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SOIL STABILISATION USING BY GEOTEXTILES

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Abstract

India is a vast country with widely varying climatic and terrain conditions. The resulting diverse nature of sub-soil conditions creates a spectrum of problems for construction engineers. A wide variety of geosynthetic materials and their products are available to improve soil sub grade properties in unpaved roads. This paper on coir geotextile gives an idea to improve properties by resulting through direct shear test & CBR before and after treatment.

I. LITERATURE REVIEWS

Prof. J.N. Mandal (1995) highlighted the use of geosynthetics in pavements. He concluded that placement of geosynthetics over subgrade soil can substantially reduce the required fill thickness. Use of geosynthetics ensures 36% improvement in highway quality and 10% saving in cost. Hybrid geosynthetics can be used as good drainage, filtration and reinforcement materials G Venkatappa Rao & P K Banerjee (1997)[1] highlighted in their studies the use of geosynthetics in recent developments. A wide variety of geotextiles and related products were briefly presented along with their functions and applications. A beginning was made to characterize the jute and Coir mattings that are available in India and to develop new products for wider applications. "Georg Heerten (2007)[2] proved that with the use of high modulus geogrid reinforcement layers, the load bearing capacity of soils can be significantly increased to extend service life by reducing deformations" is enabled significant savings in foundation material in road or railway applications compared to unreinforced structures. Geogrid-reinforced soil structures allowed for a quick and economic construction method for the rehabilitation of landslides and secondarily reduced construction costs as steep structures can be built which utilize reduced building land compared to natural slope inclinations Geotextiles are permeable fabrics which, when used in association with soil, have the ability to separate, filter, reinforce, protect, or drain"

"Typically made from polypropylene or polyester, geotextile fabrics come in three basic forms: woven (looks like mail bag sacking), needle punched (looks like felt) , heat bonded (looks like ironed felt)"

II. COIR GEOTEXTILE

Geotextiles are permeable fabrics which, when used in association with soil, have the ability to separate, filter, reinforce, protect, or drain. Typically made from polypropylene

or polyester, geotextile fabrics come in three basic forms: woven (looks like mail bag sacking), needle punched (looks like felt) , heat bonded (looks like ironed felt).

2.1. Types of geotextiles- There are three types of Geotextiles; Woven fabrics Non-woven fabrics and Knitted fabrics.
2.2. Geotextile requirement- Selection of Geotextile depends on survivability and governed by anticipated construction stresses
2.3.Pavement overlays benefits of using fabric interlayer –Geotextile provides benefits like waterproofing of the lower layers, retarding reflection cracking in the overlay , increase in structural stability, absorption of stresses.
2.4. Applications - A geotextile/geofabric is a permeable textile used with foundation, soil, rock, earth, or any other geotechnical engineering-related materials as an integral part of a human-made project, structure, or system.

Table 1.1: Symbols used in codification of samples

Symbol	**Description**
CBR	California Bearing Ratio
SS	Subgrade Soil
GF	Granular fill
FA	Flyash
FS	Foundry sand
G	Gypsum
JT	Jute

List of samples prepared with their respective codes are as follows:

Table 1.2: Codification of samples

Serial Number	**Sample Code**	**Description**
1	Direct shear c and o before treatment	11&3 with sand 12&2 after treatment
2	Direct shear c and o after treatment	16&3 with sand 16&2 with clay

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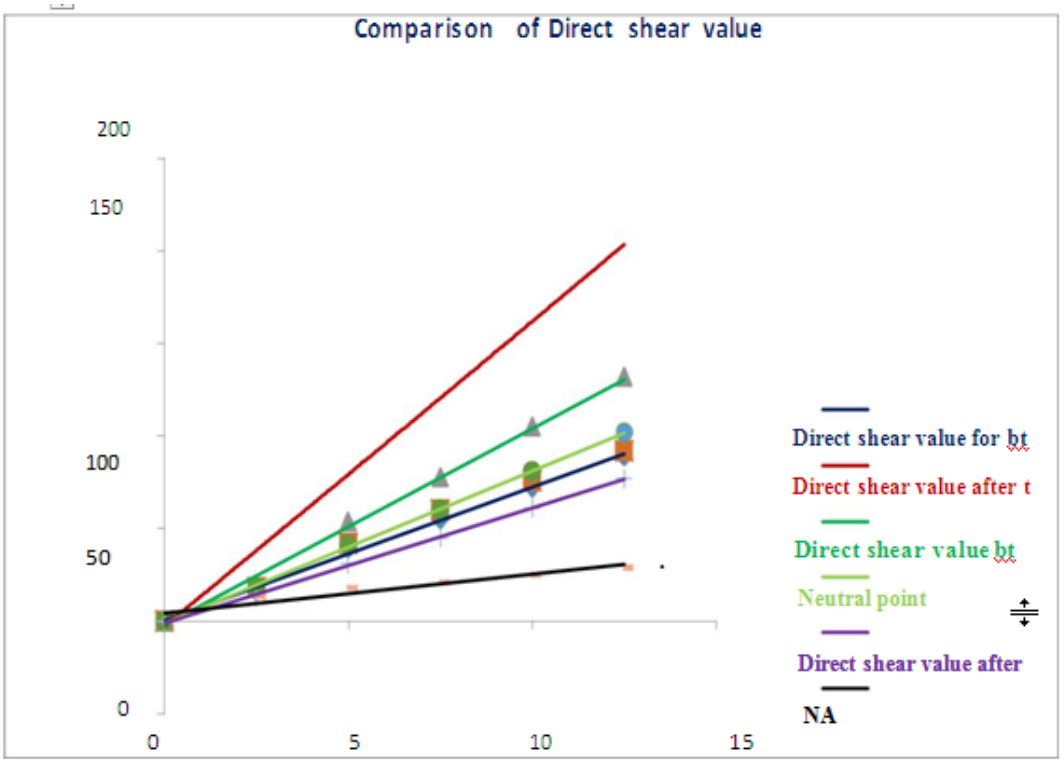

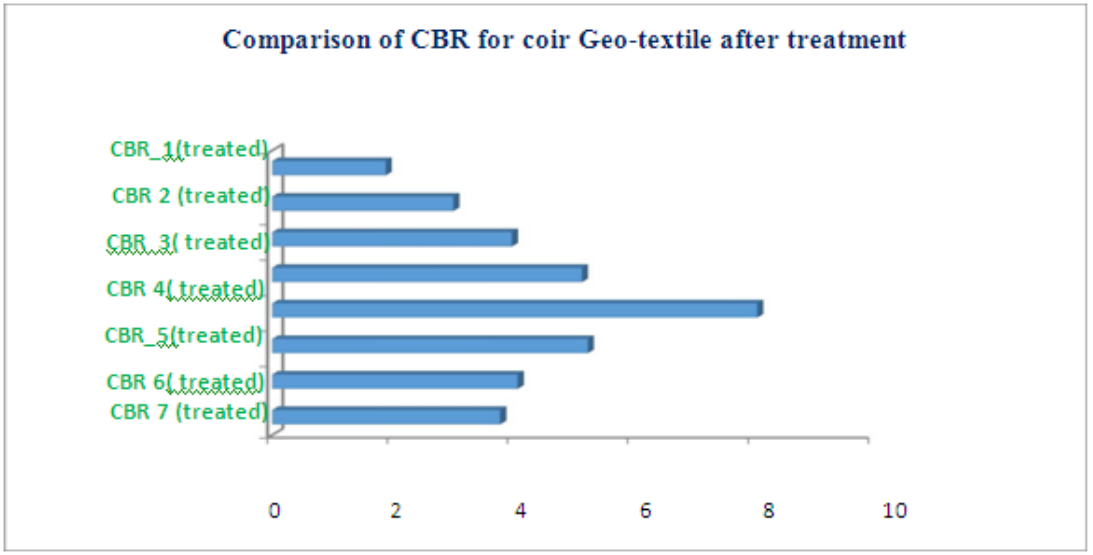

III. CONCLUSIONS

Based on the studies on the sub grade soil, strengthening materials and the reinforcements performed, following conclusions can be drawn –

- With application of woven coir reinforcement, a good increment in the CBR value was observed as the depth of the reinforcement from the top of the mould was increased in steps. So selection of proper depth is necessary as with the increasing depth of reinforcement application, a transformation of moderate to good CBR was observed.
- Providing two layers of jute reinforcement at different levels and at same level resulted in a very limited increment in CBR. So thickness of the fiber layer also needs to be optimized for economic considerations and strength parameters.
- With application of Geotextile reinforcement , a slight decrement in the CBR value.

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