

Montana Department of Transportation  
Research Program  
June 2002

**ANNUAL EVALUATION REPORT**

**Cold In-Place Recycle (CIR) Koch™ Process CIR-EE**

Location: Red Lodge, Montana – Carbon County, Highway 212 (P-28) Milepost 91-101.6

Project No.: Red Lodge North STPP 28-2(22)70

Description: Experimental rehabilitation project consisting of cold milling approximately 75mm of asphalt cement, replace with cold in-place recycled using Koch's CIR-EE (Cold in-place Engineered Emulsion), plant mix surfacing and seal & cover

Evaluation Date: June 5, 2002

Participants: Craig Abernathy  
Research Specialist

Highway 212, (P-28) suffered from rutting, plastic deformation and transverse cracking with the current AC pavement. The Montana Department of Transportation decided to conduct an experimental cold in-place recycle project using Koch Pavement Solutions™ CIR-EE process.

Research will perform and publish annual evaluations until the year 2006. A final report will be issued at that time. Research may elect to continue the evaluations informally for the life of the project. The experimental documentation will encompass taking wheel rut measurements and crack mapping with 300 ft. intervals at every milepost of the project. Note that at the time of this report no chip seal had been added to the project. The breakouts of sections within this project are as follows (locations are approximate):

- ▶ MP 89- MP 91, 90mm cold mill, 105mm PMS
- ▶ MP 91-MP 94.3, 75mm recycle with 45mm PMS overlay
- ▶ MP 94.3-MP 95.4, 75mm recycle with seal and cover
- ▶ MP 95.4-MP 96.3, 75mm mill and fill PMS
- ▶ MP 96.3-MP 98, 75mm recycle with seal and cover
- ▶ MP 98-MP 101.6, 75mm recycle with two lifts of PMS (90mm)

The following is the individual breakout on cracks-per-mile (CPM) in order as listed above.

<b><u>Treatment</u></b>	<b><u>CPM</u></b>
90mm cold mill, 105mm PMS	0
75mm recycle with 45mm PMS	0
75mm recycle	0
75mm mill and fill PMS	6.5
*75mm recycle	35.2
75mm recycle, 90mm PMS	0

\*This data site was located at milepost 97.5 in the 75mm recycle section. The extrapolation puts the CPM at 35.2. This report should note that there was an abnormally high transverse cracking within the 300' data site. Six, low severity across-lane cracks were documented. Of the other two data sites within this section exhibited

no cracking at all. This site will be considered an anomaly and will not be considered (at this time) an indication of performance.

The chart below is the averaged wheel-path rutting for all treatments. Rutting data was measured by the string-line method.

TREATMENTS	RUTTING DATA (IN MILLIMETERS)			
	NORTHBOUND		SOUTHBOUND	
	OWP	IWP	IWP	OWP
90mm cold mill, 105mm PMS	0.3	0.7	0	0.3
75mm recycle, 45mm PMS	0	0	0	0
75mm recycle	1.7	4	4.3	3
75mm mill and fill PMS	1.3	0.3	1	0.7
75mm recycle	1	1	2	2
75mm recycle, 90mm PMS	0	0	0	0

Visually all treatments except the 75mm recycles exhibited the same outward show, a good tight mat with uniform appearance. The straight 75mm recycle section did show flushing in the wheel paths. Material was tender enough to be picked out with a metal ruler and piled when rolled on the palm of the hand. The average air temperature that day was 80° F (27° C).

Based on this first evaluation Research has rated this project as performing well. The following are representative images of the individual treatments. All views are looking north.



75mm Recycle – 45mm PMS



75mm Recycle (MP 95.2)







75mm Recycle – 90mm PMS