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A Review on Use of Geosynthetic Material in Road Construction

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ABSTRACT: As per civil engineering is concerned it is very important to know recent trends and technologies. Geotextiles, which is now an effective engineering technology and has exposed to wide spread applications in pavement construction. Geotextiles are most widely used under paved and unpaved road-ways, and this is referred to as the application of separation / stabilization. In addition, geotextiles used in paved and unpaved roads provide many advantages: separation, stabilization, strengthening and filtration. In few words, geosynthetics are very useful, economical and easy to handling and installation materials.

I. INTRODUCTION

Geosynthetic are combination of geomaterials which is used in a wide variety of civil engineering applications. Many polymers (plastics) common to everyday life are found in Geosynthetic. The most common are polyolefin and polyester. Basically Geosynthetic are used to function as a separator, filter, planar drain, reinforcement, cushion/protection, and/or as a liquid and gas barrier. Geosynthetics gives higher value than traditional road construction products and the fast, simple installation process which reduces the construction process.

Objectives-

1. To do comparison and cost estimation of Geo-synthetics used road pavement and a normal road pavement.
2. For improving ground stabilization of road, runaways (for bearing vehicle loads).
3. To provide economy and sustainability to the road pavement.

II. METHODOLOGY

For this dissertation work, it is proposed to carry out the work in the following phases.

- I: Collection of information through literature review and or preliminary study on site.
- II. Comparison between the cost and effectiveness of geosynthetic material

III. LITERATURE REVIEW

1. USE OF GEOSYNTHETIC MATERIALS IN ROAD CONSTRUCTION (Aug 2020)

The author states that geotextiles, which is now an effective engineering technology and has acquired wide spread applications in pavement construction. From the paper, it understood that, Geosynthetics have been widely used to serve a variety of roles that greatly lead to roadways performing well. These provide isolation, filtration, stabilization, stiffing, drainage, barrier, and safety functions. Any or more of these different features is used in at least six major roadway applications. A geocomposite is an engineered polymeric material in the form of manufactured sheets or bars, consisting of at least one geosynthetic portion used in applications for geotechnical environmental and transport engineering.

2. Effectiveness of using Geosynthetic Material for Improvement of Road Construction and Performance - Case Study on Adis Abab (Feb 2017)

The author states that, the research is concerned with the Effectiveness of geosynthetic to improve performance of pavement. It has been done on road construction projects under Addis Ababa Road Authority. From the paper,



understood that, geosynthetic materials can improve the performance of road. Geomembrane, tended to perform better for bases, especially where subgrade strengths were below a CBR of 3. By reducing the undercut and thickness of base and subbase material, geomembranes can save initial construction cost of road also the life cycle cost by increasing the design life of the road.

3. COMPARATIVE STUDY OF GEOSYNTHETICS USED AND UNUSED ROAD PAVEMENT AND CASE STUDY (May 2021)

The author states that, in the areas having soft strata, or low strength of subgrade and also in rainy season, numerous incidents like road sinking, flowing of the road pavement, potholes occur every year. These scenarios happen because of the less or no drainage provided, no reinforcement to the subgrade and lack of clear separation between various layers of road pavement. From the paper, it is understood that, to overcome these situations, must provide a proper drainage mechanism, reinforcement and the separation to the road pavement. A Geo-synthetic material consists of synthetic fibres and are composed of yarns. These yarns are made up of polypropylene or polyester resins.

4. Application of Geosynthetics in Pavement Design (July 2017)

The author states that geosynthetics have been widely used in recent thirty years for separation, reinforcement, filtration, drainage, and containment functions of the pavement design. From the paper, it is understood that Geosynthetics with reinforcement function can play a vital role as they not only improve the load bearing capacity but at the same time reduce deformation. Acceptable design guidelines for designing geosynthetic reinforced pavements.

5. TOMORROW WITH GEOSYNTHETICS: A COST EFFECTIVE BUILDING CONSTRUCTION MATERIAL (Nov 2016)

The author states that over the last three decades geosynthetics are being increasingly used in civil engineering applications like road construction, high embankments, retaining structures and erosion control. From the paper, it is understood that, geosynthetics are relatively light and flexible, possess a high tensile strength, even extensible during application of loads. It is demonstrated by using Geosynthetics in different applications of civil engineering (especially highway engineering) that Geosynthetics are well developed.

6. Studies on geosynthetic-reinforced road pavement structures (Aug 2016)

The author states that many of the pavement structures fail well before their design life owing to the poor quality of construction materials, inadequate compaction, inadequate preparation of the subgrade, overloading, etc. From the paper, it is understood that, the performance of the geocells as surface confinement layers and as reinforcement layers has been reported by several researchers in the past. The performance of highway pavements is governed by the strength and stiffness of the pavement layers. The cost and duration of construction are dependent on the availability of aggregate materials for construction.

IV. RESULT & CONCLUSION

Deduction in Initial installation cost can be a good way to achieve economy. Road construction and pavements need higher costs but in areas having soft strata the projects should go for geosynthetic members to control land settlement.

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