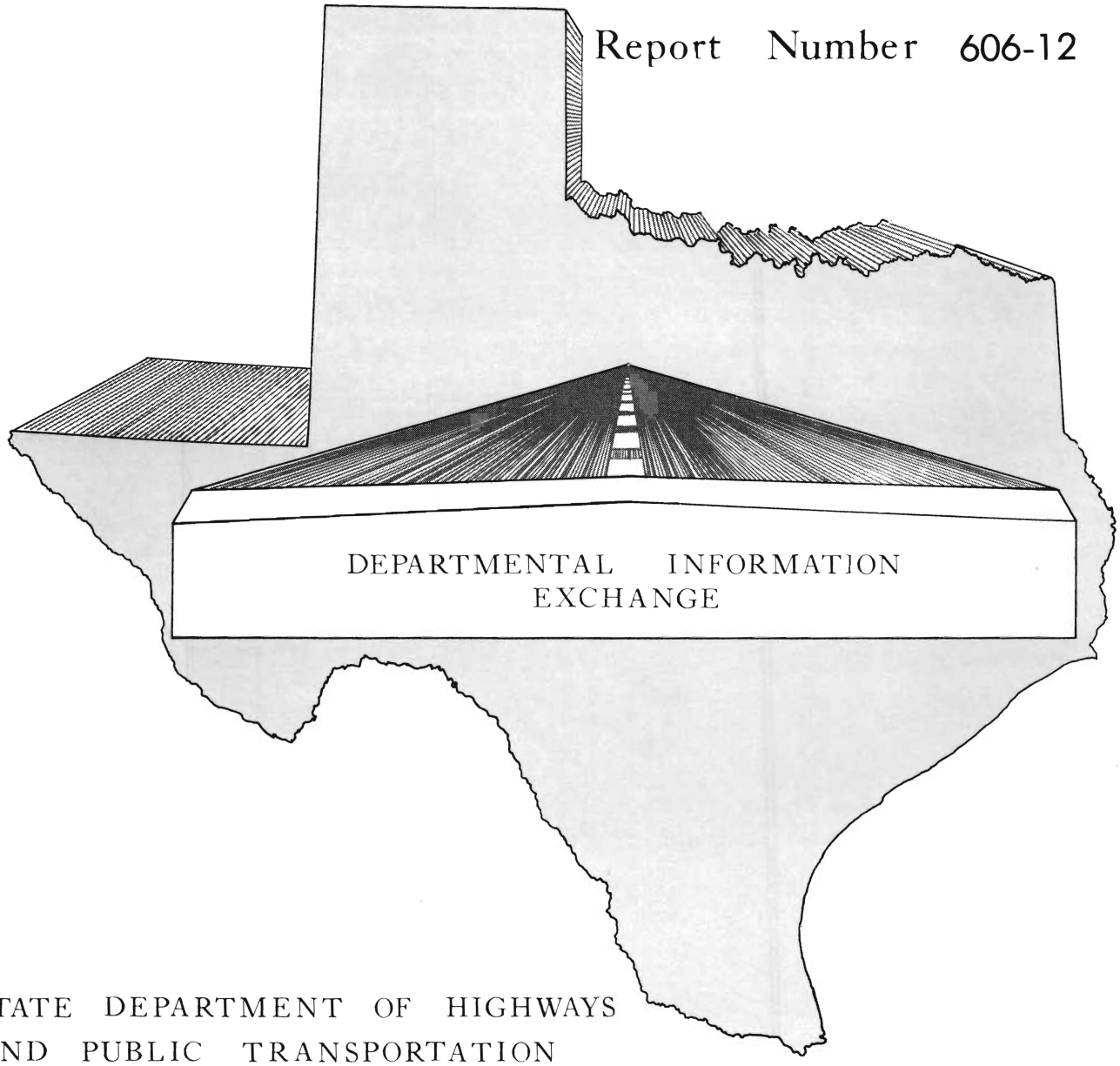
EXPERIMENTAL PROJECTS

AN EVALUATION OF THE USE OF A SURFACE-SEALING SYSTEM OF HOT ASPHALT-RUBBER TO RETARD REFLECTIVE CRACKING

Report Number 606-12



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Work done in cooperation with the Federal Highway Administration.

16. Abstract

The portion of Interstate 40 covered in this project was originally constructed under three separate contracts begun in 1962 and completed in 1966.

The objective of this experimental project is to evaluate performance of a surface-sealing system of hot asphalt-rubber seal coat and asphaltic concrete pavement to stop reflective cracking and restore structural integrity of the pavement surface in climatic conditions existing in the Panhandle of Texas.

As of October 1983, small hairline cracks were observed in the jointed, non-reinforced sections; no cracks were observed in the continuous reinforced sections.

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OBJECTIVES

The objective of this experimental project is to evaluate performance of a surface-sealing system of hot asphalt-rubber seal coat and asphaltic concrete pavement to stop reflective cracking and restore structural integrity of the pavement surface in climatic conditions existing in the Panhandle of Texas.

PROJECT BACKGROUND

This project is located from IH 27 in Amarillo East 8.0 miles. The roadway surface is at an elevation of 3650 feet and is oriented from West to East. The soil is Pullman clay loam with a Plasticity Index (P.I.) between 21 and 27 and Triaxial Class of 4.3 to 5.0.

The average rainfall is 20.28 inches with an average snowfall of 15 inches. The mean annual temperature is 59 degrees Fahrenheit with a minimum of 21 degrees Fahrenheit and daily variations of 30 to 40 degrees are common.

The portion of Interstate 40 covered in this project was originally constructed under three separate contracts beginning in 1962 and completed in December of 1966. Four typical cross sections of the roadway were constructed and are detailed in Figure I.

DESIGN

The design of the roadway used the concept of placing a hot asphalt-rubber seal coat on the existing pavement at a rate of 0.65 gal/SY and Type PB grade three aggregate at the rate of 1 CY per 75 SY of pavement surface. This was to be overlaid with approximately 275 lb/SY of asphalt concrete pavement in such a way as to increase the cross slope of the roadway by 1/16" per 1.0'.

The design called for extensive repair of existing concrete pavement prior to seal coat application.

CONSTRUCTION PHASE

Construction operations began on January 6, 1983, with repairing of existing concrete pavement. This operation involved removing and replacing sections of concrete where failures were obvious, and patching spalled areas around concrete paving joints.

Sahuaro Petroleum and Asphalt Company, subcontractor for Gilvin-Terrill, Inc., began the applications of hot asphalt-rubber on June 22, 1983. The material, made up of 75% AC asphalt and 25% rubber, was heated to a temperature of 325 to 350 degrees Fahrenheit. It was applied over an emulsion tack coat at an average rate of 0.648 Gal/SY and covered with approximately 1 CY/77SY aggregate. The seal coat was rolled at an average of 1 Hr: 1948 SY, swept and returned to traffic. Sahuaro completed its operation on July 1, 1983.

Paving operations began on July 25, 1983, after the ramps and outside shoulder had been treated with an asphalt latex underseal. A level up course was laid at an average rate of 125 lb/SY. The depth of the level up course varied across the width to the roadway in order to increase the cross slope. The second course was laid at a rate of 150 lb/SY with constant depth of 1-1/2 inches. Paving was completed on September 8, 1983.

Test sections were provided to use as controls in evaluating the performance of the hot asphalt-rubber as an underseal. No surface sealing system was applied to the main lanes of these 400' long sections. The test sections are located near bridges so that overhead photographs can be made from the bridges. The test section located between stations 154+00 and 158+00 is in an area where the original pavement was constructed of continuous reinforced concrete. The

test section located between stations 1106+00 and 1110+00 is in an area where the original pavement was constructed of jointed non-reinforced concrete. Photographs are displayed in the appendix.

Traffic was carried on the main lanes through the new construction operations. The average daily traffic count varied from 59,000 vehicles on the west end to 18,000 vehicles on the east end of the project.

EVALUATION

Occasional transverse cracks can be found in the area where hot asphalt-rubber was applied on jointed, non-reinforced concrete pavement. Close visual inspection of the test section in this area found 16 transverse cracks in the eastbound lanes and 12 transverse cracks in the westbound lanes. The 400' long section west and adjacent to this test section has 12 transverse cracks in the eastbound lanes and 7 transverse cracks in the westbound lanes.

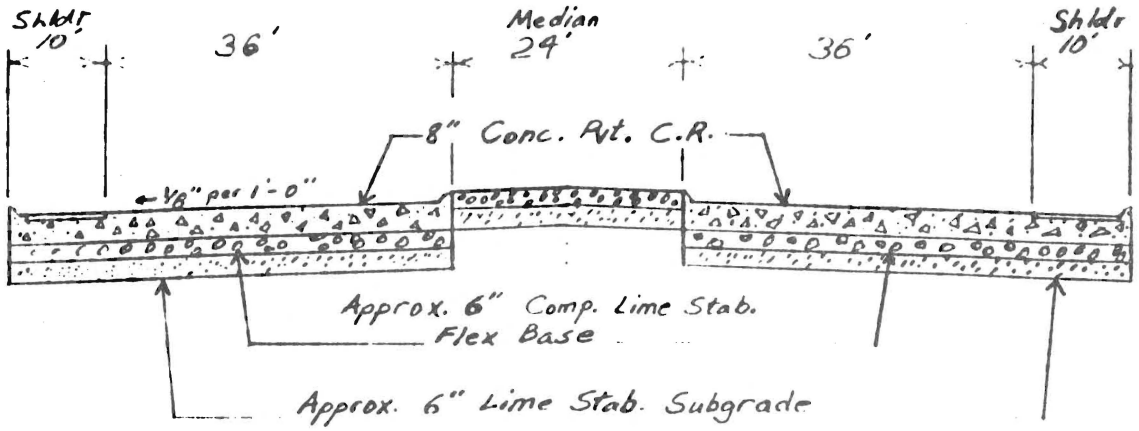
Close visual inspection of the test section and other sections in the area overlayed on continuously reinforced concrete pavement found no transverse cracks.

The roadway will be inspected regularly by the maintenance foreman and any unusual change in the surface will be called to the attention of the District Engineer.

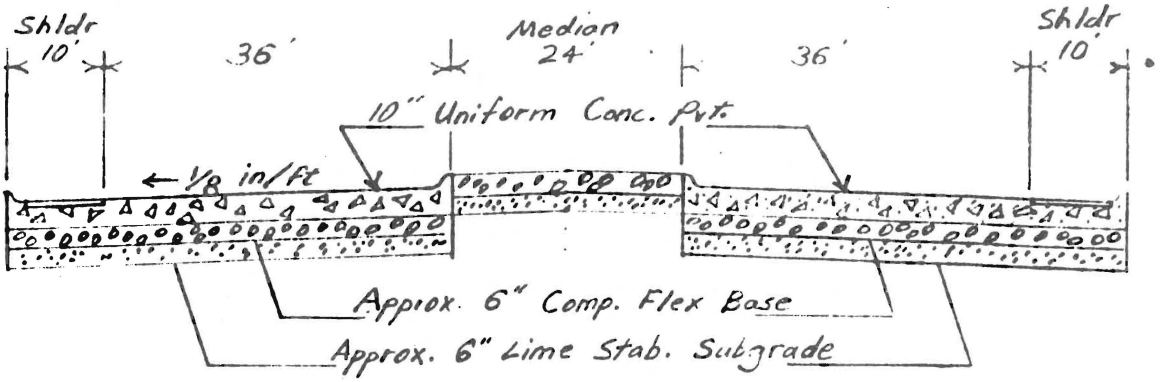
The cost per square yard for this system is $5.26 per square yard. The hot asphalt-rubber underseal accounted for 32% of this cost.

SUMMARY

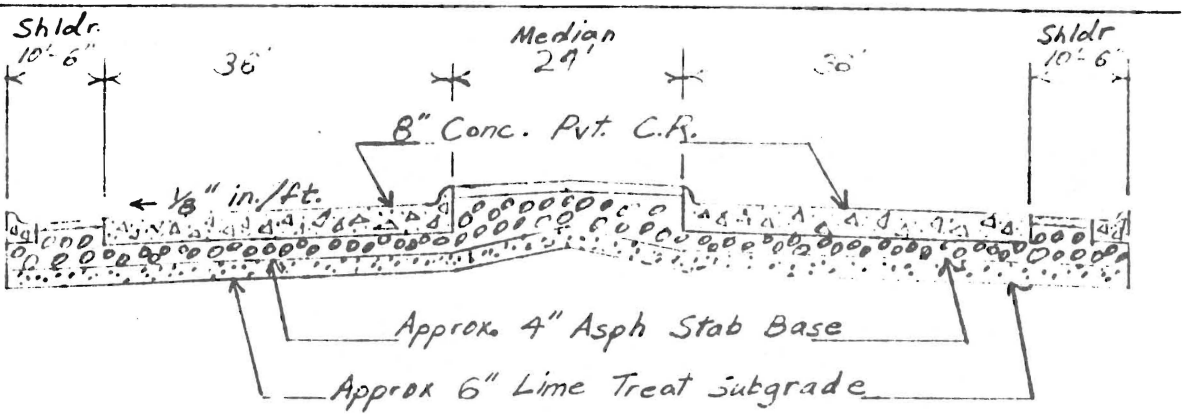
The evaluation of the performance of this surface sealing system is initiated with this report. To this date, October 1983, only small hairline cracks have been observed and only in areas where the original concrete pavement was constructed of jointed, non-reinforced concrete.



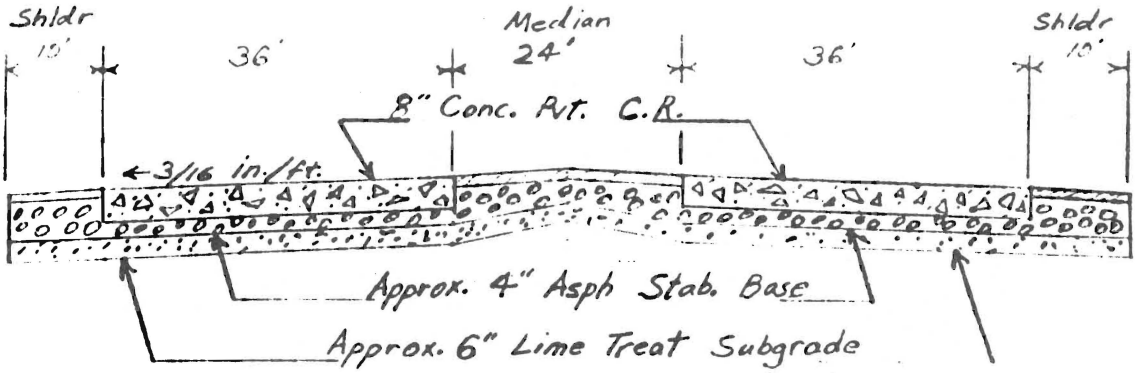
TYPICAL SECTION - STA 1008+43 TO STA 1079+35



TYPICAL SECTION - STA 1079+35 TO STA 1150+00

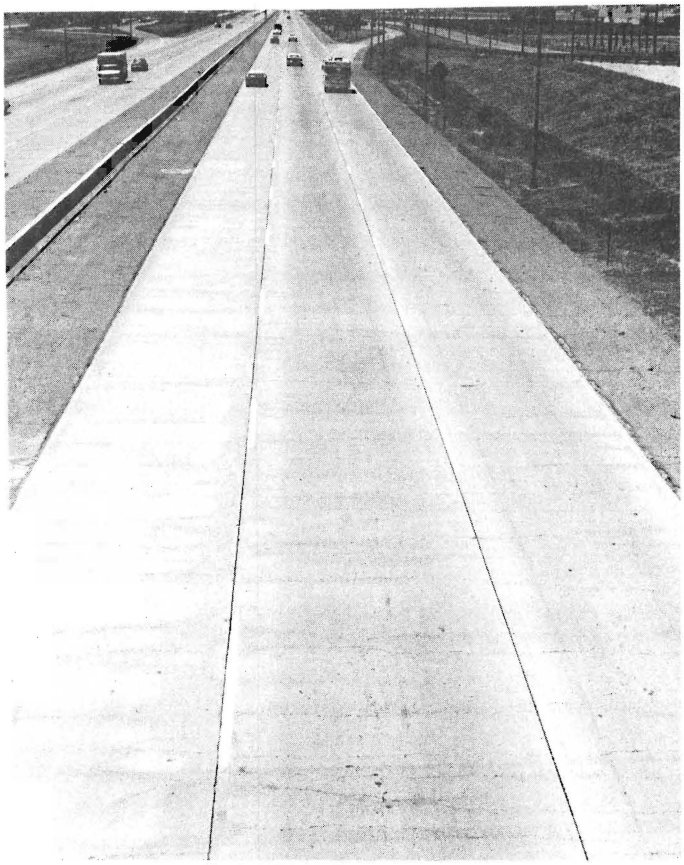


TYPICAL SECTION - STA 1150+00 TO STA 9+20



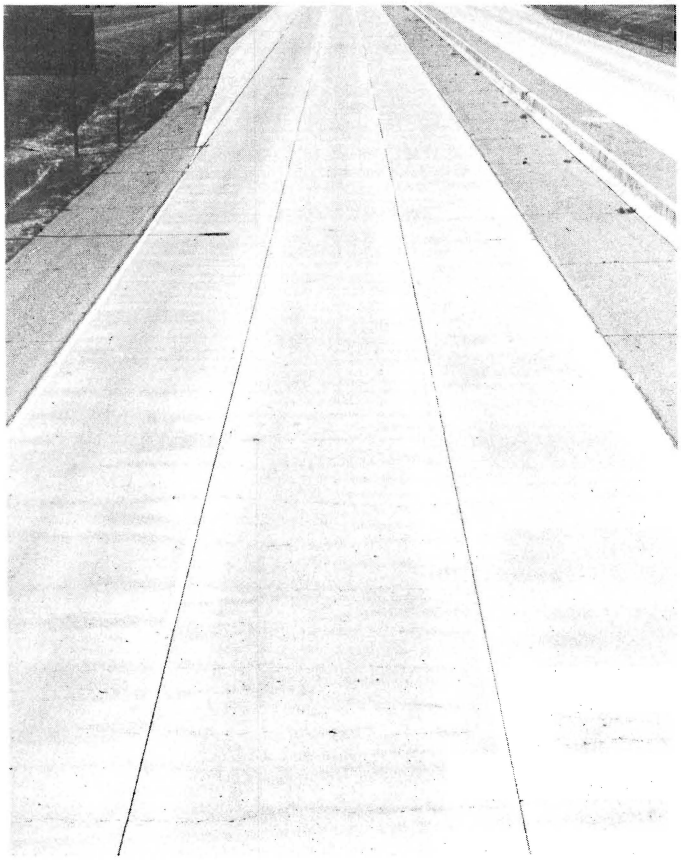
TYPICAL SECTION - STA 9+20 TO STA 235+00

FIGURE I

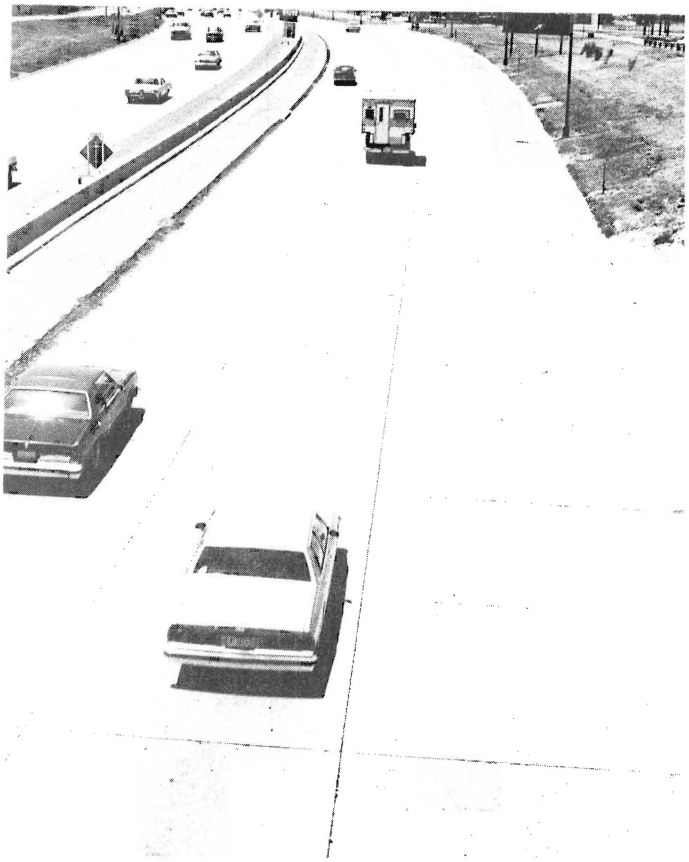


Test sections located between stations 154+00 and 158+00. Continuous reinforced concrete pavement before overlay.

Westbound lanes

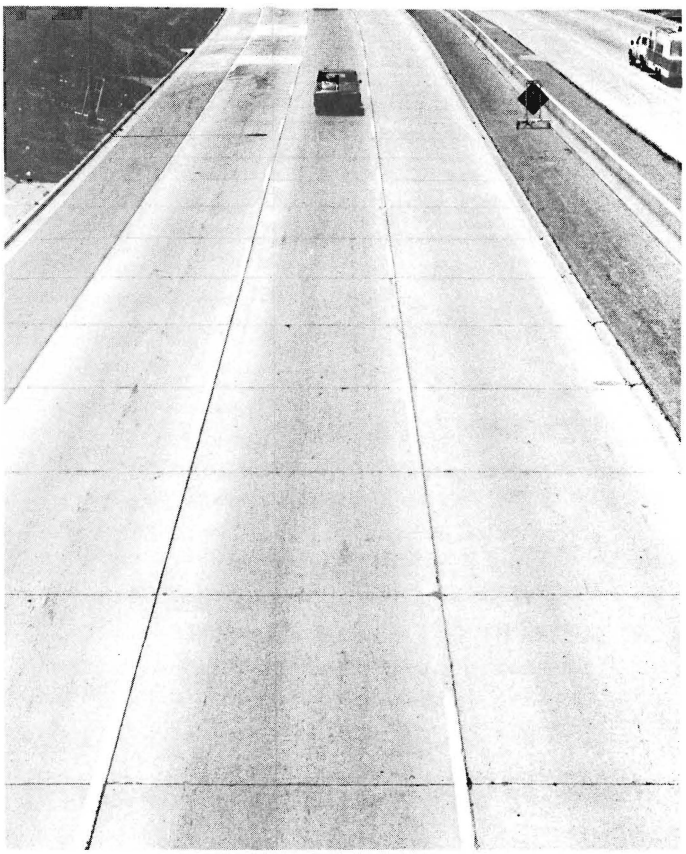


Eastbound lanes



Test sections located between stations 1106+00 and 1100+00. Jointed non-reinforced concrete pavement before overlay.

Westbound lanes.



Eastbound lanes