

INVESTIGATION OF AN  
ASPHALT-RUBBER INTERLAYER FOR  
REDUCING OR PREVENTING REFLECTION  
CRACKING IN BITUMINOUS OVERLAYS

Research Laboratory Section  
Testing and Research Division  
Research Project 77 G-225  
Work Plan No. 70

Michigan Department of Transportation  
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## The Problem

Reflection cracking in bituminous overlays is becoming an increasingly important maintenance problem due to the many miles of roads and streets now in need of major repair or rehabilitation. Such cracking decreases riding quality of the affected road and allows foreign material to infiltrate the surface which will eventually cause further damage to the pavement. Sealing these cracks has proven costly and relatively ineffective.

## Scope

This project is being proposed to evaluate a recently introduced process for reducing or preventing reflection cracking in bituminous overlays. The process utilizes an asphalt-rubber stress absorbing membrane as an interlayer. The process was tried in Michigan last year over an existing concrete pavement and proved unsuccessful. It is now being proposed for an existing flexible pavement.

Detailed condition surveys and pavement profiles will be taken prior to construction and repeated annually to evaluate performance of the process.

The interlayer will be placed on a 6.2 mile length of a resurfacing project which extends for 8.7 miles on M 55 from M 115 west to 21 Mile Rd in Wexford County.

## Objectives

Reflection cracking is primarily the result of vertical and horizontal movement in the underlying pavement which is transmitted into the bituminous overlay. Such movement may be thermally or load induced. Any attempt to reduce reflection cracking must be directed toward reducing the movement or its transmission into the overlay.

This study is designed to evaluate the effectiveness of an asphalt-rubber stress absorbing membrane interlayer in preventing or reducing reflection cracking. It will be determined whether the elastic separation layer, provided by the membrane, will be sufficient to prevent movement in the underlying pavement from being transmitted into the overlay.

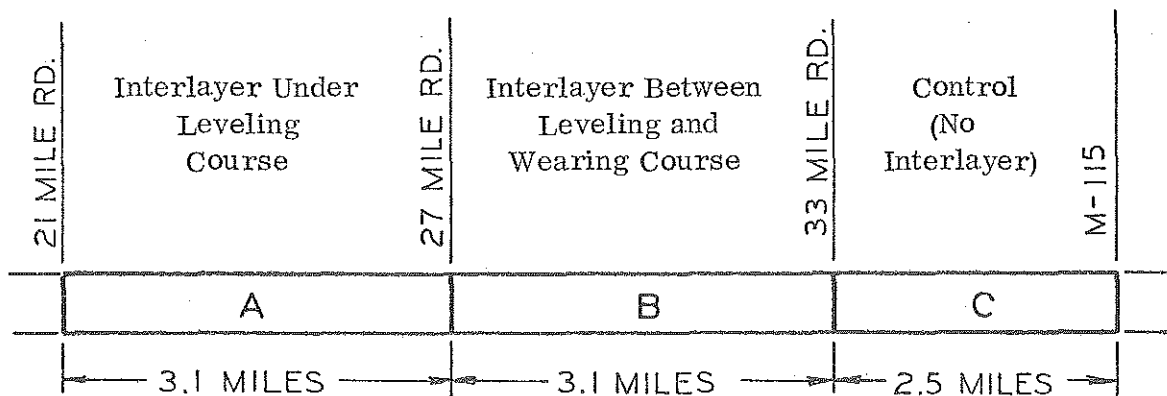
## Status of Known Research

The asphalt-rubber membranes have been used successfully in Arizona and several other western states since 1967. The material is comprised of 75 percent asphalt and 25 percent reclaimed rubber (ground passenger car tires) by weight. The material has been used in both warm southern climates and cold winter climates of the mountainous regions.

An experimental application of an asphalt-rubber membrane in Michigan was completed during August 1978. The membrane was placed over an existing concrete pavement in conjunction with a conventional asphalt overlay and has proved unsuccessful in preventing reflection cracking. This is attributable to the relatively large localized movements which occur at joints in concrete pavements. The proposed project is planned for a flexible pavement which characteristically has relatively small localized movements.

#### Research Procedure

A test site approximately 8.7 miles in length is proposed, constructed as follows:



- A) The asphalt-rubber membrane will be placed directly on the existing pavement. All existing cracks greater than 1/4 in. in width must be filled with asphalt-rubber material prior to placing the membrane. The membrane will be followed by leveling and wearing courses.
- B) The asphalt-rubber membrane will be placed between the leveling and wearing courses. Existing cracks will not need to be filled.
- C) This section will be used as a control section to evaluate performance of the membrane. It will be surfaced with standard leveling and wearing courses.

The asphalt-rubber membrane, where used, will be placed 30 ft in width. This corresponds to the proposed 24-ft pavement plus the 3-ft shoulder ribbons.

The bituminous concrete leveling and wearing courses on sections A, B, and C will each be placed at 165 lb/sq yd.

Project Supervision

Construction of the project will be supervised by the Construction Division. The experimental design, pavement condition surveys, compilation and analysis of research data, and performance evaluation will be supervised by the Research Laboratory. R. L. Felter will be project leader.

Research Cost Estimate

	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Salaries and Wages	\$2,500	\$300	\$300	\$300	\$1,000
Travel and Subsistence	300	200	200	200	200
Report	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>1,000</u>
	\$2,800	\$500	\$500	\$500	\$2,200
Total Research Cost	\$6,500				