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Increasing Strength of Sub-grade Layer of Pavement using Geo-grid

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Abstract: This Paper describes the beneficial impact of reinforcing the sub-grade layer with a single layer of geo-grid at different positions and thereby determination of optimum position of reinforcement layer. The (best) optimum position was determined based on California Bearing Ratio (CBR value) and unconfined compression tests were conducted to decide the optimum position of geo-grid.

The CBR value of a soil increases by 50-100% when it is reinforced with a single layer of geogrid. The amount of development (Improvement) depends upon the type of soil and position of geo-grid.

CBR of sub-grade soil is 6.53% without reinforcement and when geo-grid was placed at 0.2H from the top, the CBR value increased to 19.66%. Soaked Condition CBR of sub-grade soil is 4.77% without reinforcement and when geo-grid was placed at 0.2H from the top, the CBR value increased to 4.46%.

Keywords: Pavement, Geo-grid, Reinforced, Sub-grade, CBR, Filtration, Reinforcing

I. INTRODUCTION GEO-GRID

Geo-grids represent a little however speedily growing phase of the geo-synthetics space. Instead of being a woven, nonwoven or knit textile (or textile-like) material, geo-grids are plastics shaped into a really open, grid like configuration, i.e., they need apertures bigger than 1/4" to allow interlocking with surrounding soil, rock, earth and other surrounding materials. Often they are stretched in one or two directions for improved physical properties. By themselves, there is a list of application areas like under parking lots, airport runways, gravel construction roads, highways, earth retaining wall construction, Steepened Slopes, dam and railroad tracks etc. It works in two ways: reinforcement and separation which are the techniques of humanizing soil having expansive in nature with geo-grid, to increase the stiffness and load carrying capacity of the soil through frictional interaction between the soil and geo-grid material.

II. LITERATURE REVIEW

Ling and Liu (2001) carried out some static and dynamic tests on model sections to find out the contribution of geo-synthetic reinforcement to the stiffness and strength of asphalt pavements. A.K. Choudhary et.al (2011) placed multiple layers of reinforcement specifically geo-grid and jute geo-textile among the sub-grade. He found that the enlargement quantitative relation decreases once the soil is bolstered with single layer and goes on decreasing with a rise in variety of reinforcing layer, however this decrease is critical just in case of jute Geo-textile and marginal within the case of Geo-grid which implies the insertion of reinforcement controls swelling of the soil.

Chander Bhal Roy (2015) analyzed the report for the stabilization of soil of Indian origin. Scrap tyres square measure being created associated accumulated in large volumes inflicting an increasing threat to the atmosphere. In order to eliminate the negative impact of these depositions and in terms of property development there is nice interest among the usage of these nonhazardous wastes. The potential of exploitation rubber from worn tyres in many technology works square measure studied for over twenty years,

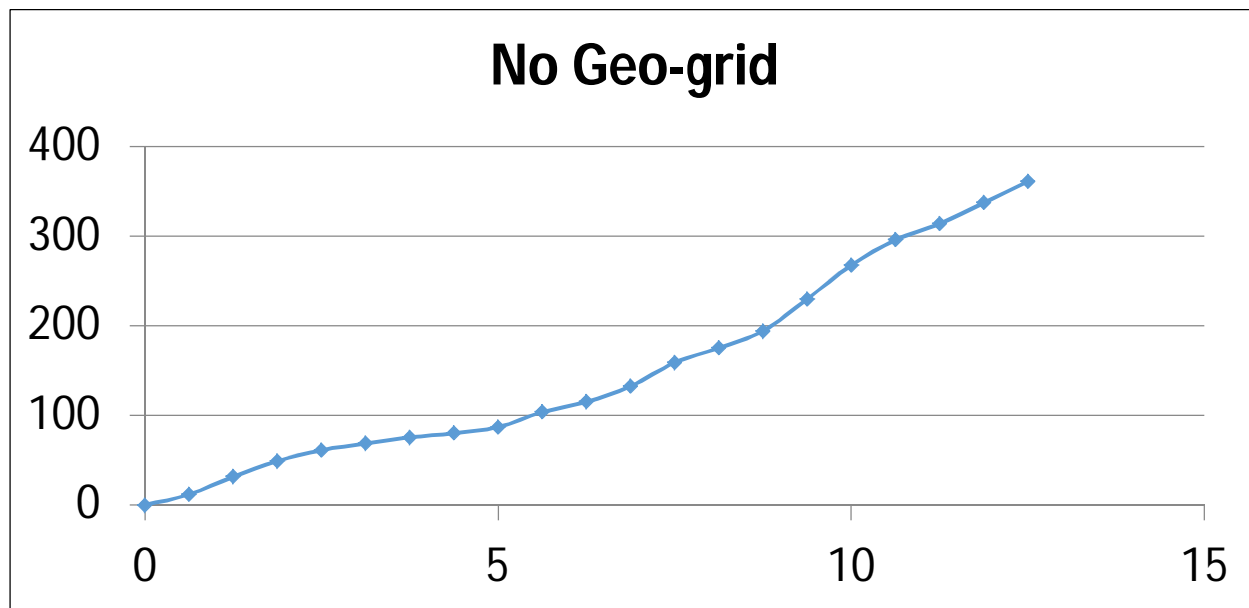
III. OBJECTIVE

To determine the effect of strength of geogrid reinforcement on the basis of CBR value at various thickness of a sample under unsoaked and soaked condition

- 1) To determine the CBR at 0.2 H.
- 2) To determine the CBR at 0.4 H.

IV. EXPERIMENTAL RESULT.

A. CBR Value Calculated Unsoking Condition Without GEO GRID the Sample



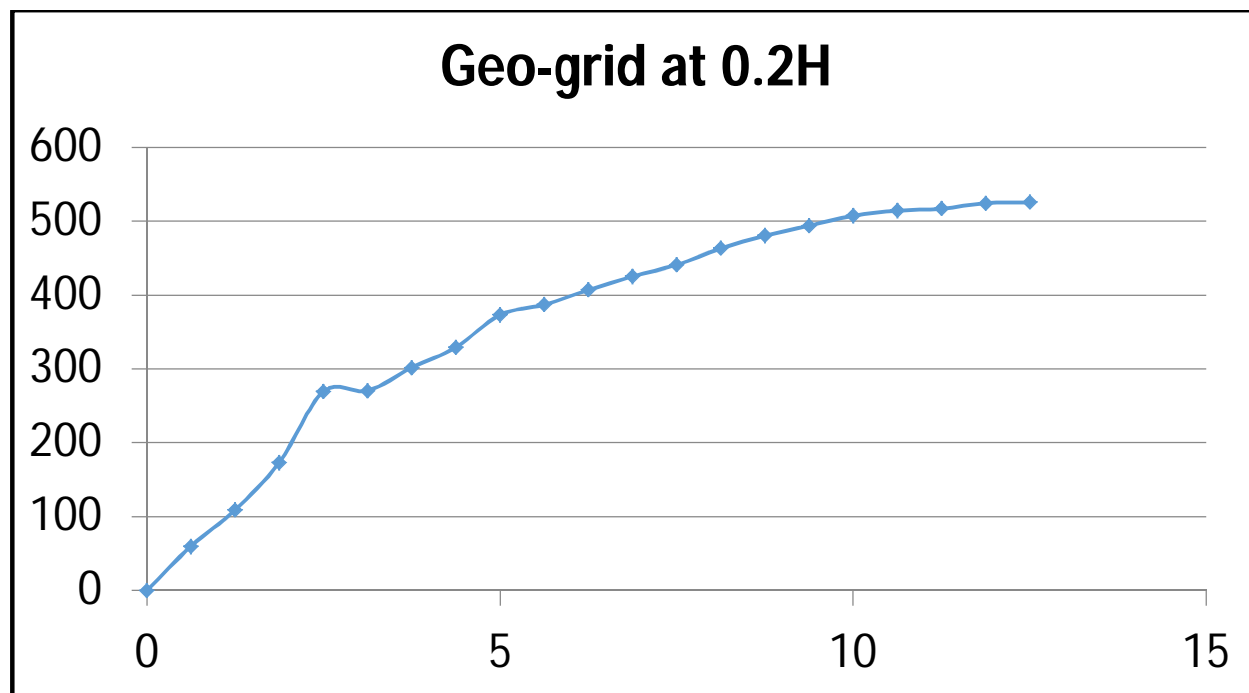
Unsoaked CBR value determination without geo-grid

CBR at 2.5 mm 6.53

CBR at 5.0 mm 6.07

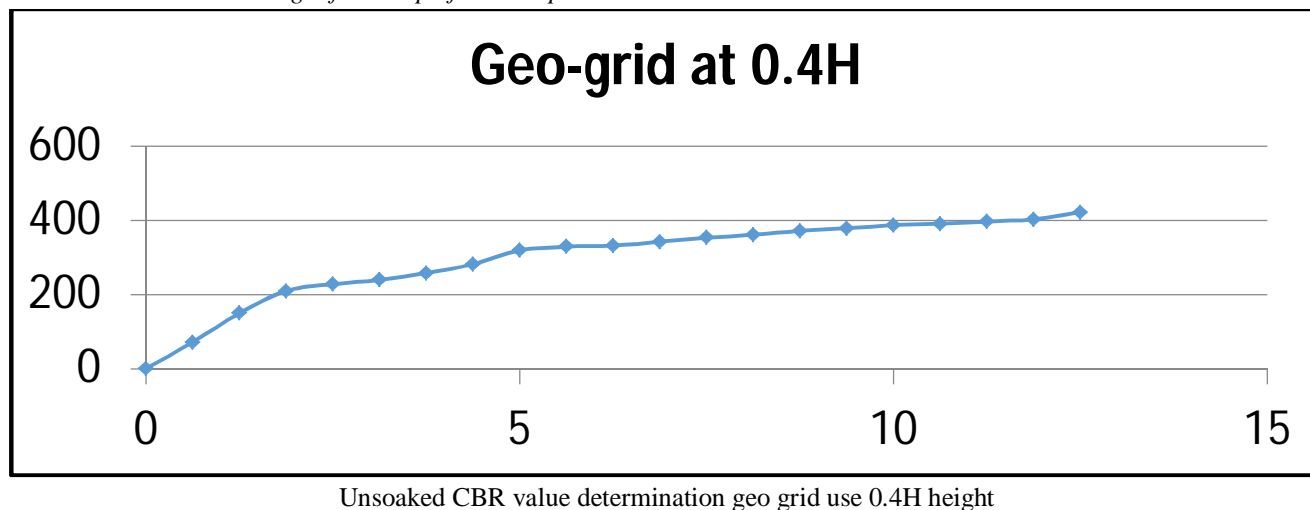
From about Graph it has been shown that the Unsoaked CBR value when geo-grid placed at height (0.2H) are 19.66 which observed that 66.67% increased CBR value from 6.53 are got virgin soil

B. GEO GRID use 0.2 H Height from Top of the Sample



Unsoaked CBR value determination geo grid use 0.2 H height

C. GEO GRID Use 0.4 H Height from Top of the Sample



CBR at 2.5 mm 16.6423

CBR at 5.0 mm 15.5707

From about Graph it has been shown that the Unsoaked CBR value when geo-grid placed at height (0.4H) are 16.64 which observed that 60.7% increased CBR value from 6.53 are got virgin soil

V. CONCLUSION

In the present study, reinforced benefits of different layers of a flexible pavement are evaluated in terms of their strength parameters like, CBR value and the important discussions of this research are summarized below:

- 1) The CBR of a soil increases by 50-100% when it is reinforced with a single layer of geo-grid. The amount of improvement depends upon the type of soil and position of geo-grid.
- 2) CBR of sub-grade soil is 6.53% without reinforcement and when geo-grid was placed at 0.2H from the top, The CBR value increased to 19.66%. Soaked Condition CBR of sub-grade soil is 4.77% without reinforcement and when geo-grid was placed at 0.2H from the top, The CBR value increased to 13.13

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