

Usage of Woven Geo-Textiles in the Construction Format of Subgrade in Flexible Pavements

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Abstract— The best connectivity to any part of the country is first to develop infrastructure of the country. The use of geotextiles in flexible pavements has been a well-accepted practice over the past thirty years. In most recent years, the base course of flexible pavement is reinforced by geo-textiles to improve performance and to reduce the thickness of base course. There are two major types of pavements: flexible and rigid. In this we are discussing about the flexible pavements. The performance of some flexible pavements in some climatic condition has been proved disappointing because a transverse crack has been developed within a few years of construction. Other forms of flexible pavements distress include alligator or map cracks, ruts and reflective cracking. The additional benefit in the construction of flexible pavement by using geo-textile is that they are very stiff.

Key words: Geo-Textiles, Flexible Pavements

geotextiles are jute, flax or coir, coconut matting, cotton, hemp, straw. The different types of composite/synthetic materials of geotextiles are kevlar, polyester, polypropylene, jute composite.

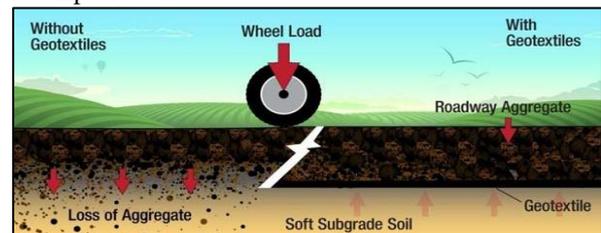


Fig. 1.1: Arrangement of Geo-Textiles in Subgrade

A. Characteristics of Geo-textiles

1) Moisture Barrier

Both woven and non-woven geo-textiles can reduce the moisture when in bituminous, rubber bitumen, and polymeric mixtures. The moisture barrier is the main function plays in the use of geo-textiles in paving overlays. It reduces the surface water entering in the base and sub-grade. Ultimately improves the performance of the pavement system.

2) Erosion Control

In this geo-textile safeguards soil surfaces from the tractive forces of wind and rainfall. Geo-textiles also one of the alternative protection against erosion on newly laid slopes. The erosion control function can be act as special case such as combination of the filtration and separation functions.

3) Sediment Control

Geo-textile can serve as sediment control. A silt fence which is composed of a geotextile acts as a vertical barrier. The silt fence reduces the velocity of water allowing the sediment out of suspension.

I. INTRODUCTION

Woven Geotextiles are some of the strongest fabrics available for erosion control, stabilization, and layer of aggregate separation. Offering an increased grab tensile strength, woven geotextile fabrics offer a robust design that allows them to successfully implement in almost any location, including the Pavement, Roads, Railroads Structures, and Rip Rap. Woven Geotextile Fabric is manufactured by blending and weaving fibers. The result is a product that is not only strong, but also remarkably well equipped to handle drainage and erosion problems.

In the past 20 years the geo-textiles growth in the market has risen. In Geo-textiles, Geo means Earth and textile means fabric. Polypropylene, polyethylene, polyester are the petroleum products which are used in the production of Geo-textiles. Geo-textiles are mainly constituents of polypropylenes, polyesters, polyethylene, and polyimides, which do not decompose under any biological and chemical processes. This will help in construction and maintenance of roads. The flexibility of geotextile is most useful for the filtration purpose and soil, rock and waste material can be reinforced by the geo-textiles. These textiles consist of synthetic fibres such as cotton, wool or silk. Flexibility and porous nature can be obtained by the usage of standard weaving machinery. Subsurface drainage and erosion control applications as well as for road stabilization for wet moisture sensitive soils are given by Non-woven geotextiles. Woven geotextile are made from weaving monofilament, multifilament, or silt film yarns. Silt film yarns further subdivided into flat tapes and fibrillated yarns. There are two steps for making woven geotextiles. First manufacturing of filaments or slitting the thin film to create yarns.

There are different types of geo-synthetics namely geo-membranes, geo-nets, geo-composites, geo-mat, geo-cell, bio-mat and bio-net. Some of the natural forms of

II. LITERATURE REVIEW

- 1) Christopher B.R. and Holtz R.D (1985) suggest the functions of geotextiles for the corresponding subgrade strengths.
- 2) Hicks et al., (1986) reports that a base contamination of about 10 percent subgrade soil fines can destroy structural strength of base layer. The problem of contamination can be solved by placing geo-textile at sub-grade level. Further by placing geo-textile as a separator between base course and sub-grade soil permits to drain off quickly through and along the plane of fabric. Due to multi-functions like separation, filtration, reinforcement and drainage, geo-textiles can be used in un-paved roads.
- 3) Bonaparte et al., (1987) soil reinforcement design by using geotextile and geogrids.
- 4) Holtz R.D. and Sivakugan (1987) design Charts for Roads with Geotextiles, Geotextiles and Geomembranes.

- 5) Bonaparte Holtz and Giroud (1987) soil reinforcement design using geotextiles and geogrids.
- 6) Killeay P. and Anderson M. (1989) have tested 3 sections of different base coarse thickness that were designed to perform same. The geo-textile reinforced thickness of base can lessen from 450 to 350 mm.

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