EVOLUTION OF STRENGTH PROPERTIES OF BLACK COTON SOIL BY USING MANGO DRY LEAF POWDER

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Abstract-*The black cotton soil is also called as a Regur soil. The properties of the regur soil are mainly influenced by the environmental condition .The black cotton soil swells during rainy season and shrinks during summer seasons. The load bearing capacity of the Black cotton soil is extremely less as compared to the other type of soil .In order to increase the load bearing capacity of a B.C.soil the soil stabilization is necessary ,as there are numerous number of stabilizing method so in this method the B.C.soil strength properties are analyzed by using Mango dry leaf powder ,the reasons behind using this stabilizing material is that mango dry leaf powder is easily available and also economical mainly eco friendly .Mainly the stabilizing materials are collected from the cloth shop and also cloth stitching shops and the collected materials are made into smaller pieces as to required amount.*

***Key Words*: Black cotton soil, waste synthetic cloth, SPT test, UCT test, Direct shear test**

1.INTRODUCTION

The India is the place of variety geological condition so far it constitutes of various soil type. The demeanors of the soil are mainly repercussion by the environmental existence. Black cotton soil is also special type of soil this soil is also known as expansive soils. The surrounding environment effects the properties of soil such as the soil get expands during the intake of water and get shrinks during the summer seasons and imparts cracks in the soil and further suspending the strength of a source. The robustness of the B.C.soil is very meager as compared to other rest of soils. In order to lift up the loading capability of soil unique method known as stabilization is utilized.

The structures constructed on the black cotton soil leads to failure because of less soil bearing capacity of this soil. In India this soil mainly found in central and southeast part of the country as like in Karnataka, Maharashtra and Madhya Pradesh etc. The properties of soils are mainly friendly for the agriculture purpose as they holds water in them and which is useful for growing of crops hence these are called as BLACK COTON SOIL.

The stabilizing material is mango dry leaf ash. The important property of the mango dry leaf ash is its fibrous quality when it get adhere in soil it modifies the demeanors of the soil. The mango leaves collected and subjected to sunlight and converted to powder form. In the Last phase of the project the Regur soil is treated with the combination of these two stabilizing material and The soil demeanors are studied.

In this test the B.C.soil is taken to that the selective amount and later the test likes liquid limit, plastic limit and all basic tests are performed and also MDD and OMC of the soil and its compressive strength are determined. and further test results are analyzed.

2. RELAED WORK

The utilization of mango dry leaf powder in the stabilization of the B.C.soil is a main part of research on this concept some literature is available, hence

As per Gopika ,Aishwarya author mentioned the research work on the stabilization of road work by using mango dry leaf powder. This study was carried out to know the performance of the sub grade soil after stabilizing it with mango dry leaf ash. In addition, the scrutinize highlights that maximum California Bearing experiment value will get at 12% of the mango dry leaf ash. And it also shows that as the mango dry leaf ash increases the dry density decreases. Hence he MDLA can be used as a stabilizing material

One more study work was done and this study was carried out for the equalization of Regur soil by coconut leaf cinder. During proceeding of the test varying percentage of coconut leaf and has been added to the soil and finally the study result

found that the Regur soil will be blossoming equalized by coconut dry leaf ash

3. METHODOLOGY

The B.C.soil was collected and later it is mixed with stabilizing material mango dry leaf powder to a selective percentage then the following tests are performed as given below.

1. Water content test.
2. Plasticity index test.
3. Shrinkage limit test.
4. Plastic limit test.
5. Free swell index test
6. Un confined compression test.
7. Liquid limit test.
8. Standard compaction test.
9. Specific gravity test.
10. Direct shear test

Initially all the preliminary test are performed and then the major test like proctor test, unconfined compression test and direct shear test are performed.

3.1TEST AND RESULTS

3.2LIQUIDLIMIT

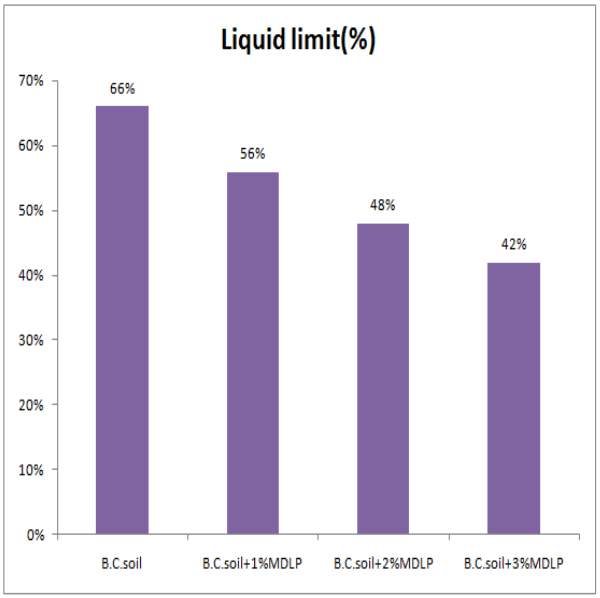

Fig -1: LQUID LIMIT GRAPH

The liquid limit of a B.C.soil was about 66% and later after adding mango dry leaf powder for a 1%,2%,3% the liquid limit starts goes n decreasing. The variations of liquid limit are shown in the graph.

3.3 STANDARD PROCTOR TEST:

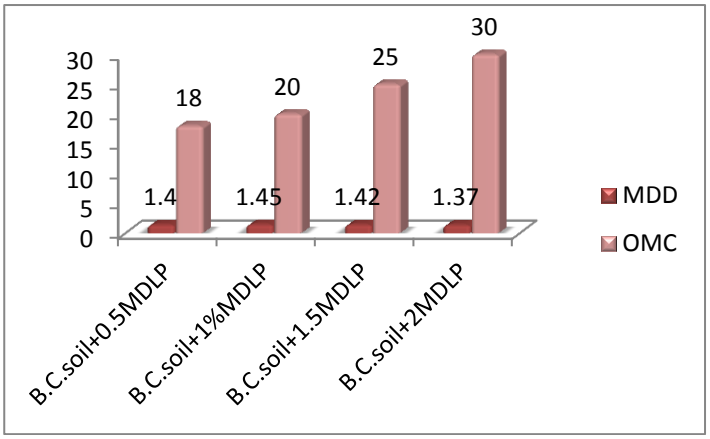

Fig -2: Standard proctor test result

The proctor test results shows that the maximum value of MDD is about 1.45 the corresponding OMC value will be 20%.this value will be available when B.C.soil was added with MDLP to 1%.later on further adding of MDLP the MDD leads to decrease and OMC value goes on increases.

3.4UNCONFINED COMPRESSION TEST:

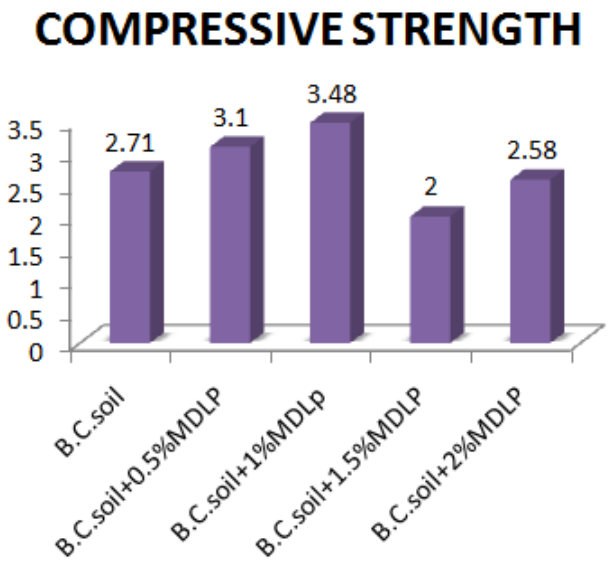

Fig -3: compressive strength results

The compressive strength of a B.C soil with MDLP shows in the graph. The compressive strength f a B.C.soil was 2.71 later on further adding of MDLP to a percentage of 0.5%, 1%1.5%and 2% the compressive strength values are increases and the peak value will be obtained at 1%MDLP added to B.C.soil about 3.48 and further adding of the MDLP the compressive strength value of a soil goes n increases.

3.5 DIRECT SHEAR TEST:

The cohesion and angle of internal friction of a B.C.soil are shown in the graph. Hence the test result shows that the B.C.soil has the value of cohesion and angle of internal friction ϕ are 98.06 and 63.43.when the soil was added with MDLP at a percentage of 0.5%,1%,1.5%and2% the optimum value of C and ϕ are 164 and 71.53 .as the percentage of MDLP in the soil increases the cohesion value goes on increases and then decreases, similarly the ϕvalue also increases further and then decreases.

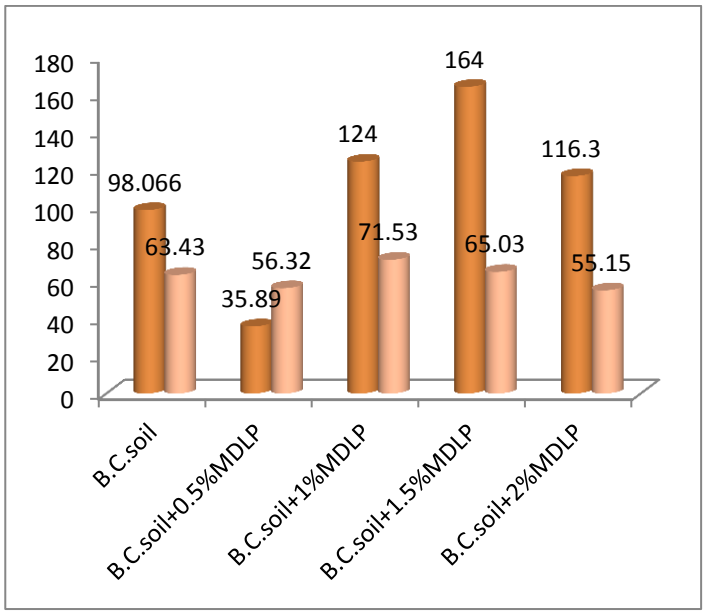

Fig -4: cohesion and angle of internal friction values.

4. CONCLUSIONS:

As we know the black cotton soil is available at larger regions of southern part of the nations this soil properties are applicable for the agriculture growth but its properties are not cooperating for bearing the loads from the super structures. Just to look out of laying the foundations on the regur soil it was very important to alter the properties of the B.C.soil by using admixtures.

However there are many admixtures are available in the market even also this project was carried out to know the affects o these admixtures W.C and MDLP o the soil. In this study the efforts are made to uplift the strength of the B.C.soil by using the admixtures like waste cloth and mango dry leaf ash. The reason behind using these admixtures is that these are available at least cost, eco friendly, and also the waste can be utilized successfully.

The fibrous property of the waste cloth and also mango dry leaf ash will profits in advancing the resistance of a B.C.soil. Specially the synthetic cloths are used for the study because the cotton cloths will absorbs the water and it will affects the strength of the soil whereas the synthetic cloths are least absorbent of water and will helpful in uplifting the load bearing capability of the B.C.soil

These properties of the soil were studied by tests like SPT test, UCS test and direct shear test. And we come to know the following affects.

These admixtures are affective when the B.C.soil was mixed with W.C and MDLP at 1%by the weight of the soil but higher percentage of W.C and MDLP will decreases the MDD value of a soil.

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