Final Year Project

On

STUDY OF SOIL STABILISATION OF PAVEMENT SUBGRADE USING STEEL SLAG

Under the Guidance of Prof. ARGHYA BANERJEE

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A Report on

STUDY OF SOIL STABILISATION OF PAVEMENT SUBGRADE USING STEEL SLAG

By

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CERTIFICATE

This is to certify that Dayal Seikh, **Roll No.-** 13001318101, **Registration No: -** 181300110503 has carried out the project work entitled as **"STUDY OF SOIL STABILISATION OF PAVEMENT SUBGRADE USING STEEL SLAG"** as a part of the curriculum for the B. Tech Degree in Civil Engineering under Maulana Abul Kalam Azad University of Technology for the year 2018-2022. This project report is approved by the undersigned only for the purpose for which it is submitted. The candidate is entirely responsible for statement, pinions and conclusions contained herein.

16/6/2022

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ABSTRACT

The project deals with the stabilization of soil using steel slag. Unsuitable highway sub grade soil requires stabilization to improve its properties. Industrial waste sand is used as raw materials when the sand can no longer be reused in the industry, it is removed from the industry and is termed as industrial waste sand. Ingredients used are copper slag, cement and lime. Copper slag is a by-product of copper industry lime has bought from locally available chemical laboratories. The project is planned to conduct various experiments like specific gravity, sieve analysis, proctor compaction test, unconfined compressive strength and CBR test to increase strength properties and behaviour of sub base. Then the result and graphs of various mixes are compared to see their effect in sub base stabilization. The Stabilization technique has an additional benefit of providing an environment friendly way to deal with industrial waste sand.

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CHAPTER-1

1.1. INTRODUCTION

A road pavement directly rests on specifically prepared soil subgrade which in its term rests on existing soil through a road. A well compacted subgrade has important bearing in the sense that it receives structural load from the road pavement along with the load of all type of traffic and transfer it to the soil.

For safe cost-effective construction and proper performance over the design life of the road, subgrade plays probably most important role. Generally fine-grained soil like clay, clayey, silt exhibit low values of CBR requiring greater thickness of costly overlaying layers of sub-base, base, wearing coarse.

Thus, for cost effective road construction CBR values of subgrade requires importance. So, it is worthwhile to check the possibility of improving CBR of such soils by adding different percentages of steel slag to it.

CHAPTER-2

2.1 OBJECTIVE OF THE PRESENT STUDY

INTRODUCTION: -

Alluvial soil near ground surface is generally of poor-quality soil having low bearing capacity. In many situations, there lies a need to improve their properties by suitable methods. Several methods for soil stabilization have been developed like cement stabilization, lime stabilization, chemical stabilization for this purpose. But these methods are costly and there are several procurement problems at far off site. It is necessary to develop, easy to use cost effective methods for soil stabilization.

Large scale construction activities are going on sectors of road construction of India through different government scheme. Design of flexible roads is generally based on limited number of CBR test results on soil samples generally collected at an interval of 500m.

For this study, alluvial soil was collected from locations namely TISL campus in North 24 Parganas district. The effective size index properties like Liquid Limit, Plastic Limit, Plasticity Index were determined in the laboratory and the compaction characteristics of the soil were determined experimentally.

Steel slag was mixed with soil in increasing percentage and each mixed soil was tested for all the index properties (LL, PL, PI) and also compaction characteristics. For each mixed soil, CBR test under unsoaked condition were conducted at Optimum Moisture Content to study the variation in CBR value due to addition of steel slag.

Literature Review

SOIL STABILISATION: AN OVERVIEW

- **Omotayo Ayeni (2016)** studied the concept of chemical stabilization of Laterite soil using varying percentages of limestone ash and has been evaluated for road construction. The geotechnical parameters tested included Atterberg limits, grain size analysis, compaction characteristics, CBR and compressive strength. The results obtained from the various geotechnical tests carried out showed a decrease in plasticity index and shrinkage limit for treated soil samples and an increase in plastic and liquid limits implying a general improvement in the workability of laterites. The outcome of the study shows an increase in CBR with the addition of up to 6% of limestone ash, this is the level at which the initial trend decrease in maximum dry density begins to modify. It was noted that the shear strength of the soil has been improved with the addition of limestone ash. Generally, the results obtained and their interpretation shows comparative trends exhibited by Laterite soil samples treated with lime.
- **R. k. Yadav and R. Jain (2014)** studied the effect of jute fibres on the properties of black cotton soil lime. Soil samples containing 0%, 1%, 2% to 5% of jute fibres were prepared and the liquid limit, plastic limit and differential free swell were conducted as per relevant IS code of practice. The test results showed significance decrease in the expansive behaviour of the Black Cotton Soil. The shrinkage limit increases from 13.75% to 28.68% if Black Cotton Soil is blended with 5% lime and jute fibres from 0% to 5% by weight of Black Cotton Soil.
- **Kartik and Ashok (2014)** studied that some waste materials such Steel Slag, rice husk ash, pond ash may be used to make the soil to be stable. Addition of such materials will increase the physical as well as chemical properties of the soil. Some expecting properties to be improved are CBR

5.2 REFERENCE

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