

Performance of Recycled Test Sections after One Year

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Sixteen sections were constructed on Aug. 20–22, 2019 as part of a partnership between City of Otsego, Minn., City of Albertville, Minn., and MnROAD, as part of the MnROAD/NCAT pavement preservation performance study.

Additional details are available at www.dot.state.mn.us/mnroad/ncat-partnership/pavement-preservation/index.html.

Primary sources of local traffic are residential developments along the north project boundary, and commercial activity from the west edge project boundary with ready mix concrete hauling and semi-trailer supply.

Prior to construction the existing pavement was in poor condition and had approximately 4 in. of bituminous surface above granular base (see Table 1).

The research layout included 16 test sections, each 500-ft-long, separated by 50-ft transition zones. The sections can be grouped into four categories:

- Seven sections of 1-in. Thinlay above 4-in. existing pavement (control section).
- Two sections of 1-in. Thinlay above X-in. mill-overlay above existing

pavement (mill-overlay depths were 2-in. and 3 in.).

- Two sections of 1-in. Thinlay above 7-in. stabilized full depth recycled base (stabilization done with either foam or emulsion).
- Five sections of 1-in. Thinlay above 3-in. cold in-place recycle (CIR) or cold central plant recycle (CCPR) above 1-in. existing pavement. Two CIR sections used foam or emulsion, and of three CCPR sections, two used foam and one used emulsion.

OBSERVATIONS

These observations will defer to measurements conducted with Pathways survey equipment.

Current Condition and Ride Quality.

Ride quality will be monitored with high-speed laser profiling equipment and reported using the International Roughness Index (IRI). Installation of the sections resulted in much improved ride quality.

In October 2018 a profile measurement was collected on Section 7001 through 7005. Eastbound average IRI was 365.5 in./mi., and the westbound average IRI was 304.5 in./mi.

On Sept. 27, 2019, a post-construction measurement was collected on all sections (7001 through 7008). The IRIs of all the individual sections were below 90 in./mi. Eastbound average IRI was 78.0 in./mi., and westbound average IRI was 74.5 in./mi.

Cracking. On May 28, 2020, a crack mapping survey was conducted from the shoulder without benefit of traffic control. The observation conditions (partly cloudy sky and dry road) were adequate for viewing of cracks.

Crack position and longitudinal length was determined with a measuring wheel, and transverse length was estimated. A map was developed for each cell.

On May 28, 2020, five sections remained free of cracks: Thinlay over CCPR-emulsion, Thinlay over 3-in. overlay, Thinlay over 2-in. overlay, and two cases using Thinlay over CCPR-foam.

Data in Table 1 show an increase in longitudinal and transverse cracking occurred during the first five months of 2020. Severity level remained LOW except for a single MED 12-ft. transverse crack.

On Jan. 3, 2020, no cracking was observed in sections built using CIR, CCPR, and mill-overlay techniques. Transverse cracking was observed in the SFDR sections. Transverse and longitudinal cracking was observed in the Thinlay control sections.

MnDOT and NCAT will continue to monitor the performance of these northern recycle sections constructed in 2019. Please continue to follow the performance updates of all the pavement treatments completed through the NCAT-MnROAD partnership.

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TABLE 1: CRACKING HISTORY BY SECTION

Section	Treatment	Total Longitudinal				Total Transverse				Remarks
		1/3/2020		5/28/2020		1/3/2020		5/28/2020		
		Count	Length, Ft	Count	Length, Ft	Count	Length, Ft	Count	Length, Ft	
7001E	SFOR-Emulsion	0	0	1	68	9	86	34	211	
7002E	SFOR-foam	0	0	0	0	16	110	29	220	
7003E	CIR-foam	0	0	0	0	0	0	4	9	
7004E	CIR-Emulsion	0	0	0	0	0	0	3	9	Rutting outside of fog line. 70%
7005E	CCPR-Emulsion	0	0	0	0	0	0	0	0	Rutting outside of fog line. 100%
7006E	M/E Overlay	0	0	0	0	0	0	0	0	
7007E	CCPR-foam	0	0	0	0	0	0	0	0	Rutting outside of fog line. 5%
7008E	Control	3	17	3	11	34	95	54	192	
7001W	Control	6	98	17	270	30	156	70	403	
7002W	Control	9	42	12	109	17	100	48	269	Look for future block crack
7003W	Control	5	21	11	57	30	146	50	280	
7004W	Control	13	165	23	188	54	276	94	454	
7005W	Control	0	0	2	4	28	110	66	259	
7006W	M/E Overlay	0	0	0	0	0	0	0	0	
7007W	CCPR-foam	0	0	0	0	0	0	0	0	
7008W	Control	3	8	4	17	6	25	29	111	