

Study On Utilization Of Geo Grids For Strengthening Of Sub Grade Soil

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Abstract

Utilization of Geo synthetics in late thirty years for partition, support, filtration, seepage, and regulation elements of the asphalt structure. The utilization and offers of geo synthetics materials are expanding 10% to 20% every year. They are being promptly used for pavement and bridge construction in the present filed of construction. This project explains the use of geo synthetic materials like geo grids in for reinforcing of soil by concentrating on the writing survey, fundamental helpful qualities and essential data accumulation of geo synthetics. The investigation centers around the decrease of base course thickness by utilizing the geogrid material in the base course layer without changing the heap conveying limit. Further they are illustrated with AASHTO configuration result demonstrated in line with base course and analyzed for conceivable utilization of geo grid in Rigid structure, Obtained results have been characterized in line with American Society for Testing and Materials (ASTM) Committee D35 on geo synthetics as planar items produced from polymeric materials utilized with soil, shake, earth, or other geotechnical building related material as a basic piece of a man-made undertaking, structure or framework. Geo synthetics is the term used to depict a scope of polymeric items utilized for Civil Engineering development works.

In the present study the geotechnical properties of soil like water content, maximum dry density, optimum moisture content, compressive strength and shear strength of sub grade soil is done by using geo grids at different position 25%, 50%, 75% from the top surface of the unconfined compressive strength specimen in UCS mould.

1. Introduction

Geo synthetic is defined as a planar product manufactured from a polymeric material that is used with soil, rock, or other geotechnical-related material as an integral part of civil engineering projects. Geo synthetics are available in a wide range of forms and manufactured using different processes and materials. Their market is growing steadily, and they are available worldwide because of their wide-range civil applications.

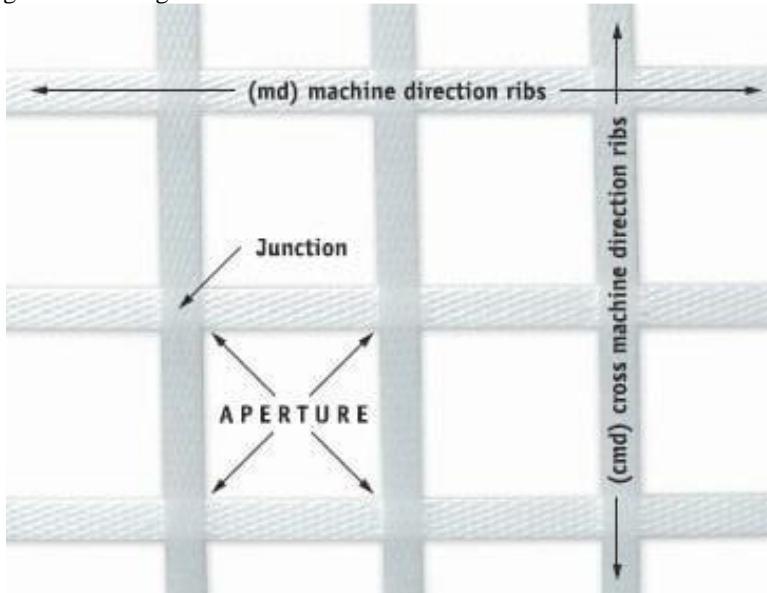
Geo grid is a major type of geo synthetics which has an open mesh grid structure. It can be used for soil reinforcement, separation, drainage and filtration in roads, airfields, railroads, embankments, earth retaining structures, reservoirs, canals, dams, and coastal protection. Uniaxial, biaxial, and triaxial geogrids are three common types of geogrid. Recently, geogrids have been widely used for soil reinforcement of paved and unpaved roads where weak soil condition exists.

To improve the strength of soil using geogrid reinforcement and study the optimum position of the reinforcement resulting in maximum strength. □To study and compare the performance of the conventional soil and reinforced soil. To study the OMC and Maximum dry density for different proportions of ferrochrome slag. To study the maximum strength of soil for different proportions of ferrochrome slag. To calculate the UCS values for different proportions of ferrochrome slag.

2. Materials Used

Geo grids

A geogrid is geosynthetic material used to reinforce soils and similar materials. Geogrids are commonly used to reinforce retaining walls, as well as subbases or subsoils below roads or structures. Soils pull apart under tension. Compared to soil, geogrids are strong in tension.



Geo grid

Red Soil (RS)

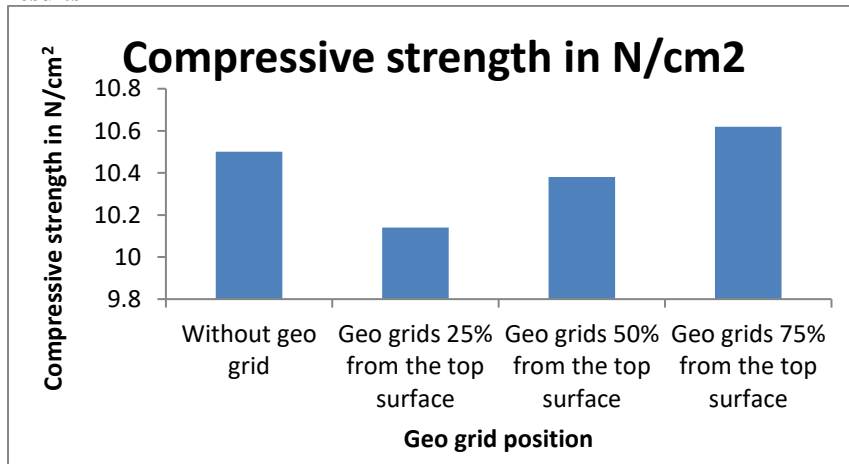
The red soil shown in Figure 3.6 is the red coloured fine grained residual soil collected from the shallow surface, which is not suitable for the construction of pavements. The red soil is used in the present study for comparison of properties as sub-grade soil to the ferrochrome slag and also characterization of stabilized red soil with ferrochrome slag as sub-grade soil for the construction of pavement..

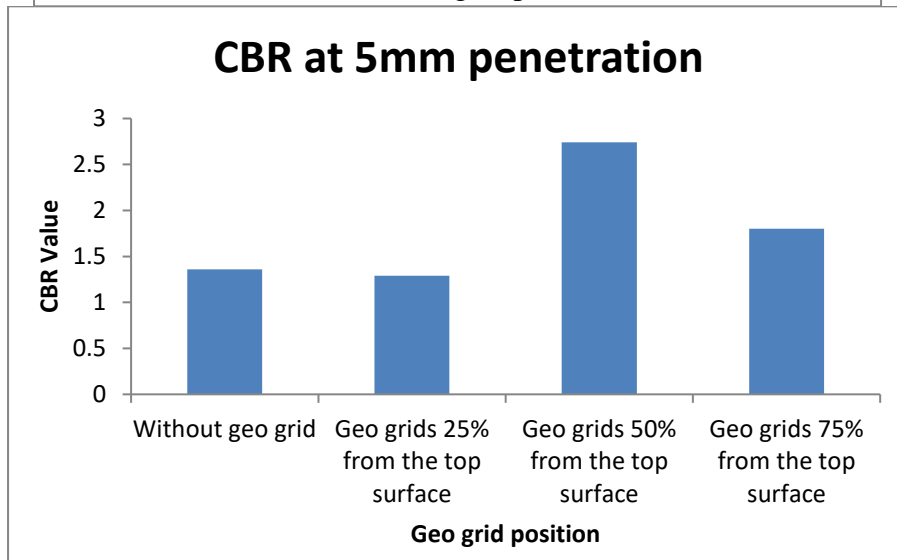
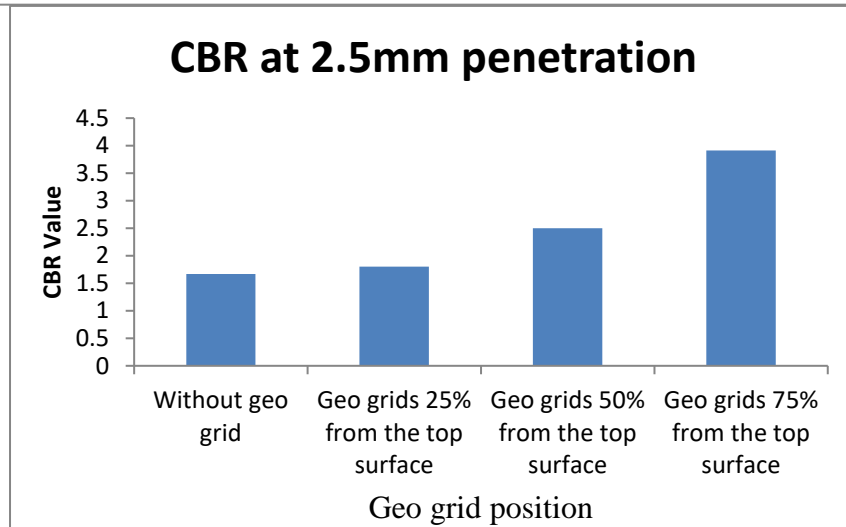
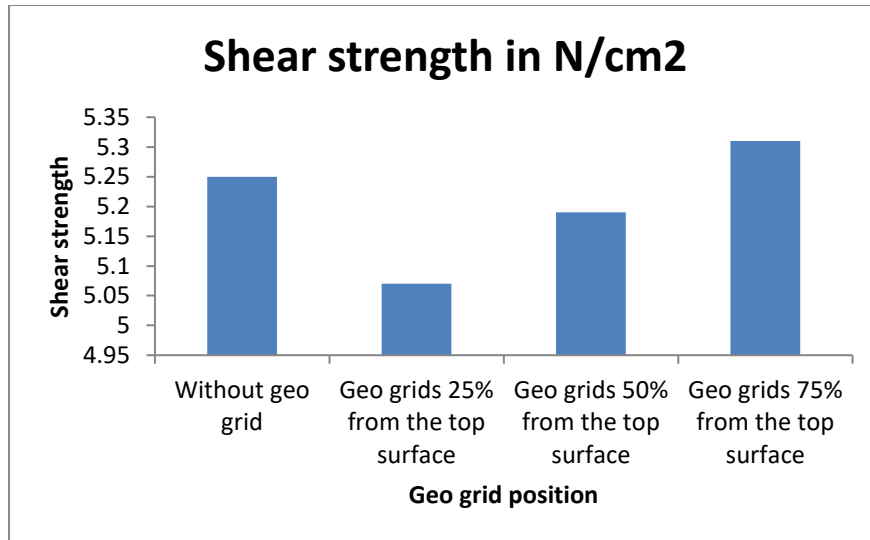
3. Experiments to be conducted

For the present research the following tests are studied

1. Material properties
2. Compressive strength
3. Shear strength
4. CBR Test

4. Experimental Results





5. Conclusions

From this study the following conclusions were made

1. Using geogrid as soil-reinforcement, there was no significant improvement of reinforced Black cotton soil compared to the reinforced sandy gravel soil because there is no internal friction between grain to grain and between soil and geogrid material.
2. With changing the position from 0% to 75% the value of compressive strength increases and the maximum value of compressive strength was observed at Geo grids 75% from the top surface.
3. The value of shear strength increases from geo grid position from 25% to 75% and the maximum value of shear strength was observed at 75% geo grid from the top surface.
4. The value of CBR value increases from geo grid position from 25% to 75%
5. Due to a good internal friction between the geo-grid material and the soil particles of sandy gravel soil it showed a good increase in the CBR value.
6. It has been observed that the inclusion of geosynthetics, i.e. geotextile, geocomposite and geogrid in the order of increase of tensile strength, have been detrimental in improving the shear resistance, with an anomaly for sand flyash mixtures. Also, it can be concluded that the shear strength at the interface increases with the tensile strength on the geosynthetic material.
7. Therefore, geogrid a polymeric material can be used as a reinforcing material into the subgrade soils for improving the strength performance of that soil.
8. When the geogrid is studied as reinforcement material, the macroscopic analysis of the mechanical properties of geogrid is not enough. There are varieties of geogrids, thus it should be refined to specific one and focus on its mechanical properties.

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