EXPERIMENTAL USE OF FABRIC REINFORCEMENT IN FLEXIBLE PAVEMENT OVERLAY OF DETERIORATED ASPHALT PAVEMENT

Experimental Features
Final Report
OR 77-04

by

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INTRODUCTION

Many Oregon highways are in need of an asphalt overlay treatment to correct deficiencies such as fatigue cracking, deformation and other distresses and provide an acceptable riding surface. These asphalt concrete overlays tend to experience reflective cracking. It was proposed to use a full width geotextile fabric to retard reflective cracking.

The purpose of this study was to evaluate the effectiveness of a nonwoven polypropylene fabric to retard or eliminate reflective cracking. The product chosen was Petromat Nonwoven Fabric produced by Phillips Fibers Corporation. This is the final report describing the performance of the Petromat fabric membrane which was installed in July 1978.

CONSTRUCTION

The project is located in a 1.65 mile section of the Willamina-Salem highway (ORE-22). The section extends from the Willamette River Bridge to Rosemont Drive N.W. in West Salem. The existing highway had 4 twelve foot asphalt concrete traffic lanes with asphalt shoulders. The pavement had extensive alligator cracking and some significant longitudinal fatigue cracks.

This study included two 750 foot sections in which a 12 foot wide traffic lane was treated with a nonwoven polypropylene fabric reinforcement placed between a leveling course and a Class E asphalt concrete wearing course. Areas on each end of the test sections were designated control sections for comparative monitoring purposes. Both experimental and control sections were located in the outside (or truck) lane only.

Prior to installing the leveling course large transverse and longitudinal cracks were cleaned and filled with an asphaltic crack sealer. The leveling course was a dense graded, 3/4 inch minus (OSHD Class C) asphalt concrete with a 1-1/2 inch maximum thickness and was installed in the Fall of 1977. The fabric was not installed until July 10 and 11, 1978. Prior to installation the leveling course was visually inspected, no reflective cracks were apparent. The fabric was installed using an AR4000 asphalt cement binder applied at a rate of 0.25 gallons per square yard. The wearing course was then installed using a 1-1/2 inch open graded, 3/4 inch minus (OSHD Class E) asphalt concrete followed by an emulsified asphalt seal coat.

In the eastbound direction the fabric was placed between Station 1309+00 and Station 1316+50 in the outside travel lane. Control sections were established from Station 1306+50 to Station 1309+00 and between Station 1316+50 and Station 1321+50.

In the westbound direction, the fabric was placed between Station 1332+00 and Station 1339+50 in the outside travel lane. Westbound, control stations were established from Station 1328+00 and Station 1332+00 and between Station 1339+50 and Station 73+00. The latter control section spans an equation having Station 1339+86.77 back equal to Station 76+45.29 ahead.

EVALUATION

The project was evaluated every year for almost ten years. The evaluations included primarily visual observations and photographic records of the asphalt pavement. In November 1981 cores were taken in both test sections and control areas.

The first evaluation, April 1979, showed no signs of distress in the pavement. The second and third years, 1980 and 1981, only a crack between the passing lane and the outside travel lane in both the Petromat and the control sections was reported. No reflective cracks were observed. By 1982 the pavement was beginning to lose fine and a questionable area was forming. It appeared to be an alligatoring pattern in the eastbound right wheel track of the Petromat section. In May 1983 the project was inspected again. No cracks were observed in the fabric or control sections. The questionable area was checked and no evidence of cracking was found.

Between 1983 and 1988 the pavement continued to lose fines throughout the entire project. In 1985 light to moderate stripping was observed with moderate bleeding in both the Petromat and control sections. Rut depths were measured an average of .02 foot. No reflective cracking was observed in either section.

The final evaluation was performed in March 1988 prior to the Highway Division applying a chip seal to preserve the wearing surface. No reflective cracking was observed in the fabric test sections or the control sections. Other types of distress observed included severe stripping moderate bleeding and medium raveling.

The cores taken in 1981 were tested for permeability and moisture content. The results indicate with the correct asphalt application rate and the use of Petromat to retain the asphalt. an impermeable surfacing structure condition can be obtained. Moisture tests on base material below the core test sites show lower moisture contents for Petromat areas than those from adjacent nonfabric areas.