Impact Factor (SJIF): 3.632

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 3, Issue 2, February-2016

Barriers in Implimentation of Geosynthetics Applications

Jay Narendrabhai Panchal[1], Prof. Kumkum Bhattacharjee[2]

[1]*P.G. Student, M.E. (Civil), Infrastructure Engineering, L.D.R.P. Institute of Technology & Research, Gandhinagar*
[2] *Faculty, Department of Civil Engineering, Infrastructure Engineering, L.D.R.P. Institute of Technology & Research, Gandhinagar*

Abstract — *Generally, geosynthetics are being used in all the civil engineering works now days. But especially in road infrastructure geosynthetics are not that much used compared to other countries of the world. Because, there are some factors which are affecting the uses and implementation of geosynthetics. So all the factors should be known and which problems are creating the hindrances for adoption of geosynthetics in all over the India. Even if geosynthetics have higher strength, lowest permeability, more flexibility, unaffected by water, etc., these qualities are making it even more usable for road construction with higher quality of road pavements compared to traditional road pavements. Still geosynthetic is not widely used and hence study is necessary.*

Keywords- Geosynthetics, strength, permeability, road pavements.

I. INTRODUCTION

Currently, the numerous geosynthetic applications are understood to different grees. Each application has numerous different physical mechanisms at work, which must be thoroughly understood to enable an engineer to design with geosynthetics. An understanding and effective design methodology exists for the geosynthetic application of reinforced retaining walls that are often constructed for steep embankment slopes. Such stronger, improved, geosynthetic-reinforced retaining walls constructed near Kobe, Japan, clearly demonstrated benefits by withstanding the 6.9 Magnitude earthquake that occurred on January 16, 1995. Thus, the problem regarding the highway application is a lack of understanding of the fundamental behavior of a geosynthetic-reinforced subbase. Presently, researchers continue to investigate and define mechanisms of how geosynthetics improve highways.

The discussion about geosynthetics adoption in road pavements will let us understand that what difficulties have been faced by government and private road construction organizations. Also we will be able to know about the reasons and disputes while the usage of geosynthetics in road pavements has been proposed by these organizations.

II. GEOSYNTHETICS APPLICATIONS

- *Main applications of geosynthetics*
  - *i.* *Separation:* Confinement provides a media between the aggregate and the subsoil which absorbs the load in the form of tension and prevents change in alignment of the aggregate. Geosynthetics economically help the separation keeping two dissimilar materials apart to maximize the physical attributes of each of those materials.
  - *ii.* *Filtration:* The purpose of Geosynthetics with reference filtration is simply to retain soil while allowing the passage of water. When Geosynthetics are used as drains, the water flow is within the plane of the Geosynthetic itself i.e., they have high lateral permeability. At the same time, Geosynthetics must possess adequate dimensional stability to retain their thickness under pressure.
  - *iii.* *Drainage:* The use of Geosynthetics in drainage has made significant strides in changing the conventional procedure of using graded filters. Drainage composites are largely used to replace in one-product the standard package done by the filtration geotextiles and a draining natural gravel intermediate layer.
  - *iv.* *Reinforcement:* The purpose of Geosynthetics in the reinforcement function is to reinforce the weak sub-grade or subsoil. It helps to strengthen the soil surface and to increase the soils ability to stay put especially on the slopes. Further, it might additionally help in preventing water from pervading the slope and controlling the amount of infiltration that occurs during various rain events.
- *Highway Applications*

There are many applications of geosynthetics. Even within the highway application of geosynthetics, further division is necessary for clarity. Geosynthetic highway applications can be split into two areas, which are unpaved and paved roads. It is important to distinguish between the two, since different theories, physical mechanisms, design methodologies and failure criteria are utilized for each.

i. Unpaved Roads:

A geosynthetic placed properly does improve an unpaved road. The most effective location of the geosynthetic is below the select granular material and on the subgrade surface (Das et al. 1998). In this location the geosynthetic provides separation, lateral restraint of the upper granular course and a tensioned membrane effect when strained extensively. A geotextile separates a granularcourse from a fine-grained subgrade , due to its relatively small apertures or

apparent opening size (AOS). However, a geogrid also provides separation dueto its less than 100 percent open area and better lateral restraint of upper granular particles.

ii. Paved Road:

The purpose of geosynthetics placed below the granular base or subbase of a paved road is to allow for increased numbers of load repetitions prior to failure due to rutting and/or fatigue. Typically, shallow (less than one inch) rutting defines failure for a paved road, since fatigue failure is due more to the internal failure of the asphalt pavement. The paved road application is a primary concern of the Federal Highway Administration (FHWA) and State Transportation Departments across the United States. Any benefit realized for highways that compose this nation's infrastructure would translate ultimately to monetary savings while providing similar, if not better, performance.

III. BARRIERS IN GEOSYNTHETICS APPLICATIONS

1. No awareness.
2. No Technical education.
3. No Technical skilled labours.
4. Lack of Manufacturing Industries.
5. No Availability of sufficient raw material.
6. Not mentioned in SOR of tender as material.
7. Less adaptability as per Indian soil characteristics.
8. Cost of construction increases.
9. No quality standards are available particularly as per Indian soil type.
10. Contractors are not willing to adopt geosynthetics as they are end users on site of road construction.
11. Government doesn't have our own Indian geosynthetics standards.
12. Design of road pavement with geosynthetics is not identified yet.
13. Government is having fear about performance tests of geosynthetics in road pavements so government is not sure for adoption of geosynthetics.
14. Test laboratories are not well developed.
15. 3rd party inspection organizations are not available.
16. After construction of geosynthetic road pavement, there are no any organizations available for performance analysis.

IV CONCLUSION

As per this much of analysis, we can say that government should take 1st initiative against geosynthetics to spread awareness and education in private industries, to give education in educational institutes, do seminars and workshops, etc. And when government will include geosynthetics in tender as material other private organizations will have to adopt geosynthetics. By that, constructions organizations will automatically be aware about geosynthetics and their applications in civil engineering works. This will lead to more implementation of geosynthetics in road pavements.

REFERENCES

[1] Indian Highways: A Review of Road and Road Transport Development, IRC, Vol. 41, No. 6, June 2013.
[2] Study on Developing Measures to Promote the Use of Geosynthetics in India, Ministry of Textiles, Gov. of India, December 2013.
[3] Dr. Guda Venkatappa Rao & Dr. G. V. S. Suryanarayana Raju, "Advances in Geosynthetics", edition 2012.