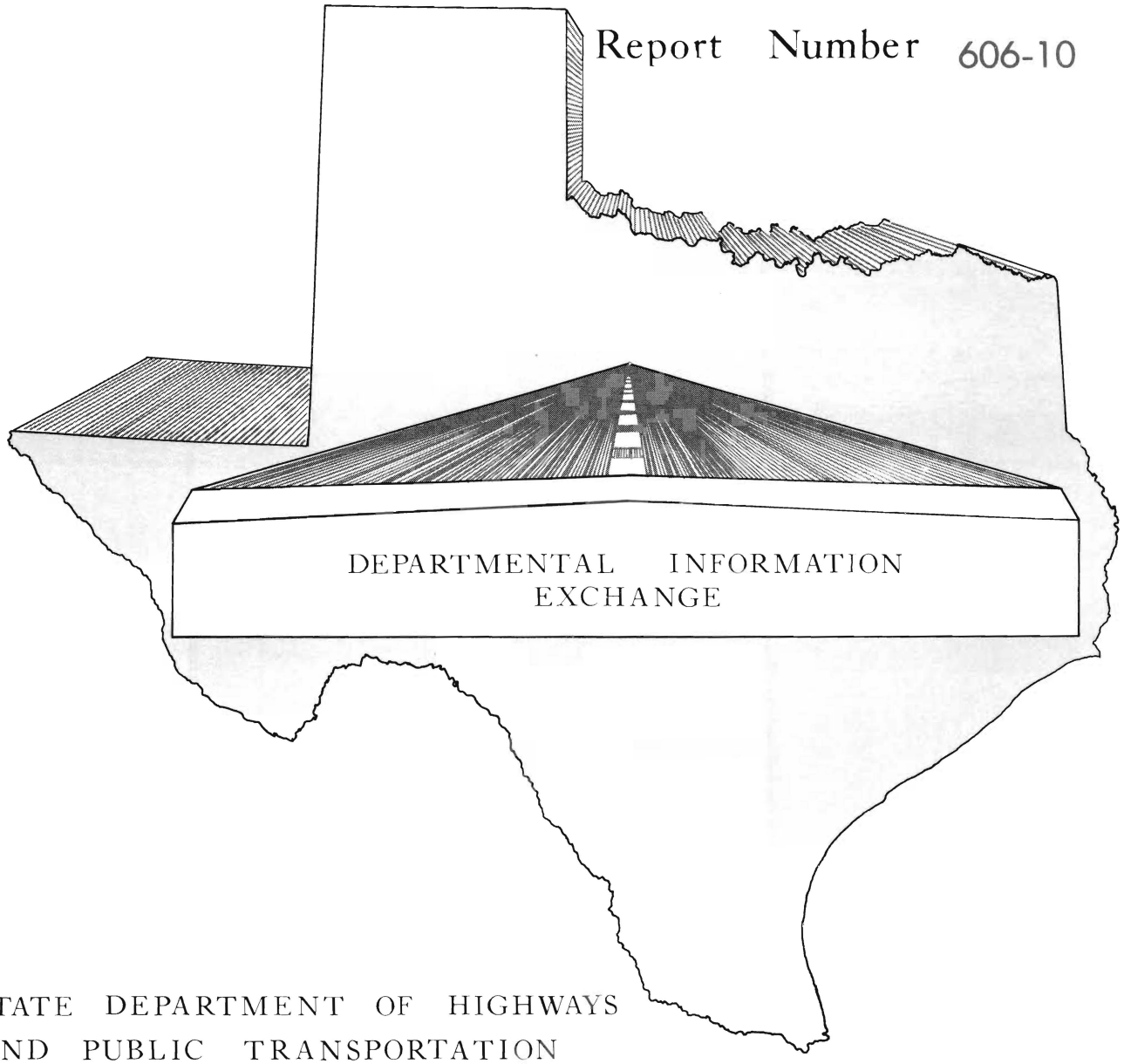
EXPERIMENTAL PROJECTS

EVALUATION OF POLY-FAB UNDERSEAL PROJECT ON IH-40, CARSON COUNTY, TEXAS

Report Number 606-10



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AND PUBLIC TRANSPORTATION

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16. Abstract

A major problem encountered in overlaying a distressed pavement concerns the retardation of reflective cracking in the new pavement. The objective of this experimental project on IH-40 in Carson County is to evaluate the performance in retarding reflective cracking of a surface sealing system containing poly-fabric. The report includes a background history delineating climatic and existing road conditions, a section on the construction phase, and evaluation/summary sections for each year from 1980 to 1983. The report concludes that it seems doubtful that the poly-fab underseal will be totally effective in retarding reflective cracking.

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INITIAL THROUGH THIRD ANNUAL REPORTS

FOR

EVALUATION OF EXPERIMENTAL

CONSTRUCTION PROJECT

ON

INTERSTATE HIGHWAY 40

CARSON COUNTY

TEXAS

CONTROLS: 275-3 & 4

FROM: 1.6 MILES EAST OF CONWAY

TO: 2.0 MILES WEST OF GROOM

PROJECT SUPERVISION

GEORGE J. CANNON, SUPERVISING RESIDENT ENGINEER

REPORT PREPARED BY

WINDELL D. CLARK, ENGINEERING TECHNICIAN V

DATES OF CONSTRUCTION:

SEPTEMBER 17, 1979 TO AUGUST 23, 1980

The material contained in this report is experimental in nature and is published for informational purposes only. Any discrepancies with official views or policies of the DHT should be discussed with the appropiate Austin Division prior to implementation of the procedures or results.

OBJECTIVE

A major problem encountered in overlaying a distressed pavement with asphaltic concrete pavement concerns the retardation of reflective cracks in the new pavement. The objective of this experimental project on IH-40 in Carson County is to evaluate the performance of a surface sealing system in retarding reflective cracking. This system consists of asphalt concrete pavement in conjunction with an underseal containing a poly-fabric placed with asphalt.

PROJECT BACKGROUND

This project is located 30 miles east of Amarillo. The roadway is at an elevation of 3400 feet and is oriented west to east. The soil is Pullman clay loam with a Plasticity Index (P.I.) between 21 and 27 and a Triaxial Class of 4.3 to 5.0.

The average annual rainfall is 20.28 inches with an average of 15 inches of snow. The mean annual temperature is 59° Fahrenheit with an average minimum temperature of 20.9° Fahrenheit in January. The lowest recorded temperature is -16° Fahrenheit and daily variations of 30° to 40° are common. Hard freezes for several days followed by rapid thaws are not unusual.

The project was originally upgraded to interstate standards in 1970. The main lanes consist of two 12 ft. lanes, 6 ft. inside shoulders, and 10 ft. outside shoulders. They are constructed of 6 inches of lime treated subgrade, 16 inches of flexible base, 600 lbs/sq yd of asphalt stabilized base, 300 lbs/sq yd of asphalt concrete pavement (Type A), and 100 lbs/sq yd of asphalt concrete pavement (Type D). The roadway slopes 3/16 in. per 1 ft. from the center of the lanes to the shoulders. The project had a rather heavy seal coat applied during the summer of 1978 after considerable distress became evident during the winter of 1977-78.

DESIGN

The design of the roadway used the concept of placing asphalt and poly-fab underseal in direct contact with the existing pavement. This was to be overlaid with 200 lbs/sq yd of asphalt concrete pavement. A field change was implemented, modifying the above design to a level-up course of approximately 75 lbs/sq yd of asphalt concrete pavement placed over existing pavement, on the level-up course was placed the poly-fab underseal with asphalt, and finally approximately 125 lbs/sq yd of asphalt concrete pavement was laid on the poly-fab. (See Figure 1). The field change was sought because of anticipated problems with the poly-fab due to the coarse texture, depressed wheel paths, and shrinkage and stress cracks on the existing pavement.

The geometrics of the project remained the same as the original 1970 project.

CONSTRUCTION PHASE

Construction operations began September 15, 1980. A level-up course of approximately 75 lbs/sq yd was applied to the existing surface throughout the project; the poly-fab underseal was laid on approximately four and one-half miles of the eastbound lane with approximately 125 lbs/sq yd asphalt concrete pavement surface. The date was late November and considerable distress became evident during a freeze-thaw and wet-dry weather cycle. This distress included reflective cracking upwards through the level-up course, stress and shrinkage cracking, and surface deterioration on the previously placed fabric underseal and surfaced area. In view of unfavorable weather forecasts and the unlikelihood of any improvement of sufficient duration, construction was suspended until asphalt season the following spring.

Construction operations began June 3, 1980, with an overlay to repair winter damage on the right eastbound lane of the four and one-half miles of road constructed the previous fall.

The poly-fab is made exclusively of man-made thermoplastic fibers and is mildew resistant, rot-proof, and compatible with asphalt cements. The weight of this poly-fab is four ounces per square yard.

Phillips Fiber Corporation manufactures a machine for the placement of the fabric. The contractor purchased two of these machines for this purpose.

The fabric on this project was supplied by Phillips Fiber Corporation, a subsidiary of Phillips Petroleum Company.

The fabric underseal was lapped with the traffic flow 6 to 12 inches at the transverse joints and 6 inches at the longitudinal joints. The wind caused a slight problem in placing the fabric.

The average application of AC-10 asphalt with the underseal was .21 gal/sq yd The air temperature varied from the 60's to the 100's (Fahrenheit) during construction.

The traffic was carried on the main lanes through the new construction operations. The average daily traffic count was 8200 vehicles.

During August, after a summer of extremely high temperatures, asphalt began flushing to the surface of the outside lanes. The road remained stable without rutting or shoving, but it was deemed advisable to place a thin overlay to improve skid resistance.

EVALUATION 1980

The purpose of this experimental project is primarily to evaluate the performance of a surface sealing system of fabric underseal and asphalt concrete pavement in stopping reflective cracking and restoring structural integrity of the pavement surface in climatic conditions existing in the Panhandle of Texas.

The performance of the roadway will be watched regularly by the maintenance foreman and any unusual changes in the surface will be called to the attention of the district engineer.

The cost per square yard of this system is $3.90. The cost of the fabric underseal is $1.30 per square yard or 33% of the cost.

SUMMARY 1980

The evaluation of the performance of this surface sealing system is initiated with this report. Up to October 1980, no cracks have been observed. There is no evidence of failure in the pavement structure.

EVALUATION 1981

A visual inspection of the project was made in October 1981. The following observations were made: the project looked good; minor cracks have appeared, although no fine aggregates have pumped up through the cracks.

In the summer of 1981, the State maintenance forces bladed a thin overlay on the right lanes to correct slick spots caused by asphalt flushing to the surface.

SUMMARY 1981

This first annual report is submitted in accordance with the procedures set out in the evaluation program for this experimental project.

This project has been continuously monitored since it was constructed in the fall of 1979 and the summer of 1980. The volume and type of traffic have not changed significantly since construction. There is no evidence of failure. The cracks observed at this time are minor; no conclusions can be made as to the effectiveness of the poly-fab underseal.

EVALUATION 1982

A visual inspection of the project was made in October 1982. The following observations were made:

One isolated pavement failure was noted in the westbound lane. Transverse cracks were observed in both the inside and outside lanes. There were no noticeable wheel path depressions.

The transverse cracks were counted in the east and westbound lanes from Mile Marker 107 to 108. Eighty-two cracks with approximately 5% needing maintenance were noted in the westbound lane; and thirty cracks were in the eastbound lane, with one needing maintenance.

Most of the transverse cracks were not visible at highway speeds. At two spots on the inside and outside shoulders, where no poly-fab had been placed, longitudinal cracking was observed.

SUMMARY 1982

This second annual report is submitted in accordance with the procedures set out in the evaluation program for this experimental project.

This project has been continuously monitored since it was constructed in the fall of 1979 and summer of 1980.

The maintenance performed to date has been to place a thin overlay of asphalt concrete pavement on the driving lanes to correct slick spots caused by asphalt flushing to the surface.

Some of the transverse cracks on the inside lanes are spalling and will soon need maintenance.

Although it is too soon to make conclusions, it seems doubtful at this point that the poly-fab underseal will be totally effective in retarding reflective cracking.

EVALUATION 1983

Visual inspection of the project was made in October 1983. The observations were made:

One isolated pavement failure was noted in the westbound lane. Transverse cracks were observed in both the inside and the outside lanes and slight wheel path depressions were noted. The wheel path depressions appeared deeper in the westbound lanes. Slight flushing was noted in the westbound outside lanes.

The transverse cracks were counted in the east and westbound lanes from Mile Marker 107 to 108. One hundred ten cracks with approximately 5% needing maintenance were noted in the westbound lane and 80 cracks with none needing maintenance were noted in the eastbound lane. Most of the transverse cracks were not visible at highway speeds. Longitudinal cracking was observed along the center joint and on the inside and outside shoulders which had no poly-fab.

SUMMARY 1983

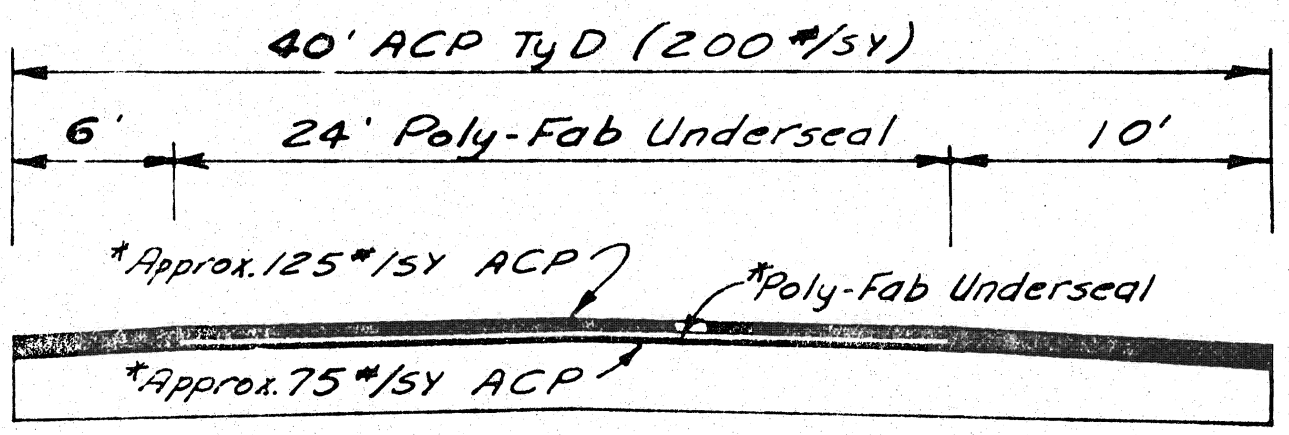
This third annual report is submitted in accordance with the procedures set out in the evaluation program for this experimental project.

This project has been continuously monitored since it was constructed in the fall of 1979 and summer of 1980.

The maintenance performed to date has been to place a thin overlay of asphalt concrete pavement on the driving lanes to correct slick spots caused by asphalt flushing to the surface.

Some of the transverse cracks on the inside lanes are spalling and will need maintenance soon.

Although it is to soon too make definite conclusions, it seems doubtful at this time that the poly-fab underseal will be totally effective in retarding reflective cracking.



*Due to Field Change #1

FIGURE 1