

Geosynthetic Road the Future of Construction

Raj Gaikwad, Tushar Bhong, Somesh Salunke, Jagdish Rajput, V. N. Kundlikar

Pimpri Chinchwad Polytechnic, Pune, Maharashtra, India

***Abstract:** In this project of we have study about the GEOSYNTHETIC OF ROADS. In this Project explain the roads basic characteristics and Properties of Geo Synthetic Classification of soil Using we find use of layer of Geo Synthetic sub-Base and subgrade of road. Using the Geosynthetic layer in rural road construction Giving the efficient road, smooth road, saving Travel time in comparison of than other Conventional Road construction. Geosynthetic Layer in road construction is initially cost but life is long term. The geosynthetic increase the performance and life span of the road . geosynthetic increase the strength of the road and increase the strength of the road prevent slipping of the geosynthetic material is ecofriendly and it is easy to installation Geotextiles are most widely used in paved and unpaved road and this is referred to as the application of separation / stabilization of subgrade. In construction of road most of the country uses non-woven geosynthetic fabric.*

Keywords: Durability, Economy, Efficient.

I. INTRODUCTION

To study of Geo Synthetic Road, Geosynthetics are defined as the products Produced from polymeric materials. These are Used in various geotechnical engineering Projects, soil stabilization and road construction, and are an essential part of man-made Construction projects and structures. These type of produced in Malaysia. Geo grids are used in Construction. Geo Synthetic Road solution for More stability strength. Geo grids made from High strength. These roads are improving Stability and bearing capacity and reduce Rutting and installation strength. This type of roads are constructed when soil base is Unstable. We were use natural fibers for Production of geosynthetic mat for Construction of roads. In our country this Type of roads are not developed. Roads in India facing problems like formation of Cracks and depression during the rainy Season and this is due to the less baring Capacity of soil so we can use geosynthetic Material. Synthetic material is widely used in the world but it is not using in India. Our Project aims at to spread awareness about it So we in India's cannot face problem of road Different types of geosynthetics are used for various purposes in road construction. Most commonly, geogrids are used in road construction. A geogrid is a type of geosynthetic material. It is a polymeric structure it is produced in the form of a manufactured sheet, containing a network of connected elements.

II. LITERATURE REVIEW

Willmwes.W(2002) et.al studied the sustainability by employing recycled aggregates such as Geosynthetic Recycled Aggregates. After the repair of existing roads, leftover concrete, gravel, and Ballast are utilized as road construction aggregates. Recycled aggregate mechanical Qualities cannot provide load assistance because asphalt, cement, and particles are Present. Even, they could have concerns with their lifespan in the long run. The use of geosynthetics has enabled the lo to increase their Mechanical qualities and their Long-term durability. This study highlights the important results of contemporary Research on Geosynthetics, including permanent deformation, creep deformation, Deterioration, stress distribution, and/or crack propagation.

J. Reading, B. (1991). The use of geosynthetics to strengthen soil. This lecture explains various geosynthetic materials and how they are made, what they do, and how they are designed, selected, and specified. A wealth of information is also provided on geosynthetics for soil stabilization, which include soft base embankments, steep slopes, and retaining wall and abutment backfill applications. Materials qualities necessary for designing and constructing geosynthetics are emphasized. Geosynthetic reinforced walls and abutments are built using construction processes detailed by Christopher and Holtz (1985) and Holtz et al. (1997). Failure with patented segmental precast concrete wall facing

systems is surprisingly prevalent. the majority of such faults are likely related to inadequate construction, especially with regards to the wall base and back slope.

Zornberg (2010), North American contributions in pavements. Flexible pavement systems have long been reinforced using geosynthetics. Despite the strong data demonstrating the beneficial role of geosynthetic reinforcements in road construction, it remains unknown how these reinforcements act in various environments and processes. For the most part, it has been challenging to determine the appropriate design parameters for geosynthetics due to the difficulties in determining the respective performance enhancing features. Informed research has been done with the aim of determining the regulating processes and relevant characteristics of geosynthetics.

III. MATERIALS AND METHODS

3.1) MATERIALS USED IN PROJECT:

1. Subgrade Soil: Investigated soil has a specific gravity of 2.6, liquid limit 25.3, plastic limit 21.3
2. Clay: Less than or equal to 0.02mm is 10.77
3. Silt: Silt is used as 0.075mm is 71.65%
4. Gravels is more than 4.75mm size
5. Geosynthetic fiber is used
6. Paving fabric: Fabric paving is the polymer made up of 83%weight of the polulyolefins heat bonded surface on one side only.
7. Track coat: It is to bond with fabric on subgrade pavement.placed above paving fabric.

3.2 METHODOLOGY OF GEOSYNTHETIC ROAD

1. Site preparation: clear the installation area by removing the large object and stones.
2. Preparation of subgrade by compaction by using road roller.
3. Use of soil: place soil in subgrade of road.
4. Geosynthetic mat: spread geosynthetic sheet on the soil of subgrade. Bond the sheet with track coat on pavement.
5. Hold the geosynthetic sheet in place.
6. Placement of aggregate: place the aggregate over geosynthetic sheet by dumping the aggregate.
7. Spreading of aggregate: spread on to the geosynthetic by using bulldozer.
8. Provide asphalt: provide a layer of asphalt on the aggregate layer level road by using road

IV. RESULT AND DISCUSSION

Roads are constructed with bitumen and cement concrete in our country. It takes more time for installation. R.C.C roads have high initial cost and maintenance cost extreme and improper weather makes bituminous pavement soft and slick. Bituminous with impurities can cause pollution to the soil they have hydrocarbon in small amount. These roads have less life span. Geogrid are most commonly geosynthetic material used in road construction. They provide soil stability, especially in areas where there is a high chance of rutting and erosion. Geosynthetic materials provide stability and support in unpaved road construction and areas where the high flow of traffic is expected. Geogrids improve the bearing capacity of the soil and make the roads stronger and durable. Geosynthetic road prevents excessive excavation and re compaction of road. It has high load carrying capacity. There are many types of geosynthetics produced in Malaysia. The term is used to refer the use of polymeric material used in construction. Geomembrane, Geotextile, geoclay liner are the types of geosynthetic material used in road construction. In heavily trafficked area like the highways and main roads are constructed with geosynthetic for more stability and strength. The specific type of the geosynthetics used in road construction of trafficked areas such as paving fabric and track coat. Many of the geosynthetic fibre used in construction offroad from that non-woven fabric is best for construction of road. This fabric is durable and economical.

V. CONCLUSION

Geosynthetic materials, which started to be used in the field of geotechnical engineering with the fabrication of geotextile materials in the 1960s, The Geosynthetic Road is very Useful for long duration of time and it's safety for Human. That Road contains most of the durability of more than any other conventional road. A Geosynthetic road is stronger and stiffer than Without reinforcement of road. Geogrids improve the bearing capacity of the soil and make the roads stronger and more reliable. It prevents expensive excavation and re-compaction. Compared to the traditional road construction techniques, using geosynthetic materials in road construction is much more economical and efficient. Geosynthetic materials are homogeneous because they are manufactured in a workshop with quality control. Geosynthetic sheets consume less space and can fit anywhere on land. This road also have some disadvantages Handling, storage, and installation must be taken with quality control and quality assurance. geosynthetic material, long-term performance should be assured using appropriate additives including antioxidants, UV screeners, and filters. geosynthetic materials are involved in forming drainage structures, separating different layers, preventing irregular settlements, providing waterproofing, of road structure and superstructure. The road line stabilization by using geogrid material to decrease the ballast and sub-ballast layer thicknesses of road. Use of geosynthetic road is the future of our transport. This type of road is better than the bituminous and cement concrete road.

REFERENCES

- [1] (AASHTO (2000). Geotextiles Specification for Highway Applications, AASHTO Designation:
- [2] M 288-00, American Association of State Highway and Transportation Officials, Washington, DC Abramson, L.W., Lee, T.S., Sharma, S., and Boyce, G. (2002). Slope Stability and Stabilization Methods. John Wiley & Sons, Inc., New York.
- [3] AASHTO (1993). Guide for Design of Road Structures, American Association of State Highway and Transportation Officials, Washington, DC.
- [4] Wilmers, W. (2002). The revised German regulations for the use of geosynthetics in road construction. In Geosynthetics: State of The Art-Recent Developments. Proceedings of The Seventh International Conference on Geosynthetics, 7(4), 22-27.
- [5] Van Santvoort, G. P. (1994). Geotextiles and geomembranes in civil engineering. CRC Press.
- [6] Webster, S. L., & Santoni, R. L. (1997). Contingency airfield and road construction using geosynthetic fiber Stabilization of sands (Vol. 97, No. 4). US Army Engineer Waterways Experiment Station.
- [7] Bloise, N., & Ucciardo, S. (2000). On site test of reinforced freeway with high-strength geosynthetics. In EUROGEO 2000: Proceedings of the 2nd European Geosynthetics Conference. Volume 1: Mercer Lecture, Keynote Lectures, Geotechnical Applications.
- [8] Han, J., & Thakur, J. K. (2015). Sustainable roadway construction using recycled aggregates with geosynthetics. Sustainable Cities and Society, 14, 342-350.