THE EFFECTS OF ENGINEERING FABRIC IN STREET PAVEMENT ON LOW BEARING CAPACITY SOIL IN NEW ORLEANS

Executive Summary

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LOUISIANA DEPARTMENT OF TRANSPORTATION
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Research and Development Section
In Cooperation With
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FEDERAL HIGHWAY ADMINISTRATION

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INTRODUCTION

Subsurface soil in the New Orleans area is generally composed of peat and clay. The low bearing capacity of the soft natural soil has caused early deterioration of asphaltic concrete pavements which typically fail prior to carrying their designed loads. Maintenance of the network of 1,500 miles of streets within the city limits has become a tremendous effort.

Traditional methods of street construction in New Orleans have involved excavation of soft soils followed by replacement with sand. Often the sand, being heavier than the excavated organic soil, has caused differential settlement with time.

In an effort to provide an improved means of construction, the Department of Streets included engineering fabrics in the reconstruction of three city streets. The research study served to document the method of construction and placement of the fabric. Performance measurements were also made in an early attempt to document any benefit attributable to the engineering fabrics.

METHODOLOGY

CONSTRUCTION

Curran Road

The Curran Road installation was comprised of fabric placed as a separator between the subgrade and two different base courses. First, a woven fabric, "Polyfilter X", was placed under six inches of sand-shell base followed by three inches of asphaltic concrete as indicated in Figure 1a. Second, a non-woven fabric, "Bidim C-34", was placed under six inches of asphaltic concrete. A matching control section without fabric was constructed for each test section.

General Haig

On General Haig Street a non-woven fabric, "Fibretex 300", was placed on the subgrade under six inches of asphaltic concrete on one block and under seven inches of asphaltic concrete on another as in Figure 1b. Again control sections without fabric were provided.

Orleans Avenue

Two non-woven fabrics, "Fibretex 300" and "Bidim C-34", were placed on the existing asphaltic concrete pavement prior to a two-inch overlay as in Figure 1c. Control sections contained no fabric.

TESTING

Performance measurements were conducted before reconstruction/overlay and at three-month intervals after for three years. The measurements included pavement crack surveys, pavement deflection tests with the Dynaflect device and the Benkelman Beam, pavement rideability tests using the Mays Ride Meter, and strain gage readings.

STUDY FINDINGS

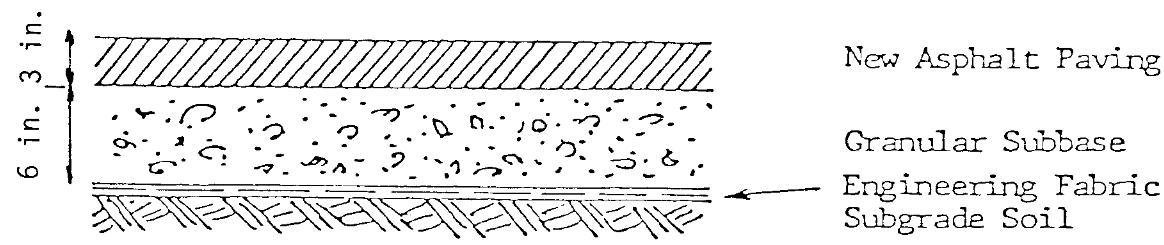
Each of the three city streets evaluated in this study carries light traffic loads with respect to the structural section provided by the overlay or reconstruction. Two of the streets are entirely residential and carry automobile traffic with only occasional truck traffic. For these reasons, load-related performance variations between sections placed with and without engineering fabric were not expected during the course of the research study (1980-1984).

Pavement deflection measurements did not indicate any benefit in the use of fabrics. This was the case for deflections made with both the relatively light (1,000-pound) Dynaflect device and with a full-scale (18,000-pound) single-axle truck load. Strain gage measurements also produced data which was inconclusive. Measurements of pavement rideability made before and after reconstruction indicated improvements for each of the three streets evaluated. Pavement ride measurements with time have not produced trends which could be used to infer a benefit from using engineering fabrics.

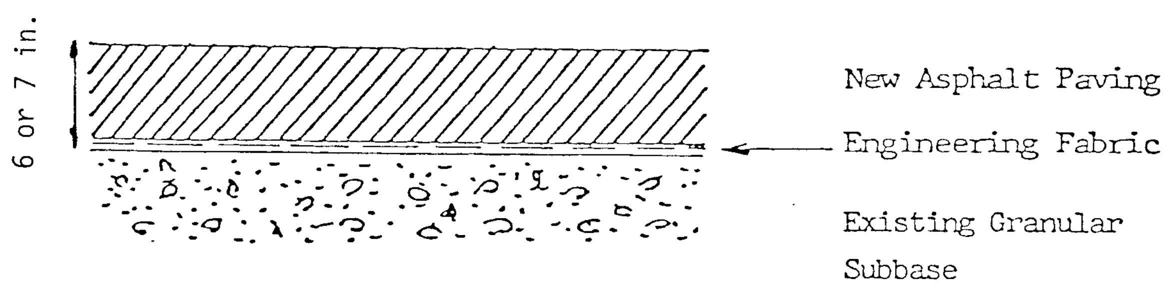
The Orleans Avenue installation, where fabric was placed in an attempt to control reflective cracking through a two-inch overlay, exhibited slightly less reflective cracking for sections with fabric. After four years, twenty percent of the cracks had reflected through the sections without fabric as compared to eight percent in the sections with fabric.

Future inspections are planned to determine any possible long-term benefits from the use of engineering fabric.

a. ENGINEERING FABRIC BETWEEN GRANULAR SUBBASE AND SUBGRADE SOIL



b. E.F. BETWEEN EXISTING GRANULAR SUBBASE AND NEW ASPHALT PAVING



c. E.F. BETWEEN EXISTING ASPHALT PAVING AND NEW ASPHALT SURFACE

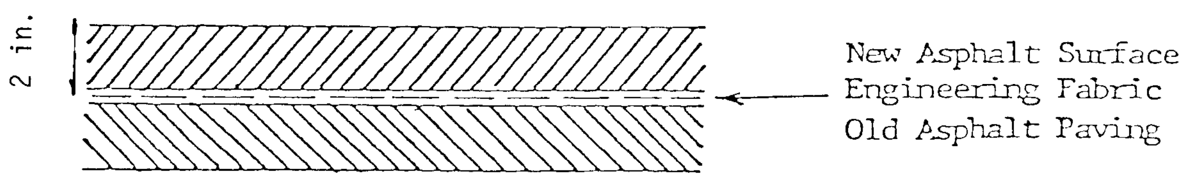


FIG. 1. LOCATIONS OF ENGINEERING FABRIC IN THE PAVEMENT