Improvement of Clayey Soil using Rice Husk Ash and Coconut Shell

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Abstract: **Soil change is that the progression that plans with adjusting the properties of soil (record and planning) to help its show. Change is getting used for a spread of planning works either in its not unexpected kind or in a very taken care of type. At last all plans lay on soil foundation any spot the most objective is to widen the strength or steadfastness of soil and to diminish back the progression cost. At this moment everyday the usage of aftereffect with soil has obtained thought because of the rising issues of waste organization. This paper presents the eventual outcomes of accomplice in nursing preliminary program embraced to separate the impact of Rice husk trash and coconut shell and at absolutely remarkable estimation on Clayey soil. Direct of soil was seen through various estimations of blend of rice husk flotsam and jetsam, and coconut shell. The introduction of Rice husk trash, and coconut shell stable soil was surveyed double-dealing physical and strength execution tests specifically; water content test, express gravity test, grain size assessment, liquid end test, changed delegate test, California bearing extent test, direct shear test. These checks were driven to condemn the improvement inside the strength credits of the soil.**

Keywords*: *Rice husk ash, coconut shell Clayey soil, Soil stabilization

I. INTRODUCTION

Soil is one of the world's most huge customary resource, alongside air and water it is fundamental for life on planet earth. Soil is a characteristic body that contain layers (soil horizons) made in a general sense out of mineral, which fluctuate from parent materials in their superficial part, plan, uniformity, assortment, compound, regular and other genuine characteristics.

In planning, soil is implied as regolith, or free stone materials. When in doubt, soil is the significance of regolith that effects and has been impacted by plant lays out and may in centimeters

to a couple of meters. On volume a good quality soil is one that is 45% minerals (sand, sediment and earth), 25% water, and 25% air, 5% natural material both live and dead.

1.2 STABILIZATION OF SOIL

A. soil stabilization

The modification of soil properties to meet explicit designing necessities is known as "Soil adjustment". There are basically two types of progress Modification and Stabilization. Soil adjustment is the change of soil properties to further develop the designing exhibition of soils. Alteration of soil properties is the brief upgrade of sub level strength to speed up development.

B. Methods of soil stabilization

There are various techniques by which soils can be balanced out; nonetheless, all strategies fall into two general classifications. They are,

Mechanical stabilization.

Chemical admixture stabilization.

Some adjustment strategies utilize a blend of these two techniques. Mechanical adjustment depends on actual cycles to settle the dirt, either changing the actual piece of the dirt (soil mixing) or putting a hindrance in or on the dirt to get the ideal impact, (for example, laying out a grass cover to forestall dust age). Compound adjustment depends on the utilization of an admixture to change the synthetic properties of the dirt to accomplish the ideal impact (like utilizing lime to lessen a dirt's pliancy).

II. OBJECTIVES

- To study the basic properties of clayey soil.
- To study basic properties of rice husk ash and coconut shell.
- To study optimum dosage of rice husk ash and coconut shell required for the stabilization of clayey Soil.

III. METERIALS AND METHODOLOGY

A. Materials used

The various materials utilized in this examination are,

1.Clayey soil: Clayey soil is only dark Cotton soil which is far reaching in nature. The top surface of the dirt was cleared with every one of the natural squanders and different strips materials. The top soil was uncovered up to a profundity of 1.5 feet and afterward the dirt was gathered.

Fig No:1 Black Cotton Soil

2.Rice husk ash: Rice husk debris is singed cellulose and lignin are eliminated abandoning silica debris, The controlled temperature and climate of consuming yields better nature of rice husk debris.

Fig No:2 Rice Husk Ash

Coconut Shell: The mesocarp is made out of a fiber, called coir, which has numerous Traditional and business utilizes. Both the exocarp and the mesocarp make the husk of the coconut, while the endocarp makes coconut shell.

Fig No:3 Coconut Shell

B.Methodology

Following research center tests have been do according to IS: 2720. The test were completed both on regular soil and balanced out soil with dark cotton soil, Rice husk debris coconut shell

- Water content test – IS 2720 Part 2, 1973.
- Grain size analysis – IS 2720 Part 4, 1985.
- In-situ density by Core cutter. IS 470 (Part 29) – 1975
- Specific gravity – IS 2720 Part-3, 1980.
- Liquid limit test - IS 2720 Part-5, 1985.
- Plastic limit. IS: 2720 (Part 5)-1985
- Standard Proctor Compaction – IS 2720 Part-8, 1983.
- Direct shear test of soil. IS 2720 (Part 13) – 1986

Table No-1: Table showing on basic soil test conducted result

Basic soil test	Result
Water contents test	22.97%
In-situ density by core cutter	1.90
Pycnometer test to determine specific gravity	2.25
Liquid limit	59.59%
Plastic limit	26.2%
Compaction test	1.29
Direct shear test	0.45
Permeability test	0.0035

Standard proctor test:

Compaction is the course of densification of soil mass by decreasing voids. The degree of compaction of a soil is assessed concerning its dry Density. For a given compaction energy every soil achieves the best dry thickness at a particular water content which is known as ideal clamminess content.

OMC and MDD: not entirely set in stone by the compaction test. Every one of the compactions were completed with Standard delegate device. For the assurance of dampness thickness relationship, it included energy got from a mallet of 2.5Kg mass tumbling from a level of 31 cm in a 2250 mm^3 shape. Each layer is compacted in three layers with the end goal that each layer getting 25 blows.

Fig No:4 Standard proctor test

Table No-2: Table Showing admixtures adding in Clayey soil and rice husk ash by light compaction

Clayey soil + Rice husk ash	Maximum dry density (MDD)	Optimum moisture content (OMC)
2%	1.23	16%
4%	1.24	16%
6%	1.38	18%
8%	1.25	20%

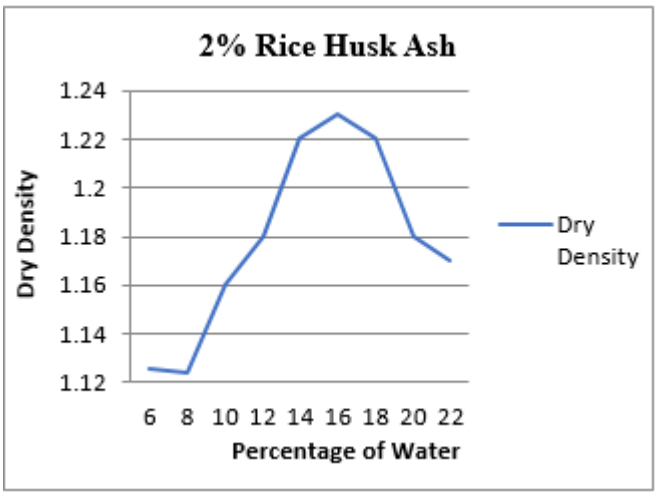

Fig No:5 Graphical variation 2% Rice Husk Ash

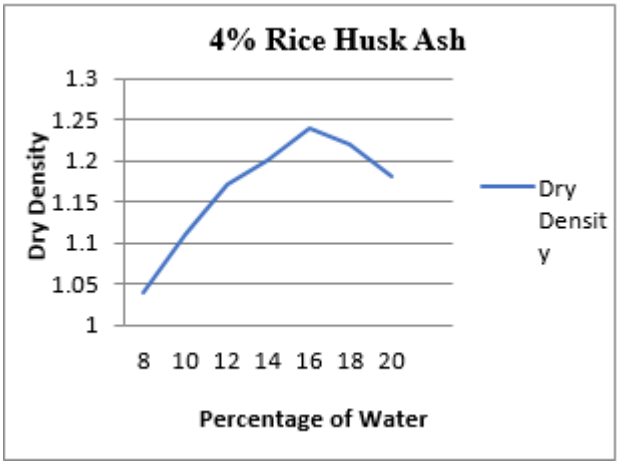

Fig No:6 Graphical variation 4% Rice Husk Ash

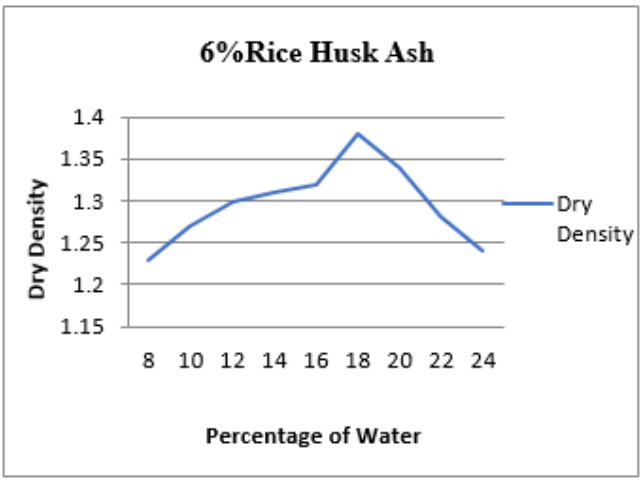

Fig No:7 Graphical variation 6% Rice Husk Ash

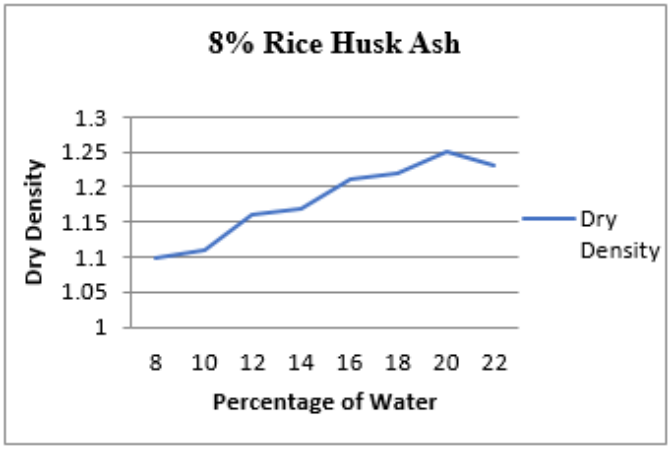

Fig No:8 Graphical variation 8% Rice Husk Ash

Direct shear test:

A prompt shear test is a lab or field test used to measure the shear strength properties of soil or rock material, or of discontinuities in soil or rock masses. The soil model undisturbed model is prepared by pushing a cutting ring of size 10 cm in expansiveness and 2cm high, in the undisturbed soil test got from the field. The square illustration of size 6cm X 6cm is the cut from the indirect model so procured

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Fig No:9 Direct Shear Test apparatus

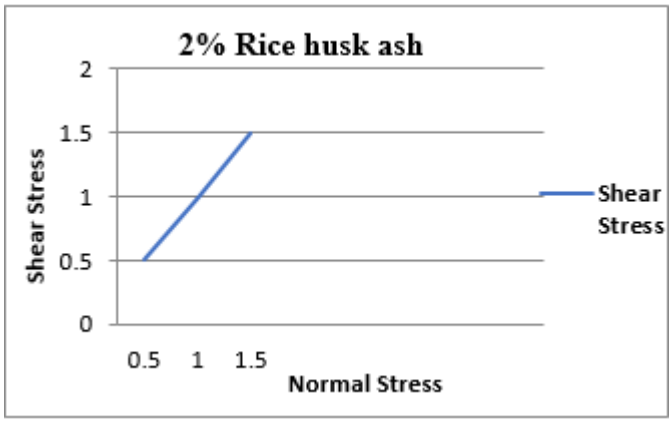

Fig No:10 Graphical variation 2% Rice Husk Ash

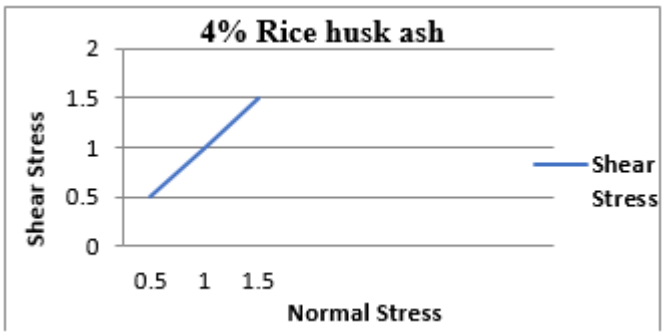

Fig No:11 Graphical variation 4% Rice Husk Ash

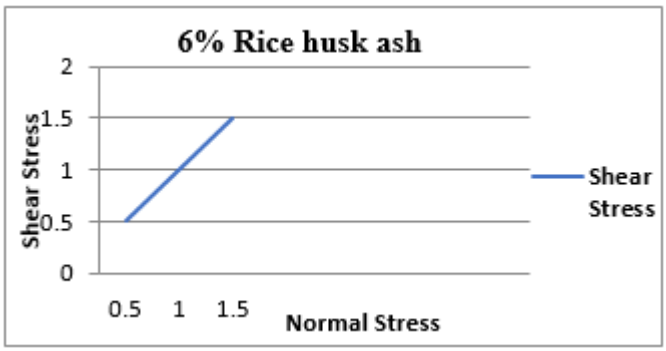

Fig No:12 Graphical variation 6% Rice Husk Ash

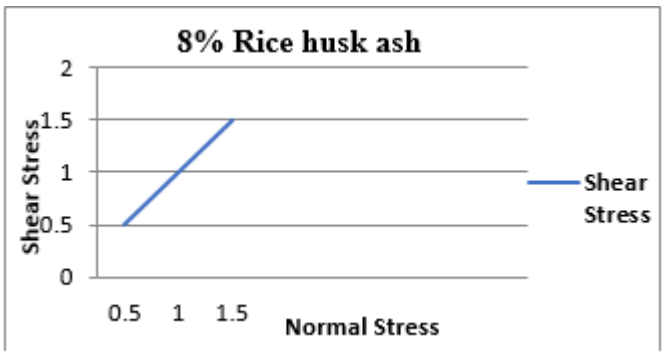

Fig No:13 Graphical variation 8% Rice Husk Ash

Table No-3: Coefficient of Curvature and Angle of internal friction of Direct shear test

Clayey soil + Rice husk ash	Coefficient of Curvature	Angle of internal friction
2%	0.10	30
4%	0.16	30
6%	0.10	30
8%	0.42	30

California bearing ratio test:

CBR is the extent imparted in degree of force per unit locale expected to enter a soil mass with a standard traffic circle unclogger of 50 mm width at the speed of 1.25 mm/min to that normal for looking at entrance in a standard material. The extent not altogether made due with penetration of 2.5 and 5 mm results gained by these tests are used with the trial twists to conclude the thickness of black-top and its part layers.

Fig No:14 California bearing ratio test

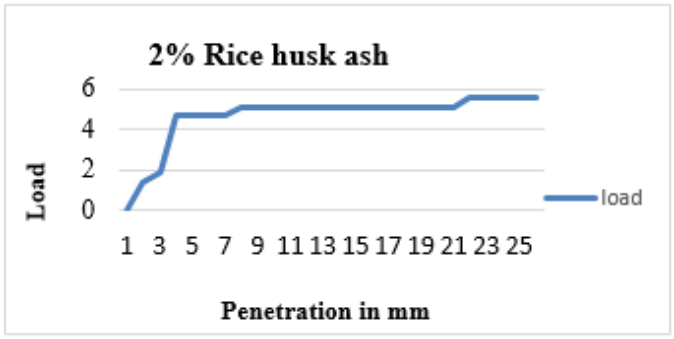

Fig No:15 Graphical variation 2% Rice Husk Ash

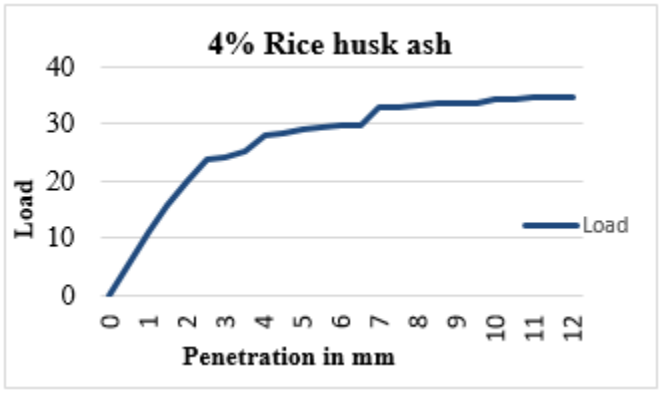

Fig No:16 Graphical variation 4% Rice Husk Ash

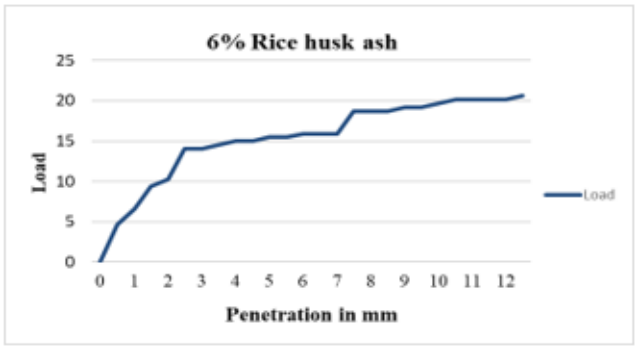

Fig No:17 Graphical variation 6% Rice Husk Ash

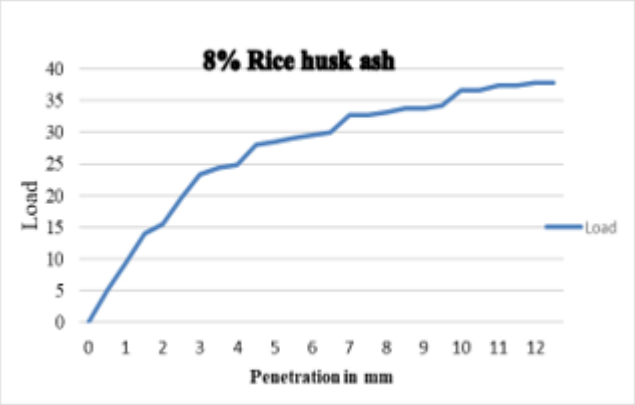

Fig No:18 Graphical variation 8% Rice Husk Ash

Table No-4: California bearing ratio test in pentration 2.5 mm and 5mm percentage

Clayey soil+ Rice husk ash	2.5mm Penetration in percentage	5mm penetration in percentage
2%	3.41	2.50
4%	1.74	1.41
6%	1.02	0.75
8%	1.43	1.39

Table No-5: Table Showing admixtures adding in Clayey soil, rice husk ash and coconut shell by light compaction

Clayey soil + Rice husk ash+coconut shell	Maximum dry density (MDD)	Optimum moisture content (OMC)
4%	1.192	16%
6%	1.185	14%

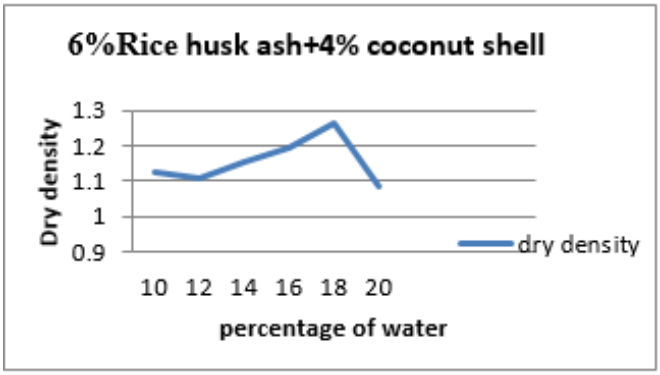

Fig No:19 Graphica variation6% Rice Husk Ash+4% coconut shell

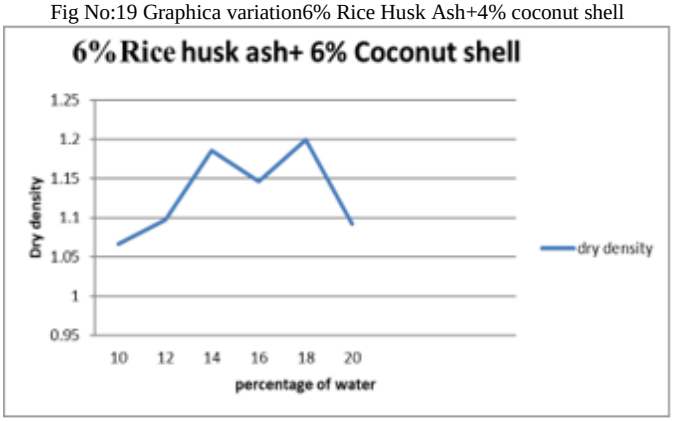

Fig No:20 Graphical variation 6% Rice Husk Ash+6% coconut shell

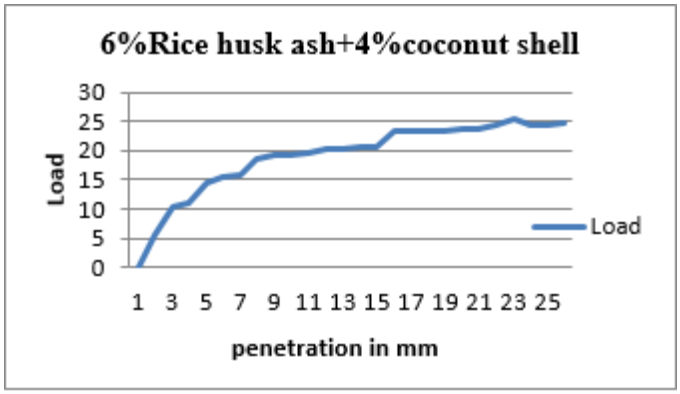

Fig No:21 Graphical variation 6% Rice Husk Ash+ 4% Coconut shell

IV. CONCLUSION

•Clayey soils when mixed with Rice husk debris and coconut shell are extremely encouraging to work on the geotechnical properties of soil.
•Clayey soil with rice husk debris by utilizing standard delegate trial of expanding esteem 6%.By the OMC esteem is 18% and MDD esteem is 1.38 g/cc.
•Clayey soil with rice husk debris by utilizing Direct shear test.The shear pressure esteem expanding of 8%
•Clayey soil with rice husk debris and coconut shell by utilizing standard delegate trial of expanding esteem 4%.By the OMC esteem is 16% and MDD esteem is 1.192 g/cc.

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