Reviewed by: - *NobuA* Cauley Robert F. Cauley, P.E. Materials and Research Engineer



Prepared by: Milma

Theresa C. Gilman December 20, 2000

RESEARCH UPDATE

U 2000-7

PAVEPREP CRACK REDUCTION INTERLAYER

REFERENCES:

Report WP 94-R-19, U94-11, U95-7, U96-14, U97-15, U1999-5

INTRODUCTION:

In 1994, Paveprep SA Crack Reduction Interlayer was applied on three separate projects, Lowell-Westfield F029-2(11), Highgate STP 9214 and on US Route 5 in Hartford. The Lowell-Westfield (VT Route 100) site consisted of a 38 mm asphalt rubber hot mix (ARHM) overlay. The Highgate (US Route 7) site consisted of a 38 mm bituminous pavement overlay over a portland cement concrete base. The US Route 5 site in Hartford was placed on a milled surface with a bituminous concrete overlay.

PROJECT HISTORY:

Installation on the Lowell-Westfield and Highgate projects posed little or no problems during the application. The interlayer on both projects was exposed to traffic prior to the placement of the asphalt overlay. No problems were experienced during the placement of the pavement.

On the Hartford project, the interlayer detached itself from the road surface the day following its placement. The loss of bond was thought to be attributed to the rough textured pavement surface and the condition was further aggravated by rain showers that followed the installation. The following week a new 7.3 m strip was placed near the previous strip location. Emulsified asphalt was applied on the milled surface just before the PavePrep installation. One lane was paved within five to ten minutes of application. The fabric was picked up by the shoes on the paver's automatic grading and slope equipment. This problem was corrected by lifting up each pad as it passed over the PavePrep.

PRODUCT DESCRIPTION / COST:

PavePrep SA (self adhesive) is a high density asphaltic membrane laminated between a nonwoven polyester geotextile and a woven polyester geotextile. At the time of these projects the unit cost of one meter of 50 cm wide PavePrep SA was \$3.28 to \$3.94.

PERFORMANCE:

The product was applied over shoulder to shoulder transverse cracks at all four sites and over a longitudinal crack along the centerline in Highgate. The width of the material installed was 50 cm.

PAVEPREP SA FIELD PERFORMANCE						
PROJECT .	SITE LOCATION (Mile Marker)	TRAFFIC VOLUME (AADT)		WIDTH OF CRACK (mm)		CURRENT LENGTH OF
		1994	1998	1994	2000	(% of failure)
Lowell-Westfield VT Route 100	3.26	1810	1900	13	8	2.8 (32%)
Lowell-Westfield VT Route 100	6.13	1400	1600	13	0	0
Highgate US Route 7	3.60	590	630	32	0	0
Highgate US Route 7	3.60 (@ CL)	590	630	32	0	0
Hartford US Route 5	3.13	13,085	10,100	19	N/A (Crack Filled)	7.9 (100%)

In Lowell-Westfield, the test site at MM 3.26 has developed a crack 2.8 meters in length beginning at the eastbound shoulder going toward the centerline. The crack continues but diverges toward the south, away from the interlayer. Several other cracks have developed on both sides of the test site. No cracking was evident at the MM 6.13 test site in Lowell, but evidence of reflective cracking exists north and south of the test site.

In Hartford, two independent transverse cracks have developed along the alignment in which the PavePrep was installed. One crack measuring 2.8 meters in length, begins at the shoulder edge and goes toward centerline, while the other measuring 7 meters in length, begins at the median and goes toward the centerline. The crack is across the entire lane with the two cracks overlapping slightly at the center. The placement of crack sealant at this test site has continued to arrest the further crack development. Since the cracks were routed prior to sealing, the developed crack width prior to routing is unknown.

In Highgate, reflective cracking has developed both north and south of the test area, but the test site shows no signs of reflective cracking where the previous, transverse shoulder-to-shoulder crack existed, or along the centerline.



Highgate US Route 7 @MM 3.60



Lowell-Westfield VT Route 100 @MM6.13



Lowell-Westfield VT Route 100 @ MM 3.26



Hartford US Route 5 @ MM 3.13

SUMMARY:

Reflective cracks are representative of vertical and horizontal movements of the pavements beneath the overlay. These movements can be affected by factors such as traffic loads, temperatures, environmental factors and the earth's movement. Additionally, performance may be affected by the subbase.

After six years of service, two of the five applications developed reflective cracks, and in one of these applications, failure occurred along the entire length of the test site. Although the results are inconclusive at this time, the Hartford failure may be attributed to a high traffic volume and the milled surface on which the material was placed. Although not required, the manufacturer recommends the material be exposed to traffic prior to paving. The Hartford site was paved shortly after installation, possibly contributing to its failure.

In Lowell, one site continues to perform as intended, while the other is beginning to show signs of failure. Although both these sites were part of the same resurfacing project, the site at MM 6.13 has a lower traffic volume than MM 3.26, possibly contributing to the performance difference. The Highgate site has a concrete road base and low traffic volume, factors that may be associated with its good performance.

FOLLOW-UP:

Performance monitoring will continue for the life of these projects, with emphasis on reflective cracking quantification. An attempt will be made to saw cut a portion of the Hartford test site to identify the probable cause of failure.