

Black Cotton Soil Treated with Chemical Additive as a method of Soil Stabilization

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Abstract— Due to Rapid growth in population and increasing construction of pavement and other civil engineering structures have to carry out weak and soft soil. swelling properties. The Black cotton soil is hard when dry, but loses its strength when it is in wet condition. In this work, BC Soil was tested by using stabilizing agents- Terrasil, lime. Investigation includes by evaluation of Grain size distribution, Atterberg's limit, Maximum dry density, Optimum moisture content and CBR value of Black cotton soil with and without stabilizers for curing period.

Key words: Pavement design, Soil Stabilization, Terrasil, Lime

I. INTRODUCTION

Transportation is field in which most important facility in moving men and material. It contributes to the economic, industrial, social and cultural development of any countries are depended on the transportation. The growth of population has need for better and economical vehicular operation which requires good highway having proper pavement design. The road is maintained by safety and comfort for traveling people. Black cotton soils is characterized by alternate wet and dry seasons. Such cyclic swell – shrinkage movements of ground cause damage during rainy season and main causes are poor strength of pavement layer and low permeability to drainage of water in the soil. In the case of road less CBR (California Bearing Ratio) value of soil higher pavement thickness it is costly for pavement composition. To overcome problem of pavement associated in subgrade and to come out with a stabilization method is used.

A. Present Work

In this present study, Terrasil and lime is used for stabilization of black cotton soil. The test is carried out to determine the Atterberg's limits, compaction test, CBR value of soil with and without stabilizers for a curing period

II. LITERATURE REVIEW

A. Prof. R. K. Sharma, 2012

In their work on "Subgrade Characteristics of locally Available soil Mixed with Fly ash and Randomly Distribution Fibers" expresses that the soil is modified with fly ash, recron 3S fiber of CBR are studied for soil bended with fly ash in range of 20 – 80%. The mixture of soil fly ash 30% fly ash was selected for modified fiber by 0.5-1.5%. the soil is modified by conducting test moisture-density relation and CBR are evaluated.

B. Azhani Zukri, 2013

"Peken soft Clay Treated With Hydrated Lime As A Method Of Soil Stabilizer". This paper presents the result of investigation of the optimum lime content (OLC) required for

Peken soft soil treatment program and its strength. the OLC will be determined using Eades-Grim Ph test. Another testing that involved study are Atterberg Limit Test, Unconfined Compressive Strength and Standard Proctor Test from the study, the optimum amount to stabilizer of clay soil in this particular area and minimum amount of lime to raise soil pH level to 12 is 4% . The strength is reach 116kN/m² which the MDD and OPC for treated soil are 16kN/m³ and 13% respectively. In this paper all the sample tested reach a significant strength level when enough lime is provided.

C. Nandan A patel, Prof. C. B. Mishra , Vasu V pancholi. 2015

In this work on "scientifically surveying the Usage of Terrasil Chemical for Soil Stabilization" which emphasized that it is the responsibility of the road authorities to use the local material and correct the soil properties using additive enhancing the strength of soil and make road durable. The test was done by soil engineering properties of soil by with and without stabilizer by standard compaction; four days soaked California Bearing Ratio (CBR), permeability test and cyclic loading test according to codal procurement. A chemical name Terrasil was utilized as stabilizer and it was utilized for measurement i.e. 0.041% by dry aggregate weight of soil test according to the convention of Zydex Industries, Vadodara. Test which outcome to improve designing properties got modified and CBR on stabilized clayey samples increased considerably, which relate to the lower thickness of soil.

D. Nandan A. Patel, C. B. Mishra, Saurabh B. Gautam

"Influence of Chemical Additive In Modification of Subgrade soil for Pavement". The physical and designing properties of nearby soil prior and then afterward the option by including chemicals in suitable measurements for example, PPC, Terrasil, Zycobond or a blend of these by test of consistency limit, Atterberg Limit, Standard Proctor Test & CBR value. The mixture of soil with Terrasil + Zycobond + PPC test convention so that the engineering property of soil is improved.

III. EXPERIMENTAL PROGRAM

The basic test including, Atterberg limits, Standard Proctor Test, Grain size distribution, CBR are to be performed as per INDIAN STANDARDS in soil.

Initially, Terrasil and Lime is add to soil and standard Proctor Test and CBR test are conducted for the combination of soil, terrasil and lime. The dosage for terrasil taken are 0.04%. Later, we add lime i.e. 1% and 2% with terrasil. Test are done as

soil + Terrasil (0.04%)

soil + Terrasil (0.04%) + Lime (1%)

CBR tests are to be done as 4 days and 7 days data are to be consider.

IV. FUTURE SCOPE OF WORK

Including Terrasil and Lime other admixture is added like fly ash, cement waste, concrete waste, Pastic waste etc are to be added and futher test to be added are UCS and Permeability test are to be done.

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