



RESEARCH NOTES HIGHWAY DIVISION RESEARCH SECTION

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RSN 85-3

STRESS ABSORBING MEMBRANE INNERLAYER ADOPTED AS "PERMITTED ALTERNATIVE" FOR OREGON OVERLAYS

A Stress Absorbing Membrane Innerlayer (SAMI) is designed to prevent reflective cracking and extend the useful life of an overlay. When the westbound lanes of the South Baker - Encina Interchange Section of I-84 needed overlaying in 1977, a SAMI treatment was incorporated into the pavement design.

The design called for two different SAMI test sections -- a single SAMI layer on the inside lane and a double SAMI layer on the outside lane. The single SAMI layer was placed beneath the asphalt concrete leveling course. The second SAMI layer was placed between the leveling course and the wearing course.

Work began in September, 1977. Placement of the SAMI layers proceeded without difficulties, however, the placement of the leveling and wearing courses did not progress as well. The aggregate for the class "C" leveling course was substantially outside the specified gradation due to an excess of fine material. The aggregate in the class "E" wearing course was even more substandard, and resulted in the contractor only being paid for 30 percent of the class "E" pavement.

The performance of the stress absorbing membrane innerlayer was evaluated between 1977 and 1982. Benkelman Beam deflections were measured, cores taken at selected crack locations to determine their origin, and visual inspections were made to check for rutting, raveling, and cracking.

The evaluations noted the start of transverse cracking two years after construction and significant transverse cracking throughout the project after five years. Fine map cracking as small as two-inches square predominated in the outside lane. Some of the small cracked segments had been dislodged by traffic.

Although transverse cracking was significant, it was noted that cracks in the inside lane and the outside shoulder quite often did not extend across the outside lane, suggesting the double SAMI layer was more effective in controlling cracking than the single layer. Core samples revealed that only 20 percent of the cracks were reflective, with the remainder originating at the surface. It was also noted that the surface cracks were being halted at the SAMI, preventing the intrusion of water into the base material.

(over)

Although the evaluation of the stress absorbing membrane innerlayer was complicated by the non-specification aggregate in the leveling and wearing courses, the research resulted in the adoption of SAMI as a "Permitted Alternative" in Oregon construction. It was concluded that the SAMI was effective in sealing the old pavement and reducing reflective cracking.

For further information on SAMI, contact the Oregon State Highway Division Research Section and ask for:

"STRESS ABSORBING MEMBRANE INNERLAYER -- Experimental Feature Final Report" by Thomas Hardy, Leon Brock, and Gordon Beecroft, Oregon State Highway Division, Research Section, April 1985

Experimental Feature OR 77-03