LITERATURE REVIEW ON USE OF GROUND NUT SHELL ASH AND COAL ASH TO MODIFY THE PROPERTIES OF SOIL

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Abstract- Utilization of industrial and agricultural waste products in the industry has been the focus of research for economic, environmental, and technical reasons. Construction and subsequent maintenance of pavements in good condition has become quite problematic especially in areas where soft or expansive soils are available below the sub grade. During rainy season the natural sub grade soils become soft and pose serious problem, strengthening of sub grade soil appear to be the only solution for keeping the pavement of surfaces serviceable.The performance of COAL ASH stabilized soil was evaluated using physical and strength performance tests namely; plasticity index, specific gravity, compaction, California bearing ratio (CBR) and Unconfined compressive strength. This research is aimed at evaluating the possibility of utilizing groundnut shell ash (GSA) in the stabilization of soils.

Keywords- Expansive soil(black cotton),groundnut shell ash,coal ash,proctor test,ucs test,cbr test.

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I. LITERATURE RESEARCH

C.Rajakumar, T.Meenambal worked on The characteristics and strength of a highly expansive soil can be improved by Coal ash stabilization. Liquid Limit and Plasticity index are decreased with percentage Coal ash added. The California Bearing Ratio can be increased 1.34 times approximately to the initial strength of the soil. From the test data it is identified that Expansive soil Coal ash mixes attained high strengths at their optimum moisture and plastic limits. 10- 40% of Coal ash makes the Expansive Soil–Coal ash mixes strong and Non-swelling can be used as sub grade and in other geotechnical applications

C.Rajakumar, Dr.T.Meenambal shows that The CBR values increased upto addition of 12%Coal ash +12%Groundnutshell ash,16%Coal ash + 16%Bagasse ash and 16%Bagasse ash + 16% Groundnut shell ash and decreased with further increase in Coal ash, Bagasse ash and Groundnut shell ash content. The percentage increase in the unconfined compressive strength value is 104.76%, 97.62% and 107.94% for respective combinations under light compaction.

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Emmanuel Akintunde Okunade studied that The mixture of coal fly ash with lateritic soils improves the plasticity and mechanical properties of the soil, as expressed by a reduction in the liquid limit and the plasticity index. With regard to the influence of self-cementing fly ash on density and compaction, test results show that fly ash increases the compacted dry density and reduces the optimum moisture content of lateritic soils. Coal fly ash stabilization increases the CBR of lateritic soils. For the soils tested, the CBR values increased from about 20% to about 56% for 12.5% coal fly ash addition.

S. Bhuvaneshwari, R. G. Robinson, S. R. Gandhi studied that The natural soil used for construction shall be dried with moisture content below 7%. If soil has more moisture it is difficult to mix with FA. Such soil shall be spread on surface and allowed to dry before construction. Presence of dry clay lumps in the borrow soil increases the number of passes of disc harrow for mixing. It is therefore necessary to eliminate such soil lumps in the construction. It is observed that placing of two different materials (local soil and FA) in three layers with FA layer sandwiched between soil layers and mixing them with disc harrow is workable.

Mr. N. V. Gajera and Mr. K. R. Thanki studied the ground nut shell as a soil stabilizer and found that Groundnut Shell Ash significantly improves the index properties, compaction and strength characteristics of black cotton soil under study and the effect of GSA vary depending upon the quantity of GSA that is mixed with the black cotton soil samples. The trend of improvement in the UCS Stabilization Analysis of Black Cotton Soil by using Groundnut Shell Ash is observed to be more pronounced with the curing of the soil and GSA mix. A curing period of 28 days is observed to yield the maximum enhancement in the unconfined compressive strength. The peak of the California bearing ratio (soaked) value of 2.17% was attained at 10% GSA.

T. Murali Krishna and Sd. Shekun Beebi studied the The effect of solid wastes namely ground nut shell ash and found that based on unconfined compressive strength test on soil sample with groundnut shell ash of 3%, 6% and 9%, the increase in unconfined compression strength was found to be 24.60%, 44.26% and 59.01% respectively . This increment is substantial and applying it for soils similar to the this soil sample is effective.

B. Ahmed, A. Rahman, J. Das studied that properties of the soil have been improved by the addition of bagasse ash and eggshell powder by comparing the behaviour of soil sample with and without both admixtures. The maximum dry density decreases and the optimum moisture content increases with the addition of bagasse ash and eggshell powder. The results of the tests also draw another conclusion that the more percentage of bagasse ash and eggshell powder we add to the soil upto optimum percentage, the CBR value increases gradually and after optimum percentage the CBR value decreases.

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Patrick Khaoya Barasa1, Dr. Too, Kiptanui Jonah, S. M. Mulei studied that there was reduction of Plasticity Index of the clay soils from 35 to 20 with the addition of 4:1 Lime to ash, which was about 43%. 2. The California bearing ratio of stabilized clay increased from 11 to 36 and conformed with road design manual part III of minimum CBR of 36, plasticity index 20, Linear shrinkage of 9.0 and negligible swelling. Bagasse ash cannot singularly be used as clay soil stabilizing agent because of huge reduction of California bearing ratio from 11 to 2 although there was slight reduction on plasticity index as well.

IICONCLUSIONS

The study was primarily aimed to modify the properties of expansive soil like cbr,mdd,omc,liquid limit,plastic limit,plasticity index,ucs ect by adding stabilizing materials from agricultural waste (groundnut shell ash) and industrial waste (coal ash).for this purpose different tests were carried out like cbr test,ucs test,proctor test,atterberg limit test of soil and then following tests were carried out by adding particular stabilizing materials and the results were obtained.

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