RESEARCH
Oregon Department of Transportation

Research Notes

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REFLECTIVE CRACKING: Year 3 Report

HISTORY

Transverse cracking is a major problem on US Highway 97. The design life of the pavement is shortened due to premature cracking, thus increasing maintenance costs.

In September 1998, a test section near Chemult was established to study the effectiveness of five different geosynthetics in reducing reflective cracking. The test section (Hwy 4, US97, MP 213.6-217.6) was inspected in May 1999, May 2000 and September 2001.

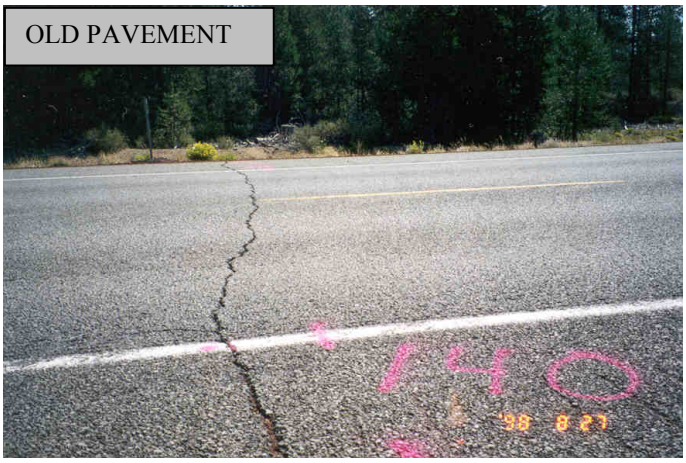
2001 INSPECTION RESULTS

Approximately 24% of the original transverse cracking returned for the control and crack-fill-only sections. About 9% of the original transverse cracking returned through the geosynthetic products. Only a few minor changes were observed in the 2001 inspection, as summarized in the table below. Crack 140 is shown below in pictures from 1998 (before the overlay) and 2001.

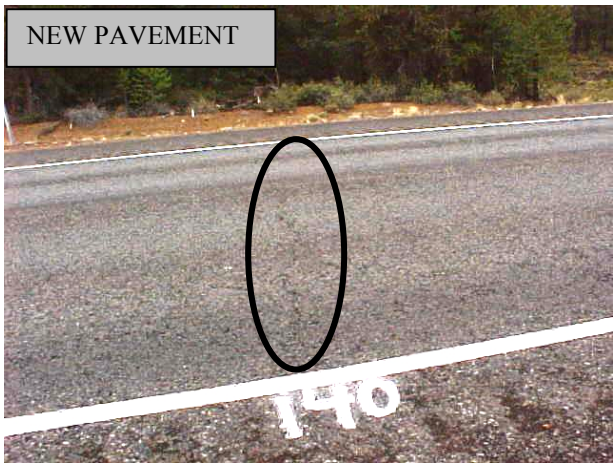
The early performance of these geosynthetics looks promising, but it is too early to draw conclusions.

Summary of Reflected Transverse Cracking by Treatment Type

Treatment Type	Existing Length (m)	1999		2000		2001	
		Reflected Crack (m)	% Reflective Cracking	Reflected Crack (m)	% Reflective Cracking	Reflected Crack (m)	% Reflective Cracking
CONTROL (NONE)	246	32.8	13	32.8	13	40.1	16
CRACK FILL ONLY	297.7	91.2	31	91.2	31	92.2	31
GLASGRID 8502®	218.9	0	0	0	0	0	0
GEOTAC®	221.4	7.3	3	7.3	3	7.3	3
PAVEPREP SA®	246	12.3	5	12.3	5	13.3	5
POLYGUARD COLD FLEX 2000 SA™	246	7.3	3	7.3	3	7.3	3
POLYGUARD 665™	246	58	24	66.2	27	78.3	32



Crack 140 (transverse) in September 1998 before overlay



Crack 140 (reflective) in September 2001

TEMPERATURE

The minimum temperatures recorded for each year by the Oregon Climate Service for a nearby site (Wickiup Dam) were:

- 1998: –12 ºF (12/98)
- 1999: 3 ºF (1/99)
- 2000: 5 ºF (1/00)

TREATMENT TYPES

The crack-fill-only and five geosynthetic treatments are listed in the table below.

FUTURE INSPECTIONS

The next inspection is planned for the fall of 2002. Research Group plans to monitor the project until the section is reconstructed or overlayed. Summary data will be provided at the end of the project.

Treatment Specifications

Material	Tensile Strength	Tensile Strength Test	Thickness (mm)	Width (m)
Glasgrid 8502®: Pavement reinforcing mesh consisting of fiberglass reinforcement coated with an elastomeric polymer and a pressure sensitive adhesive backing	200 x 100 kN/m	G.R.I. GG 1-87	1.73	1.52
GeoTac®: Peel-and-stick, thick waterproofing membrane manufactured from a rubberized asphalt, with a top layer of durable, tightly bonded polyester geotextile	8.9 kN/m	ASTM D882 (Modified)	2.03	0.61
PavePrep SA®: Heavy-duty crack reduction/stress relief interlayer consisting of a flexible high density asphaltic membrane laminated between a nonwoven and woven polyester geotextile, with an adhesive backing	167 kg/cm*cm	ASTM D412-87	3.43	0.61
Polyguard Cold Flex 2000 SA™: Peel-and-stick pavement repair membrane consisting of two layers of high strength polypropylene fabric with a layer of flexible mastic to provide stress relief	53 kN/m	ASTM D412	3.43	0.61
Polyguard 665™: Pavement waterproofing membrane consisting of a rubberized asphalt waterproofing adhesive, laminated to a strong woven polypropylene backing, with a silicone treated release sheet	16 kN/m	ASTM D882 (Method B)	1.65	0.61
Crack Fill Only: Crack segments less than 19 mm overall nominal width were filled with "sanding" material from previous winter ice control operations. This sanding material was left in the crack segments less than 19 mm wide. For crack segments 19 mm and greater, the sanding material was "blown-out" with compressed air to a depth of 50 mm and D-Mix (12.5 mm max aggregate) asphalt concrete was placed in the cleaned crack to achieve a "tightly" filled crack.				

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