iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** I **Month of publication:** January 2022

DOI: https://doi.org/10.22214/ijraset.2022.39808

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue I Jan 2022- Available at www.ijraset.com

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

Jayant Kumar Dahre[1], Pushpendra Kumar Kushwaha[2], Mithun Kumar Rana[3]
[1]*M. Tech. Research Scholar,* [2, 3]*Assistant Professor, Civil Department, RKDF College of Engineering, Bhopal (M. P.), India*

Abstract: ***This Paper describes the beneficial impact of reinforcing the sub-grade layer with a single layerof 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. IInstead 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 than1/4" 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

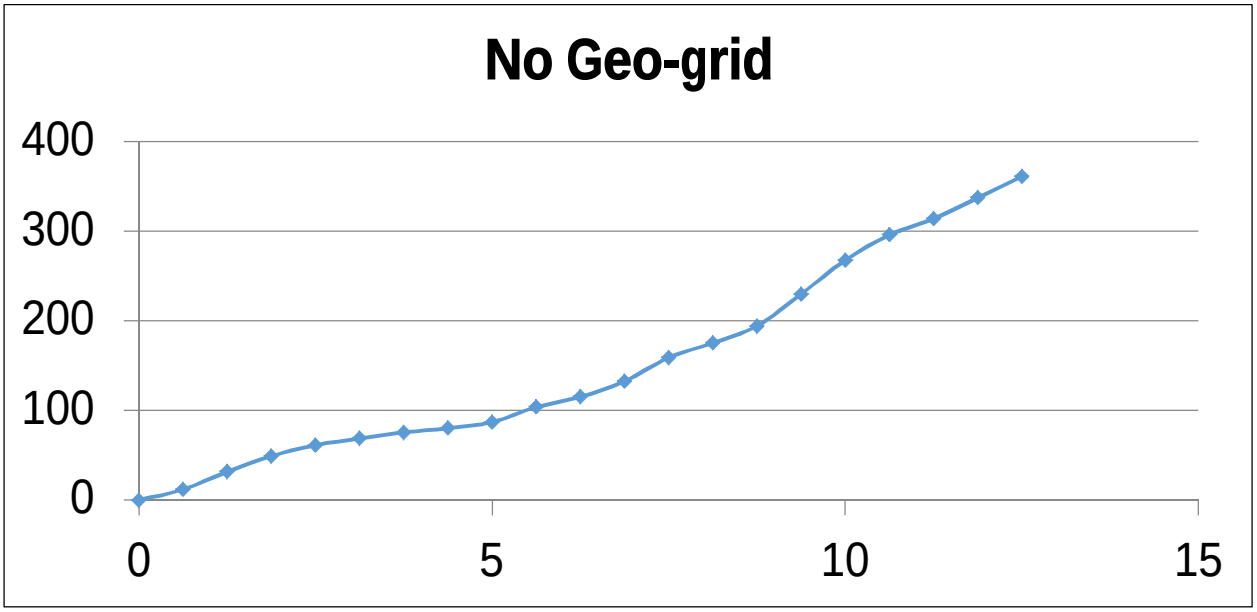
To determine the effect of strength of geogrid reinforcement on the basis of CBR value at various thickness of a sample under unsoaked and soaked condition

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

©IJRASET: All Rights are Reserved

IV. EXPERIMENTAL RESULT.

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

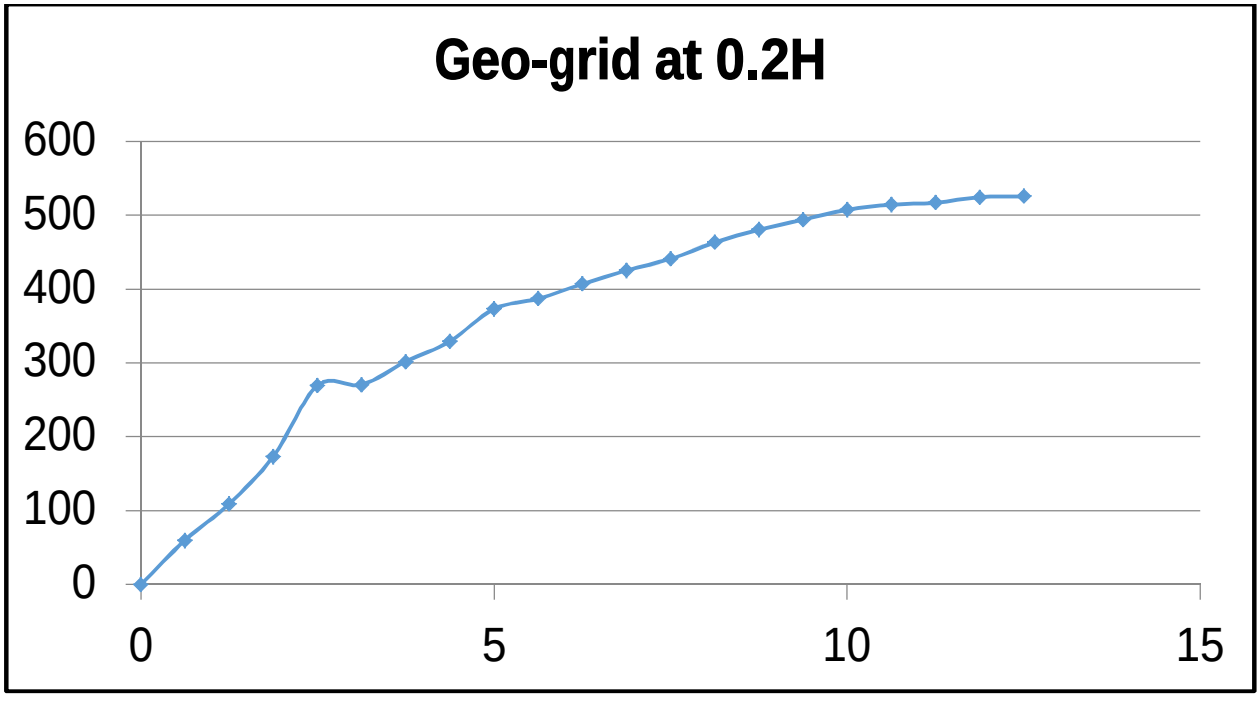


Unsoaked CBR value determination without geo-grid

CBR at 2.5 mm	6.53
CBR at 5.0 mm	6.07

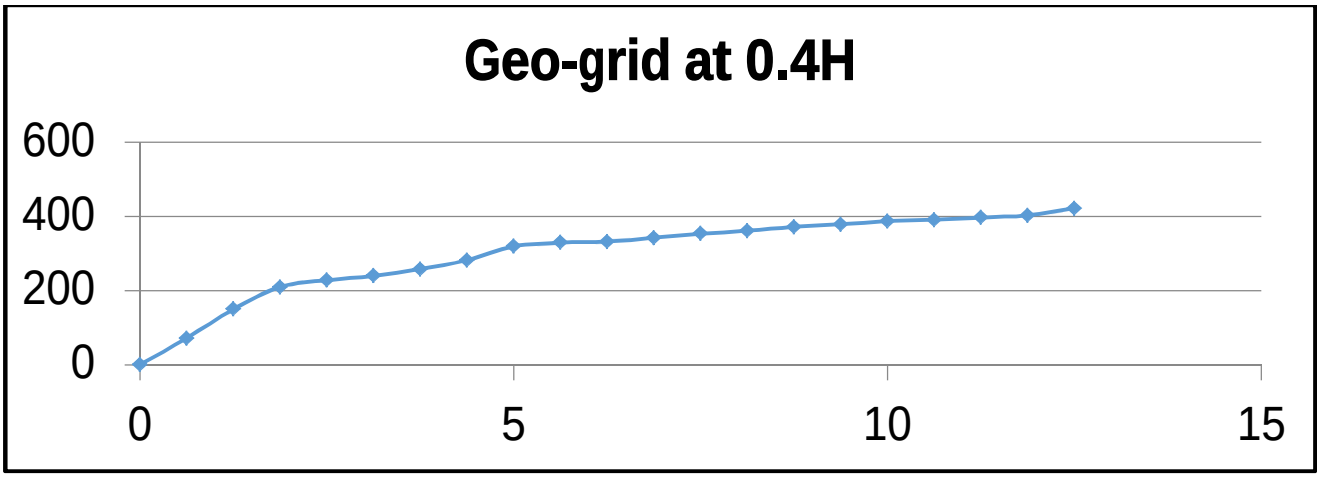
From about Graph it has been shown that the Unsoaked CBR value when geo-grid placed at height (0.2H) are 19.66 which observed that66.67% increased CBR value from 6.53 are got virgin soil

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



Unsoaked CBR value determination geo grid use 0.4H height

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 that60.7% 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:

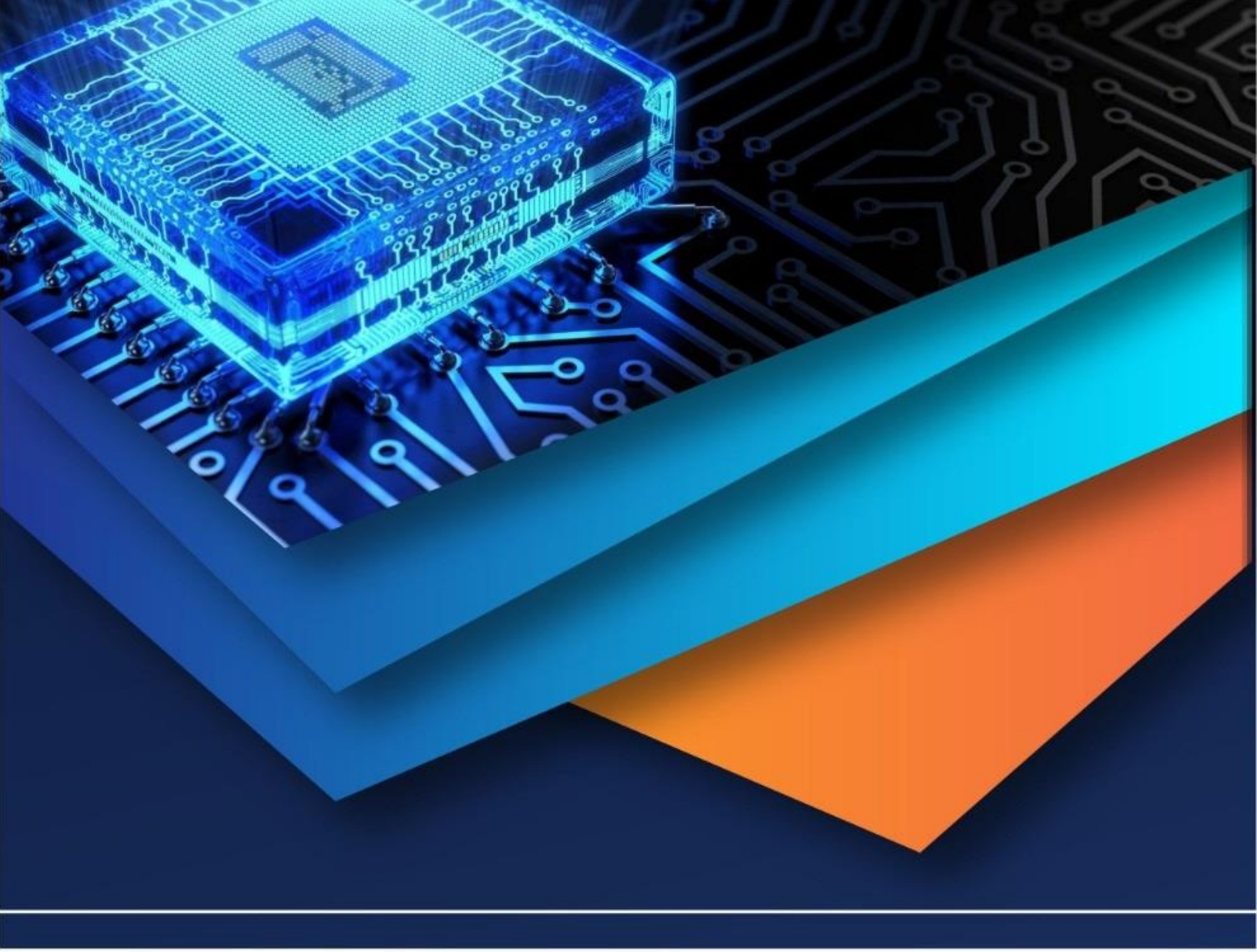
1) The CBR of a soil increases by 50-100% when it is reinforced with a single layer of geo-grid. The amount of improvement depends upon the type of soil and position of geo-grid.

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

REFERENCES

[1] K.Choudhary, K.S.Gill and J.N.Jha (2011) “Improvement in cosmic background radiation values of expansive soil sub-grades victimization geo-synthetics” IGC J-233.
[2] Chander Bhal Roy (2015), “Stabilization of soil of Indian origin” International Journal of Scientific and analysis Publications, Volume 3, Issue 3,1 ISSN 2250-3153.
[3] D.S.V.Prasad and Dr M. Anjan Kumar (2010) “Behavior of strengthened sub bases on expansive soil sub-grade” GJRE Vol. 10.
[4] Dr. Vijay Kumar , Ms P Lavanya Rekha (2016) , “ CBR performance of geo-grid reinforced weak sub-grades”
[5] Evangelin Ramani Sujatha and Vignesh Jayaraman (2012) “Improving the strength of sub-grade victimization geo-grids”.
[6] Ghate Sandeep Hambirao (2014), “Soil Stabilization victimization waste chopped rubber tyre chips”. IOSR Journal of Mechanical and applied science (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 11, PP 20-27 World Wide Web.iosrjournals.org
[7] Hossein Moayedi, Sina Kazemian, Arun Prasad, Bujang B. K. Huat (2009) “Effect of Geo-grid Reinforcement Location in sealed Road Improvement” EJGE Vol. 14.
[8] IJATRME (2014), “Study on heave characteristics of black cotton soils victimization copper dross with cement as admixture”. IJIRST –International Journal for Innovative analysis in Science & Technology| Volume one | Issue twelve | ISSN (online): 2349-
[9] J. G. Zornberg & R .Gupta (2009) “Reinforcement of pavements over expansive clay subgrade” continuing of the 17th International conference on soil mechanics and Geotechnical engineering. Pg (765-768)
[10] Kumar (2015), “Conducted a study on use of construction and dismantled waste”. He all over that construction and dismantled wastes bricks, concrete, tiles. IJIRSET –International Journal for Innovative analysis in Science, Engineering & Technology. Vol. 4, Issue 5, ISSN (Print)
[11] Kumawat (2014), “Carried out laboratory to check the performance of black cotton soil treated with carbide residue (CCR) and stone dust”. International Journal of Engineering analysis and Science & Technology: vol.3, No.4.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)