

A Research Paper On Stabilization Of Soil By Using Bituminous Material

Vikash Kumar Gautam¹, Devesh Jaysawal²,

¹ Student M.tech Dept. Of Civil Engineering, IEC College Of Engineering & Technology, U.P., India

² Assistant Professor, Dept. Of Civil Engineering , IEC College Of Engineering & Technology, U.P., India

Abstract - Soil stabilization is a method of improving soil properties by blending and mixing bituminous materials. Soil is used sub base and base material, If strength of soil is poor, then stabilization is usually required. Subgrade is sometimes stabilized or changed with solid soil. Soil could be black cotton or as fly ash which could fly in interaction with air. There are many stabilizers used for stabilizing the soil such as, cement, lime, bitumen, fly ash etc., in this paper bitumen as stabilizer. Bitumen mixture is expensive material in road construction. So it's quantity play vital part to stabilize the soil. It increases the stability of soil mechanically. It does not react with soil. It is just fill the pores of soil.

Key Words: stabilization ,soil, fly ash, bitumen, road construction

1. INTRODUCTION

The prime dispassionate of soil stabilization is to increase the California Bearing Ratio of in-situ soils by 5 to 7 times. The other prime dispassionate of soil stabilization is to increase on-site materials to create a solid and strong sub-base and base courses. In certain regions of the world, normally developing nations and now more commonly in developed nations, soil stabilization is being used to construct the whole road.

The soil in subgrade is normally stressed to assured minimum level of stresses due to the traffic loads. Subgrade soil should be of good quality and properly compacted so as to operate its full strength to resist the stresses due to traffic loads for a specific pavement. This leads the monetary situation for overall pavement thickness. On the other hand the subgrade soil is characterized for its strength for the determination of design of at all pavement.

Development of soil engineering properties is mentioned to soil stabilization. There are two main methods of soil stabilization. One is mechanical method and the other one is chemical methods. Soil is a store of earth material, determined often from the collapse of rocks or corrosion of scrub that could be exposed promptly with force materials in the field or split by delicate reflex earnings in the lab. The supporting soil below pavement and its different under course is known as sub grade soil. Short of break soil below the pavement is known as consistent sub grade. Compacted

sub grade is the soil compacted by reserved development of individual types of substantial compactors.

At present every road construction project will use one or both of these stabilization approaches. The most famous type of mechanical soil stabilization is compaction of the soil, while the addition of cement, lime, bituminous or alternate executors is mentioned to as a artificial or added substance approach for stabilization of soil. American Association of State Highway and Transportation Officials (AASHTO) classification system is a soil classification system specially intended for the construction of roads and highways used by transportation engineers. The system used the grain-size distribution and Atterberg limits, such as Liquid Limits and Plasticity Index to categorize the soil properties. There are different types of extracts available. Not all extracts work for all soil types. Usually, a stabilizer may be used to act as a binder, after the conclusion of moisture, increase the soil density. Succeeding are some most widely used extracts: Portland cement, Quicklime or Hydrated.

2. LITRATURE REVIEW

Michael (1993) had suggested about Bench-Scale Evaluation of Asphalt Emulsion Stabilization of Dirtied Soils. In this study, it was conversed about the use are discussed to the environmental fixation of soils contaminated by organic contaminants.

Razouki et al. (2002) gives an experimental study on Gravelly Stabilized Roads. Bitumen was used as a stabilizing agent act as a binder or as a water-proofing material. Soil-bitumen systems had found the highest used in road bases and surfaces.

Cokca et al.(2003) concentrated on the effects of compaction dampness content on the shear quality of an unsaturated sludge. The effects of compaction dampness substance and soaking on the unsaturated shear quality parameters of sludge were examined. Experiments were carried out on varieties compacted at optimum dampness content, on the dry side of optimum and on the wet side. It was found that edge of corrosion reductions quickly with increasing dampness substance, the union segment of shear quality attained its top rate at around optimum Moisture substance and subsequently diminishes.

A. P. Chritz (2006) Suggested about performance evaluation of mixed in place bituminous stabilized assume gravel. Here it was showed an cheap maintenance of gravel shoulders, a very common problem is facing by highway agencies.

Hussain (2008) carried out an brilliant work to establish the link between CBR value and undrained shear strength value from Vane Shear Test. It was exposed that un-drained shear strength value and CBR value increased with increasing plasticity index. In decision it was achieved that shear strength and CBR value is inversely proportional to the water content of that material.

Martinet al. (2009) established a paper deals with foam bitumen stabilization. Foamed bitumen is a combination of bitumen, air and water. Here 2.5 percent of cement and 3.5 percent of bitumen foam was used. From here it has been found that Analysis using foamed bitumen had proved to be successful because of its ease and speed of construction, its compatibility with a extensive range of aggregate types and its relative resistance to the effects of climate

3. DISSCUSSION

Subgrade may be defined as the compacted soil layer, usually of logically occurring local soil, assumed to be 300 mm in thickness, just below of the pavement crust. It provides a suitable foundation for the pavement. Therefore it is very important to increase strength of subgrade soil, it may be by replacing good soil or by stabilization of existing soil. To check the subgrade soil stability California bearing ratio (CBR) test is very commonly used test.

4. CONCLUSION

From this study it is clear that there is a considerable improvement in California Bearing Ratio of sub-grade due to use of MS bitumen mixture if proper mixing is done. It is seen that it best results are obtained if the soil emulsion mix is left for about five and half hours after mixing. In each formal of condition it was found that California Bearing Ratio value has increased consecutively from Case A to Case. In this particular experimental study California Bearing Ratio value has increased up to fifty percent of the unmodified soil California Bearing Ratio. Detecting its financial cost and quality of stabilization improvement, it is clear that this type of stabilization may be applicable in gravel soil. As we increase the amount of mixture California Bearing Ratio value of soil is increases. But the cost of mixture is so high so the amount of mixture also depends upon budget and importance of structure

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher Mr. Devesh Jaysawal as well as our HOD Mr.

Dhirendra kumar singh who gave me the golden opportunity to do this wonderful research paper on the topic "A Research Paper on Stabilization of Soil Using Bituminous material" which also helped me in doing a lot of Research and I came to know about so several new things I am really thankful to them.

Also I would also like to thank my parents and friends who helped me a lot in completing this research paper within the limited time frame

REFERENCES

- [1] S.K.Khanna, C.E.G.Justo, A.Veeraragavan- Highway engineering
- [2] Bench-Scale Evaluation of Asphalt Emulsion Stabilization of Contaminated Soils. Journal of Soil Contamination, 2(2): (1993)
- [3] Cokca.E., Erol,O., Armangil. (2004), "Effects of compaction moisture content on the shear strength of an unsaturated clay", Geotechnical and Geological Engineering
- [4] Consoli, N. C., Prietto, P. D. M., Carroro, J. A. H., and Heineck, K. S.(2001). "Behavior of compacted soil-fly ash-carbide lime mixture."J. Geotech. Geoenviron. Eng., 127(9), 774–7827.
- [5] Compection Characteristics of Non- Gravel and Gravelly Soil Using a Small Compaction Apparatus Volume 7 issue (7 July 2010)on, B. Noble, and I.N. Sneddon, Phil. Trans. Roy. Soc. London, vol. A247, pp. 529-551, April 1955.

BIOGRAPHIES



"Vikash Kumar Gautam", graduated in 2016 and now pursuing his master degree in civil engineering from Dr. APJ Abdul Kalam Technical University



Mr. Devesh Jaysawal Presently worked as a Assistant Professor in IEC college of Engineering & Technology of Greater Noida from 2014. He completed his M.Tech. in Transportation Engineering from National Institute of Technology Patna in 2014 and B.Tech. in Civil Engineering from Uttar Pradesh Technical University, Lucknow in 2012