

SOIL STABILIZATION ON EXPANSIVE SOIL USING SEA WATER AND COCONUT HUSK ASH.

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Abstract: In this study, we observed the effect of sea water and coconut husk ash on expansive soil. The sea water and soil sample will be collected from desired location. Coconut husk ash is an industrial waste is collected from desired location. By adding the sea water and coconut husk ash in different proportions like 1, 2, 3, 4, 5, & 6 percent we have change the engineering properties of expansive soil i.e Black Cotton Soil. Free swell index test will performed on the soil which concluded that it is highly expansive soil. Test will carried out showed major improvement by adding sea water and coconut husk ash.

All test will carried on soil are performed as per IS code. The results of these test performed using sea water and coconut husk ash are compared with the references we will taken.

Keywords: Soil Stabilization, Expansive Soil, Sea Water, Coconut Husk Ash, Black Cotton Soil.

I. INTRODUCTION

Expansive soil means the soil which have characteristics of shrink and swell under the influence of moisture content. When the content of moisture is high the soil swells and lifts the structure and during low moisture content the soil shrinks and there could be settlement of the structure. In both theses cenario it is not good for the structure as it could do damage .In India almost 20% of soil is expansive soil. So we cannot ignore the fact, there is need for soil stabilization before construction of any structure because of its shrink-swell nature. Soil stabilization can be done by various method. But we have to find out if any of that method is effective as well as economical which can done in short period of time. which is a agricultural waste and is generated on large scale. So there is need of proper disposal of this agricultural waste, if not done, it can lead to pollution and land infertility. There is a possibility we can use coconut husk ash as a soil stabilizer which can help us for its proper disposal.

II. Methodology

The methodology comprises of collection of soil, sea water and coconut husk ash from the desired locations. The collected soil, ash and water samples are subjected to laboratory investigation to find their physical properties. All the tests were conducted as per IS codes. Then the experimental investigation part of finding out the various engineering properties is carried out using the ash and sea water samples.

III. Objectives

- To Reduce The Initial Cost.
- To Change In Property Like Density Or Swelling Of Soil.
- To Increase In Bearing Capacity Of Soil

IV. Expected Outcomes

- It will useful for future life.
- It will increase bearing capacity of soil.
- Swelling property will be reduce.
- Stability will be increase.

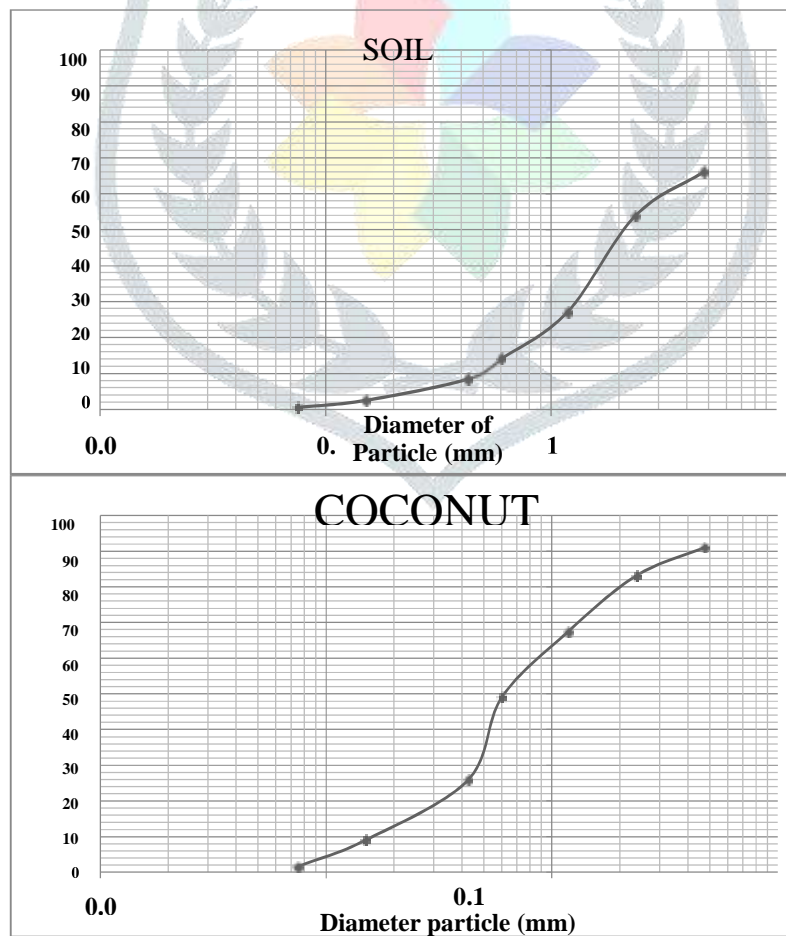
V. Various Mixture Used

Description	Symbol
Sea Water	SW
Coconut husk ash	CA
Expansive Soil	ES
Sea Water +1% Coconut husk ash+ Expansive soil	SW + 1% CA +ES
Sea Water +2% Coconut husk ash+ Expansive soil	SW + 2% CA +ES
Sea Water +3% Coconut husk ash+ Expansive soil	SW + 3% CA +ES
Sea Water +4% Coconut husk ash+ Expansive soil	SW + 4%CA +ES
Sea water+5% Coconut husk ash+ Expansive soil	SW + 5%CA +ES
Sea water+6% Coconut husk ash+ Expansive soil	SW + 6%CA +ES

VI. Test performed

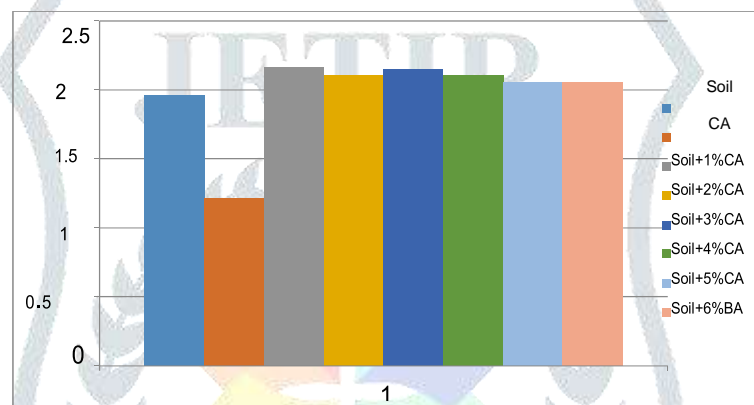
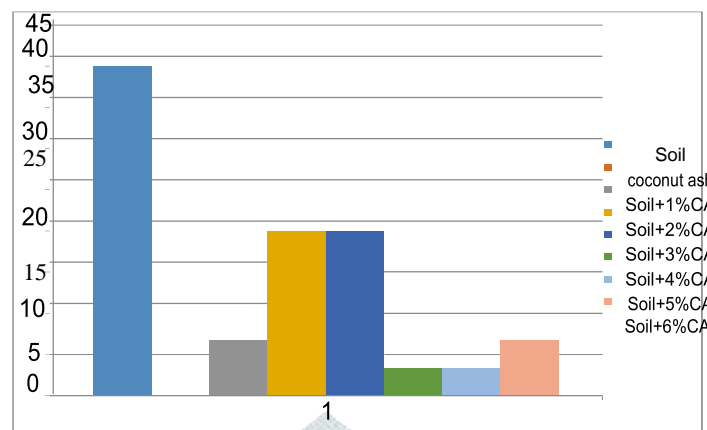
Grain Size Distribution of soil

This test is mainly to classify the soil according to the grain size. The Unified Soil Classification Method is used to classify the soil using the grain size distribution depending upon the values of C_u and C_c .



FREE SWELL INDEX

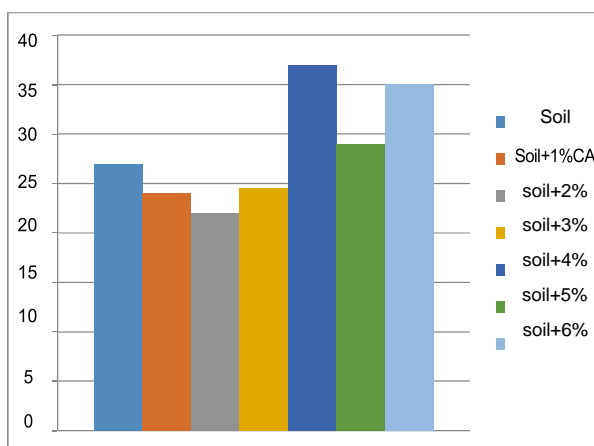
Free swell test serve to indicate the possible expansive property of soil. Free swell is the increase in volume of soil from a loosely dry powder from when it is poured into water expressed at a percentage of original volume. This characteristic of swelling of black cotton soil is attributed to the presence of montmorillonite or a combination of montmorillonite & ellite clay minerals.



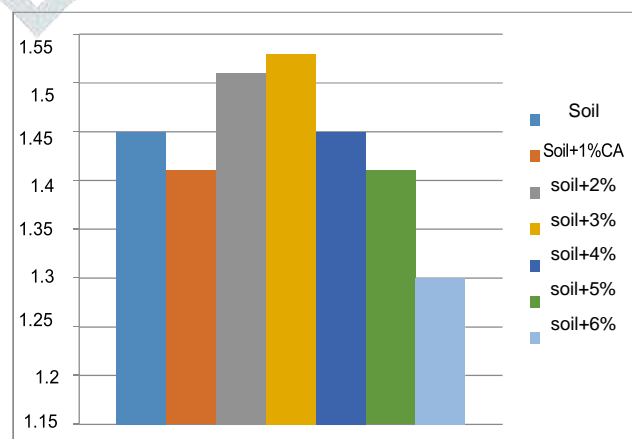
Standard Proctor Test

Used to obtain the Optimum Moisture Content of soil with and without stabilizers .In this, specified unit weight achieved through compaction should be more than the field for quality control .The primary objective of this test is to achieve a standard which may serve as guide and basis for comparison

MAXIMUM DRY DENSITY

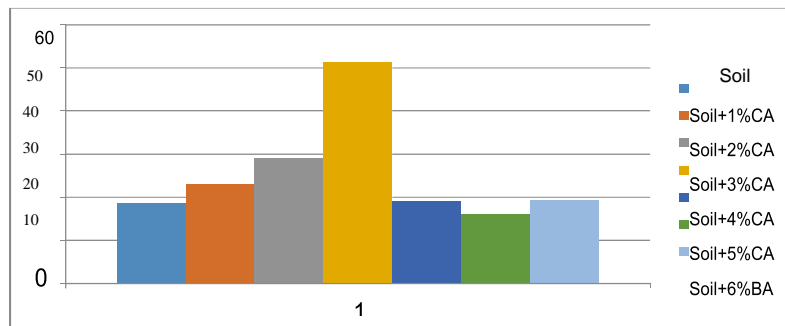


OPTIMUM MOISTURE CONTENT



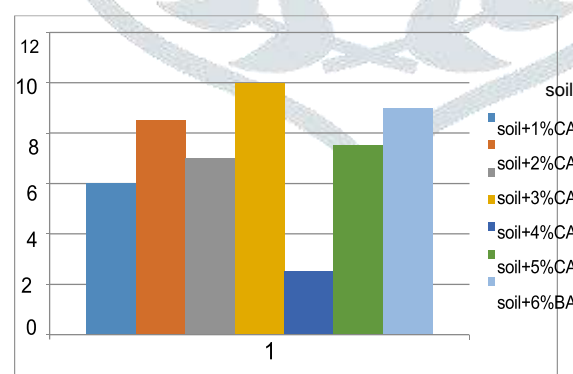
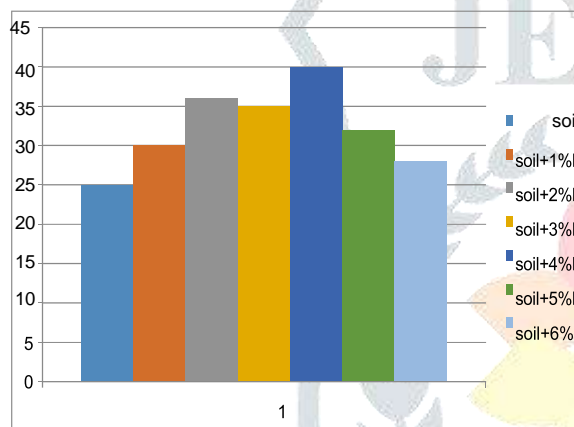
Unconfined compression test

The unconfined compression test may be considered as a special case of triaxial compression test when the confining pressure is zero and the axial compressive stress only is applied to the cylindrical specimen. The unconfined compression is suitable to test cohesive soils and all materials having high values of cohesion or bond strength such as soil, cement etc.



Direct Shear Test :

From this test we can find the values of shear parameter of soil like c & ϕ . It is used for finding bearing capacity



Conclusion: Considering the observed values of various test results, we can safely conclude that there is a variation in the values of properties of soil due to the addition of sea water and coconut husk ash.

- There is 50% decrease in free swell value of B.C soil.
- maximum dry density increases with reduction in optimum moisture content.
- variation observed in unconfined compression strength and values of cohesion and angle of internal friction.
- from the research work also conclude that it will be a great utilization of waste like coconut husk ash in construction field.

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