STABILIZATION OF SOIL USING RICE HUSK ASH

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ABSTRACT:

Substance stabilization of soil utilizing cement, lime, and so on is expensive. So as to present new material which can decrease the expense of substance stabilization an audit is made on rice husk ash. Rice husk is a waste material from paddy crop. In the wake of consuming it gives the rich measure of silica which might be utilized as synthetic stabilizer for soil stabilization.The rice husk ash is blended in different extents with soil like 5%, 10%, 15% and 20%. Different tests were additionally directed on these blends so as to discover ideal extent.

KEYWORDS: Rice husk ash, Soil stabilization.

I. INTRODUCTION

Stabilization of soil is a strategy to improve the record and Engineering properties of soil. There are sure strategy for soil stabilization, for example, mechanical stabilization, concoction stabilization and bio-enzymatic soil stabilization. RHA might be utilized as compound stabilizer as it contains high silica content.

In the event that soil contain medium or coarse sandy particles, at that point blending of RHA will involve the void made by coarser particles, further prompts increment in shearing and bearing limit because of increment in substance holding other than attraction compel. In the event that real molecule of soil contain dirt minerals like montmorinolite, at that point RHA which is having high silica content, supplant interchangeable particle further prompts decline in cation trade capacity(CEC). CEC decline because of lessening in – ve particle as Si supplant other metallic particle, for example, Na, Mg and so forth. Interchangeable particle present in the soil water prompts swelling of soil in the event that it contain earth minerals like montmorinolite as they structure week bond between dirt particles. As earth surface is adversely charged Si make more grounded bond then other metallic particle present in dirt minerals.

II. EXPERIMENTAL WORK

To study the effect of rice husk ash on properties of soil as a soil stabilizer it is blended in different proportions with soil. These mixers are further tested to calculate index properties and Engineering properties of soil. The different test performed were atterberg's limits, Standard proctor compression test and California bearing capacity test.

III. RESULTS AND DISCUSSIONS

Atterberg Limit: To find the moisture absorption of soil liquid limit is determined. Liquid limit is done by liquid limit apparatus. A soil test which going through 425 micron and air dried blended with water to frame glue. 1cm thick layer is leveled in glass. At that point groove is cut in the soil in the glass and the handle is pivoted at the rate of 2 blows for each sec. Water content only adequate to close the score for 13mm length at 25blows gives fluid farthest point. The technique portrayed in this depends on **IS 2720-5: Methods of test for soils, Part 5, [10]**

Table 1. Effect of RHA on Liquid Limit behaviour

DESCRIPTION	LIQUID LIMIT (%)
Soil + 0% RHA	52.34
Soil + 5% RHA	47.60
Soil + 10% RHA	46.08
Soil + 15% RHA	42.95
Soil + 20% RHA	41.23

Table 1 shows the effect of Liquid Limit behaviour on different percentage of RHA.It can be seen that with addition of RHA, the liquid limit continuously decreases from a water content of 52.34% to 41.23%.

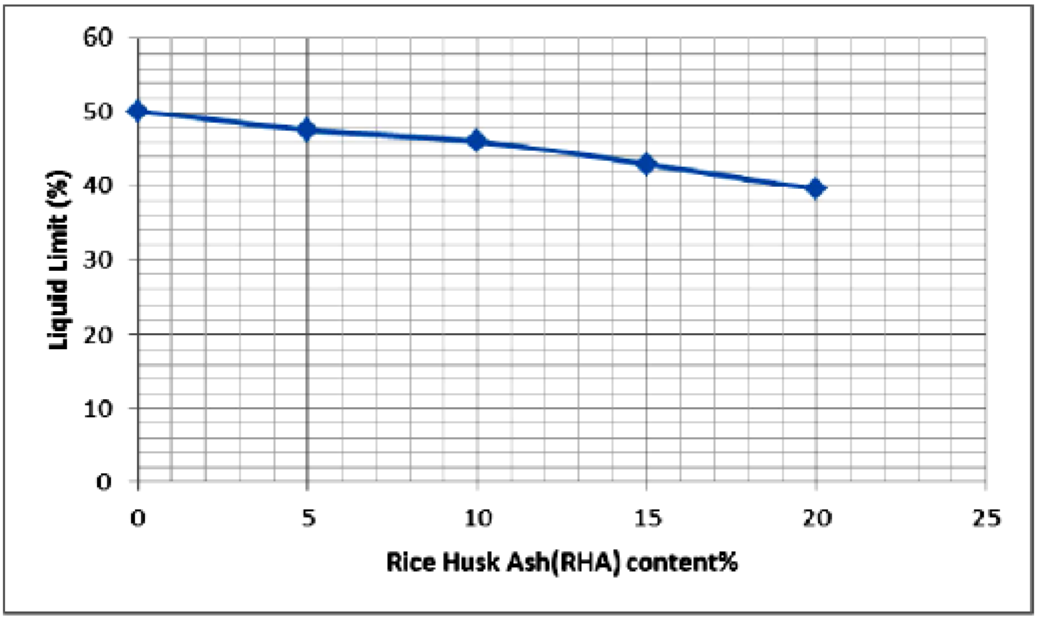

Figure 1. Effect of RHA on liquid limit behaviour of Natural soil

Figure 1 Show the variety of liquid limit of a soil with expanding level of RHA. Increment or abatement in liquid limit very impact the compressibility and swelling qualities of soil. By and large decrease in the liquid limit implies decrease in the compressibility and swelling qualities which is recipient for sub grade soil. Increment or lessening in liquid limit for the most part relies upon dirt minerals present in soil.

Standard Proctor Compaction Test: This test is performed to determine optimum moisture content of soil.

A mould of volume 944cc is filled in three layer with soil compacted with standard hammer by 25 blows falling through standard height. The method described herein is based upon **IS: 2720(Part 7)-1980-Methods of test for soils.**

Table 2 Effect of RHA for Natural soil on OMC and MDD

DESCRIPTION	OMC(%)	MDD(in g/cc)
Soil + 0% RHA	16.61	1.766
Soil + 5% RHA	18.12	1.633
Soil + 10% RHA	20.18	1.573
Soil + 15% RHA	22.05	1.45
Soil + 20% RHA	24.02	1.36

Table 2 shows Effect of RHA for Natural soil on OMC and MDD. Standard proctor compaction test has been conducted in order to study the effect of solid waste on the compaction characteristics of soil with increasing percentage of RHA by weight basis. The results were obtained for soil with 0, 10, 15and 20% of RHA along with soil and listed in Table 2.

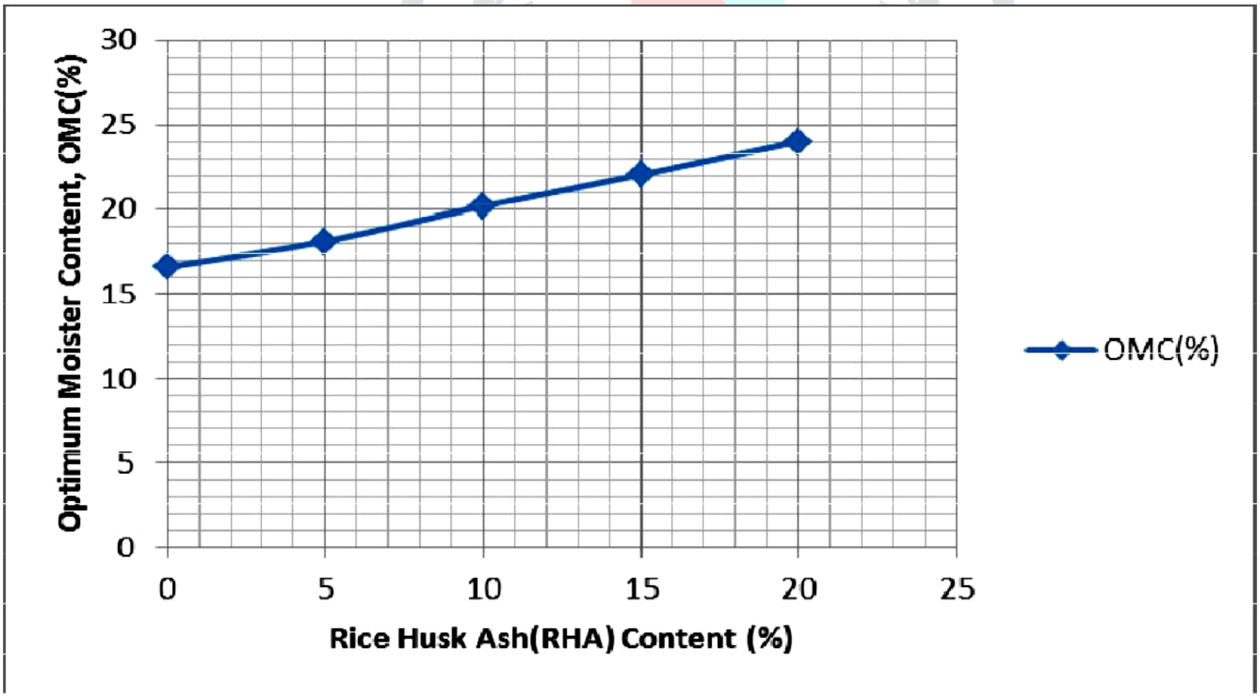

Figure 2. Optimum Moisture content (%)

Figure 2 demonstrates the variety in OMC on including RHA in various extent. OMC is expanded with increment in the RHA content.The increment is because of the expansion of RHA, which diminishes the amount of free sediment and earth part and coarser materials with bigger surface zones are shaped. These procedures need water to happen. This suggests additionally that more water is required so as to conservative the soil-RHA blends.

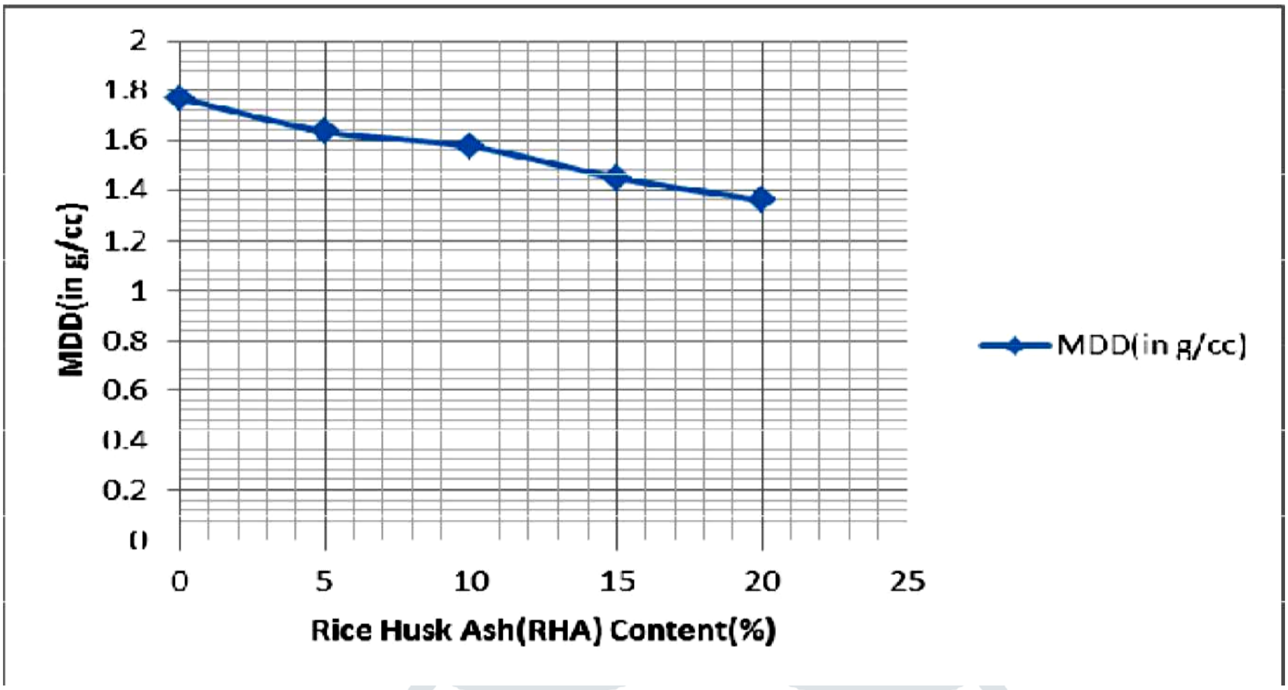

Figure 3. Maximum dry density, MDD(g/cc)

Figure 3 demonstrates the variety in MDD on including RHA in various extent. The MDD is diminished with increment in the RHA content. The decline in the MDD can be ascribed to the replacement of soil and by the RHA in the blend. The lessening in the MDD may likewise be clarified by thinking about the RHA as filler (with lower explicit gravity) in the soil voids.

CBR Test: In CBR test soil sample passing through 4.75mm sieve mixed with water. Amount of water used is equal to OMC. After preparing soil sample it is filled in 2110cc mould in five layer and each layer is compacted by standard hammer. Finally the plunger of CBR test equipment penetrates the prepared soil specimen in the mould @ 1.25mm/minute. Analysis of the test result gives the CBR values. The method described herein is based upon**IS: 2720(Part 16)-1973- Methods of test for soils. [12]**

Table 3 Effect of RHA for Natural soil on CBR values

DESCRIPTION	CBR VALUE AT 2.5 MM PENETRATION (%)	CBR VALUE AT 5 MM PENETRATION (%)
Soil + 0% RHA	1.896	1.814
Soil + 5% RHA	2.144	2.129
Soil + 10% RHA	2.617	2.445
Soil + 15% RHA	2.144	2.033

Table 3 shows The CBR value corresponding to 2.5mm and 5mm penetration. Sub grade of flexible pavement decide the thickness of flexible pavement. Higher the sub grade strength lesser will be the flexible thickness. On adding RHA we got some positive response upto certain point.

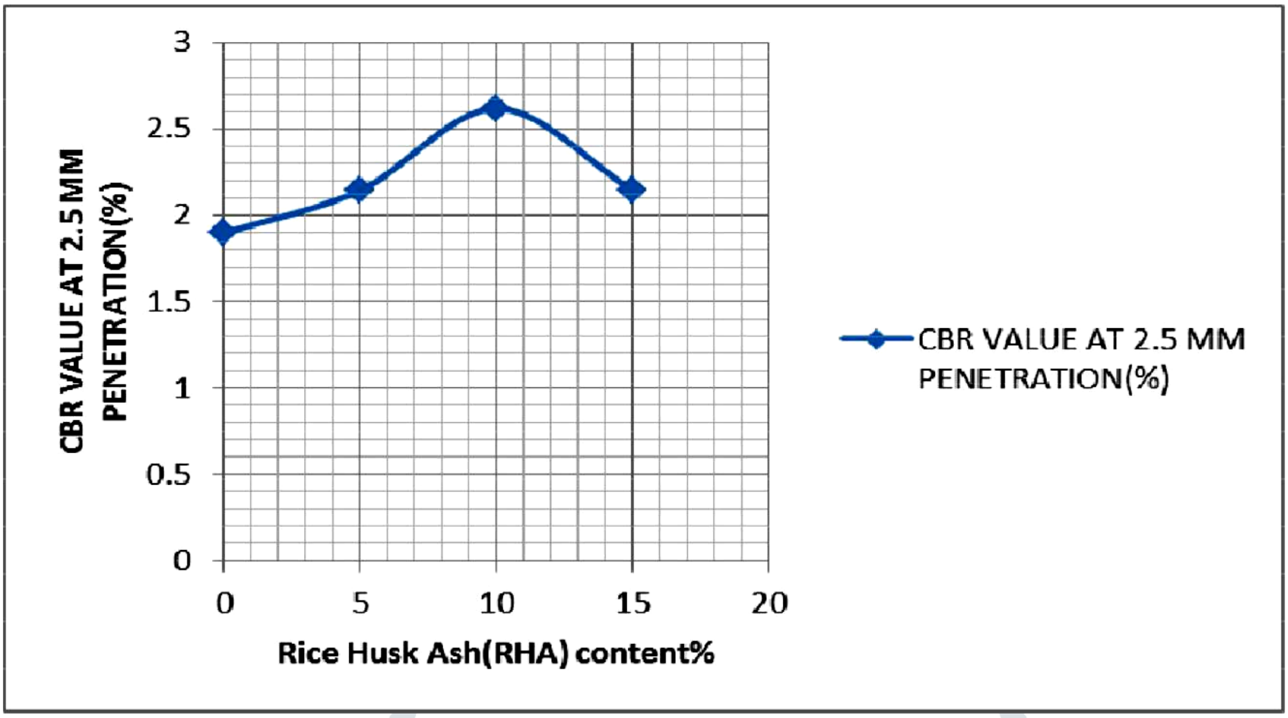

Figure 4. CBR values at 2.5mm penetration

Figure 4show that the comparison of CBR valueson different percentage of RHA. In graph, up to 10% there is increase in CBR values, beyond 10% it start decreasing.

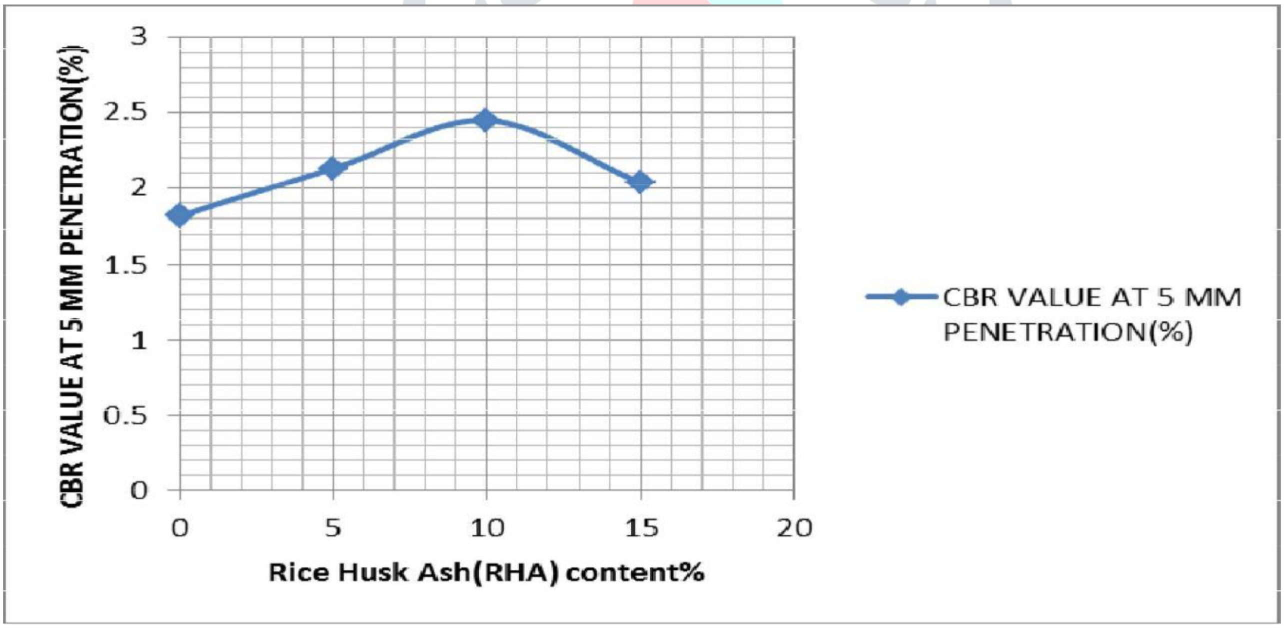

Figure 4. CBR values at 2.5mm penetration

Figure 5 also show that the comparison of CBR valueson different percentage of RHA. In graph, up to 10% there is increase in CBR values, beyond 10% it start decreasing.

IV. CONCLUSION

The primary target of this examination work was to think about the impact of including RICE HUSK ASH the designing properties of soil test. Broad test work was done on the building properties of the test soil. Real changes were seen in a portion of the designing properties of the test soil. From the building examination, the accompanying ends can be drawn.

- The expansion of RICE HUSK ASH alone to the test soil brought about decline in the estimation of liquid limit.
- The expansion of RICE HUSK ASH alone to the test soil brought about OMC increment.
- The expansion of RICE HUSK ASH alone to the test soil brought about decline in the estimation of DD.
- Silica present in RHA is fit to supplant the replaceable particle present in earth mineral along these lines can diminish shrinkage and swelling property of mud minerals.

The expansion of RICE HUSK ASH alone to the test soil brought about first increment in CBR Value from there on it diminishes towards the end.

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