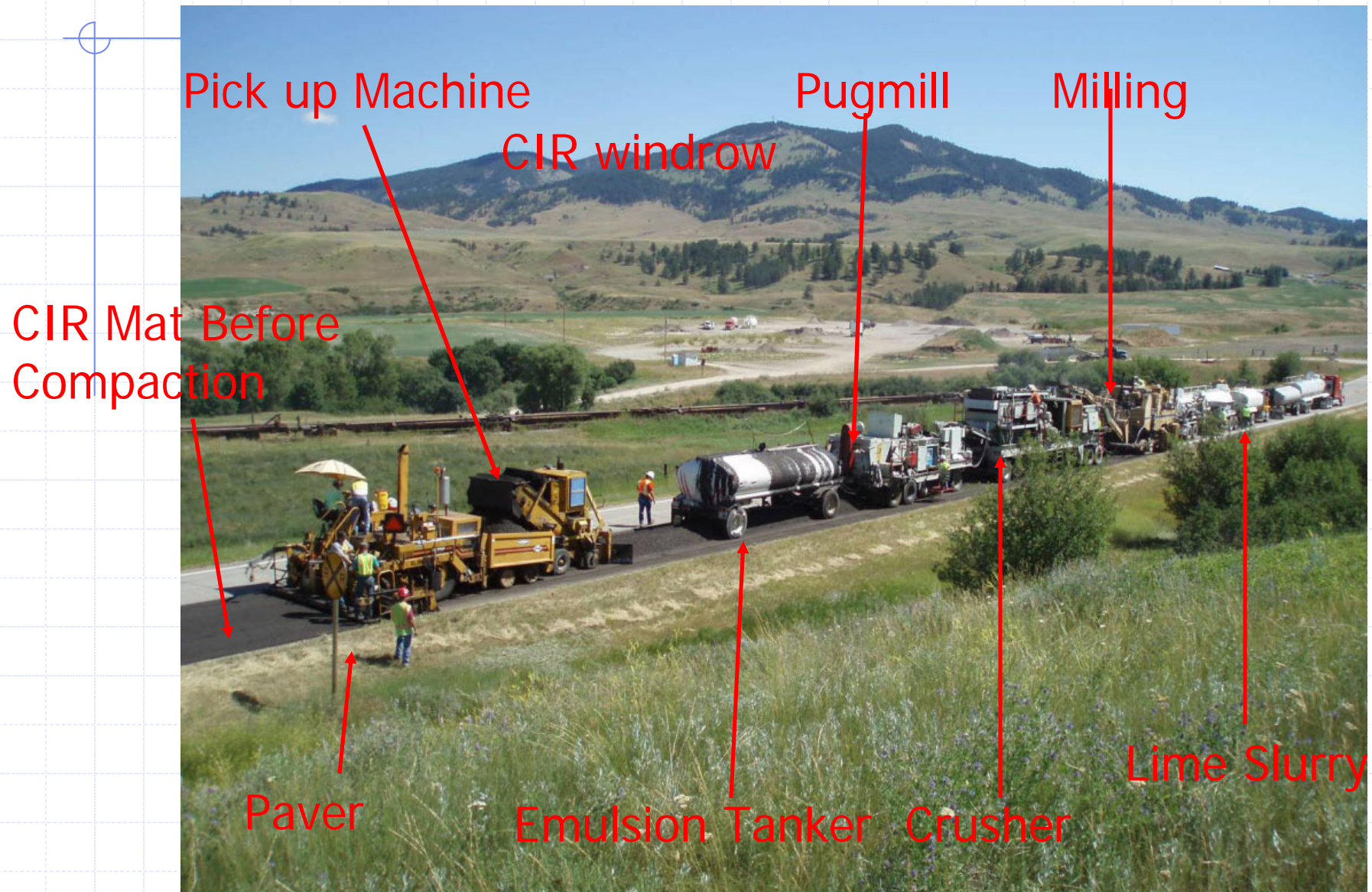


# Mix Design Information cont...

- Field produced gradation was determined to be coarse at both locations



# Typical Construction Process





# Construction process (Cont.)

- ◆ Rolling pattern, 3 rollers
  - Steel: 1 pass vibratory and 1 pass static
  - Pneumatic: 3 to 5 passes
- ◆ Was adjusted to maximize compaction



# Construction process (Cont.)

- ◆ Fog seal: about 0.08 gal/yd<sup>2</sup> CSS1 50/50 dilute
- ◆ Sand blotter: 5 to 8lb/yd<sup>2</sup> is sufficient
- ◆ Fog and blotter typically not required with CIR EE but is extra insurance against raveling
- ◆ Same day release to traffic





# Crack Sealant

- ◆ Crack sealant was present in the existing pavement of SR-426 only. Extra work by the contractor and equipment modification helped to keep part of it from getting back into the road.





# Crack Sealant (Cont.)

- ◆ Efforts taken by the contractor to prevent crack sealant from getting into the mat:
  - Extra labor to pull sealant chunks from the screen deck
  - Reverse belt system to occasionally discharge excess



# CIR vs HMA

STRUCTURAL COEFFICIENT (SC) 0.3 VS. 0.4 per inch

## ◆ 2.5" CIR = SN 0.75

CIR: 129,354 S.Y. @  
\$2.75 = \$355,723.50

QUICKLIME: 223.2 Ton @  
\$185.00 = \$41,292.00

Emulsified Asphalt: 479.4 Tons  
@ \$430.00 = \$206,142.00

Fog & blotter = \$22,000.000

**TOTAL: \$625,157.50**

## ◆ 1-7/8" HMA = 0.75

HMA: 13,642.80 Tons @ \$28.00  
= \$381,998.40

Hydrated Lime 1.4%: 199 Tons  
@ \$150 = \$29,850.00

PG 64-28 5.4% = 736.71 Tons  
@ \$500.00 = \$368,355.00

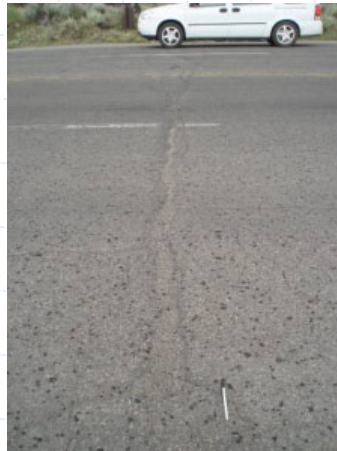
**TOTAL: \$780,203.40**

**SR-426: Savings of \$155,045.90**

\*Savings were minimized because of onsite hot plant.

\*Costs are based on unit bid prices from actual Tabulation of Bids for this contract

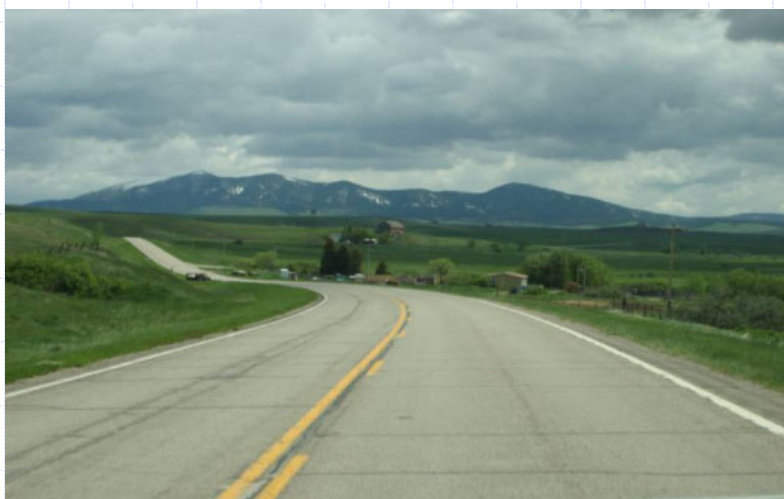
# BEFORE AND AFTER CIR



Yellowstone



# SR-426 Before & After CIR



Before



After

# Montana DOT & National Parks Service Cost Effective Way of Rehabilitating Pavement

- ◆ Cold In Place Recycling
- ◆ To be followed by a seal (chip seal)

Thank you

