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Literature review on comparative study between lime & different percentage of rice husk ash & baggash ash in black cotton soil

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Abstract- The Black cotton soil tends to swell and shrinks when come across with various temperature so its undesirable in terms of engineering consideration. The main objective of the investigation is to Study between lime & different percentage of rice husk ash & baggash ash in black cotton soil and assess the usefulness Of agricultural and industrial waste as a soil admixture, and focused to improve the engineering properties of soil to make it capable of lower layer of road construction. This investigation describes the behavioral aspect of soils mixed with industrial waste materials viz. Lime, rice husk ash (RHA) & agricultural waste material Baggase ash (BA) to improve the load bearing capacity of the soil.

Keywords-Black cotton soil, Rice husk ash(RA), Baggash Ash(BA),Lime, Increase engineering Properties.

I. INTRODUCTION

India produces an enormous amount of different types of waste materials as by-products from different sectors like industrial , agricultural, etc. These waste materials if not deposited safely it may be hazardous. The amount and type of waste generated increases with increase in population. These wastes remain in the environment for longer duration since it is unused. The waste disposal crisis arose due to the creation of non decaying waste materials. One solution to this crisis lies in recycling waste into useful products. Research into new and innovative uses of waste materials is continually advancing. In India, research is currently underway to examine the potential for use of some locally available wastes in road construction.

II. LITERATURE REVIEW

Dhawan, P. K. et al. (1994) explored the feasibility of ash utilization in bulk for road construction. They considered three types of ashes as fly ash, bottom ash & pond ash admixed with different types of soil. The result CBR values indicated that improvement of CBR values of the soil with the coal ash from thermal power station and FA can be used as sub base materials, subgrade & embankment. Prabakar, J. et al. (2004) studied influence of fly ash on soils and reported that the addition of fly ash reduced the dry density of the soil due to the low specific gravity and unit weight of soil and improved the shear strength. Kumar, P. et al. (2008) evaluated the strength parameters of four locally available materials for their use in the sub base course of a pavement. Fly ash had the lowest CBR of 9%,but its behaviour under dynamic load is better than that of stone dust, which has shown the maximum value of CBR.

Several studies have been carried out on the effectiveness of clay stabilization by RHA admixing. In this context, Basha, E.A. et al. (2005) studied the stabilization of residual soils by chemically using cement and RHA. In general, 6 8% of cement and 10 15% RHA show the optimum amount to reduce the plasticity of soil. CBR value determined maximum at 4% cement and 5% RHA mixtures with soil. According to compressive strength and PI, 6 8% of cement and 15 20% RHA showed the optimum amount to improve the properties of soils. Jha, J. N. and Gill, K. S. (2006) evaluated the effectiveness of RHA to enhance the lime treatment of soil

Brooks (2009) studied the potential of Rice Husk Ash (RHA)and fly ash (FA) blended soil as a swell reduction layer between the footing of a foundation and subgrade. He recommended 12% and 25%, RHA and FA, respectively, for modifying the expansive subgrade soil. Ali et al. (2004) studied the effect of RHA and lime on characteristics of bentonite. (Ali M and Sreenivasulu V,2004).

Han, Y. W. and Anderson, A. W. (1974) analyzed the problem of waste rice straw which more than half of the dry matter of straw consists of cellulose and hemicellulose. The rest is comprised of lignin, nitrogenous compounds, and ash mostly silica. Ranasinghe and Arjurna, P. (1993) reported about the ash and silica content of some of the plants derivatives. It has been seen that rice straw have 14.65% ash after burning, thus for every 1000 kg of rice straw burnt 146.5 kg ash are produced having about 82% of silica content.

Cordeiro (2009) obtained the important parameter for the production of SCBA with pozzolanic activity. The SCBA produced with air calcination at 600°C for 3 hr. with a rate of heating of 10°C/min presents amorphous silica, low carbon content and high specific surface area. The sample produced with these characteristics presents considerable pozzolanic activity according to both mechanical and chemical methods of evaluation. Goyal et al.(2007) reported that SCBA with high specific surface area, high contents of amorphous silica and calcium oxide fulfilled the principal requirements of a pozzolanic material. Ganesan et al. (2007) studied on the use of bagasse ash (BA) as partial cement replacement material in respect of cement mortars. Up to 20% of ordinary portlandcement can be optimally replaced with well-burnt bagasse ash without any adverse effect on the desirable properties of concrete.

Satyanarayan *et al*., 2004 studied the effect of FA and lime on the expansive soil used for construction of road base, sub base (Satyanarayan *et al*., 2004). Stabilization of expansive soil using rice husk ash (RHA) as a pozzolanic material along with a binder has been studied by researchers a number of times (N K Bhasin *et al*., 1988), (A S Muntohar and G Hantoro, 2000), Effect of RHA with cement (E A Basha *et al*., 2003), (A N Ramakrishna and A V Pradeep Kumar, 2006), effect of RHA with calcium chloride (R S Sharma, 2008), effect of RHA with with marble dust (A K Sabat and R P Nanda, 2011), effect of RHA and lime with
gypsum (D K Rao *et al*., 2011) etc

Similarly the mixing of lime sludge along with a pozzolanic material has also been studied. Some are bagasse ash with lime sludge (A K Sabat, 2012), fly ash with lime sludge (R K Srivastava *et al*.,1997).

Sabat (A K Sabat, 2012) had studied the stabilizing effects of bagasse ash and lime sludge on compaction properties, UCS, CBR and swelling pressure of an expansive soil.

M. Chittaranjan, Senior lecturer**, M. Vijay,** B.Tech student, **D. Keerthi** B.Tech student, Bapatla Engineering College, Bapatla. Were carried a study on "use of Agricultural wastes as soil stabilizers(6)**"** this paper aims to investigate the use of some Agricultural wastes such as sugar cane bagasse ash, rice husk ash and groundnut shell ash to stabilize the weak subgrade soil. The weak subgrade soil is treated with the above three wastes separately at 3%, 6%, 9%,12%and 15% and CBR test is carried out for each percent. The results of these tests showed improvement in CBR value with the increase in percentage of waste. Hence there is a value addition to these three agricultural wastes serving the three benefits of Safe disposal of wastes, using as a stabilizer and return of income on it.

Ken C. Onyelowe, Dept. of Civil Engineering, College Michael Okpara University of Agriculture, Nigeria has performed test on **"**Cement Stabilized Lateritic Soil and the Use of Bagasse Ash as Admixture(7)**"**. In this study the lateritic soil collected from Akwuete borrow site, Ukwa East Local Government Area of Abia State,classified as an A-2-6 soil on the AASHTO classification was stabilized using 4% and 6% cement with variations of bagasse ash ranging from 0%(control), 2%, 4%, 6%, 8%, and 10% by weight of the dry soil. The effect of bagasse ash on the soil was investigated with respect to compaction characteristics and California bearing ratio (CBR) tests. The results obtained indicate a decrease in maximum dry density (MDD) with 4% cement content and an increase with 6% cement content. There is also an increase in optimum moisture content (OMC) for both 4% and 6% cement content all with increase in bagasse ash content of 0%, 2%, 4%, 6%, 8%, and 10% by weight of the soil on the constant cement contents of 4% and 6%. An increase was also recorded in the CBR of the soil. This shows a potential of using bagasse ash as admixture in cement stabilized lateritic soil.

II. CONCLUSION

The use of the Rice husk Ash, Baggash Ash and lime in Any soil found anywhere, to be upgraded to achieve better characteristics necessary in improving road life and quality. As we know pavement based design and thickness of sub-base depends upon CBR value so increment in CBR value results in reduction of thickness of sub-base, which means materials require for pavements are having less quantity and it also save the construction time
The rice husk ash, baggash ash and lime improves road strength as well as cheap and easily available also.

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