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Effect of Powdered date seeds Ash on Plasticity of Black Cotton Soil

Rashmi Bade[1], Atik Bakshi[2], Prakash Mate[3], Pawan Sinha[4], Ashraf Pathan[5]

1 Assistant professor, Dept. of Civil Engineering, Anjuman College of engineering and technology, Maharashtra, India

[2]Student of Graduation, Dept. of Civil Engineering, Anjuman College of engineering and technology, Maharashtra, India

[3] Student of Graduation, Dept. of Civil Engineering, Anjuman College of engineering and technology, Maharashtra, India

[4]Student of Graduation, Dept. of Civil Engineering, Anjuman College of engineering and technology, Maharashtra, India

[5]Student of Graduation, Dept. of Civil Engineering, Anjuman College of engineering and technology, Maharashtra, India

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Abstract

This research is focussed on calculating the effect of ash of powdered date seeds on the black cotton soil collected from MIHAN, Nagpur. This soil had a plasticity index of 25 and was cohesive in nature. In order to determine whether the powdered date seed ash has an effect on the plasticity of soil, liquid limit and plastic limit tests were conducted in the laboratory. Results show that plasticity index of soil decreases with increase in percentage of admixture used. The results of this study show that with increase in percentage of admixture, plasticity index decreases.

Keywords: plasticity of soil, plasticity index, black cotton soil, organic admixture, liquid limit, plastic limit,

1. INTRODUCTION:

Soil Stabilization is the method of enhancing the physical properties of soil. Stabilization can increase the shear strength of a soil and/or control the shrink-swell properties of a soil, and also improves load bearing capacity of a sub-grade as well as support pavements and foundations. Soil Stabilization along with ground improvement techniques can be utilized on roadways, parking areas, airports and many other situations where sub-soils are not suitable for construction. This process is accomplished using a wide variety of additives, including lime, fly-ash, and Portland cement. Other material by products can also be used such as coconut shell ash and, wood shavings ash etc have also been researched upon Black cotton soils are highly clayey soil with excessive shrink and swell properties and therefore make up for problematic sub grade. Due to its high shrink and swell property it is likely to develop cracks. When high plasticity soils are treated, plasticity index decreases having less affinity with water. In India, due to dearth of finance during road construction by conventional method, there is need to go for suitable method of low cost road development, followed by step by step ground improvement techniques to meet changing traffic demands. It has been noted that that there is very little research work done on the effects of various organic admixtures on plasticity of soil. Hence the main aim of this study is to examine the likely effects of ash of powdered date seeds on the plasticity of soil.

2. MATERIAL:

A) Material in use:

1. **Soil:** Expansive black cotton soil collected from the MIHAN area of Nagpur, Maharashtra was used. The basic index properties are as follows:
    1. Liquid limit – 56%
    2. Plastic limit – 31%
    3. Plasticity Index – 25%

2. **Organic admixture – ash of powdered date seeds:** Date seeds in powder form were used. This powder has been later converted to ash by roasting. It was used in percentage by weight of soil at 15%, 20% and 25% by weight of soil.

B) Sample preparation: Collected soil sample is first air dried in direct sunlight. The organic matters, small aggregates, broken wooden material, pieces of glasses are removed carefully from soil sample. The prepared sample is then used for the liquid and plastic limit tests. The weight of soil sample taken for test is replaced by percentage of weight of ash of wood shavings. Four different blends are prepared for replacement of soil in varying proportion of 15%, 20% and 25%

3. TESTS CONDUCTED:

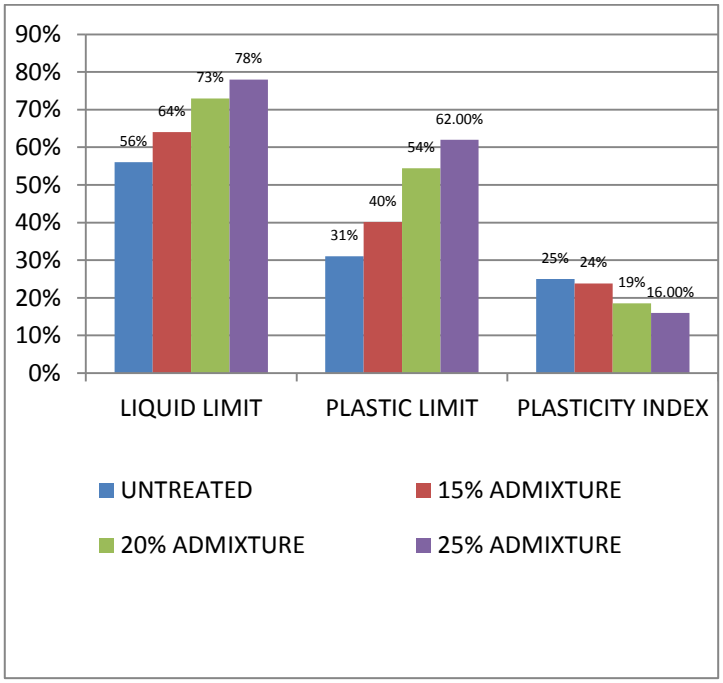
In order to determine any change in the plasticity of soil upon use of admixture, liquid and plastic limit of the collected soil sample was carried out in accordance with IS 2720 of Indian code.

1. **Liquid limit determination:** The liquid limit of treated and untreated expansive soil was determined using Casagrande's liquid limit apparatus in accordance with the procedures laid down in IS: 2720 part 4 (1970).
2. **Plastic limit determination:**The plastic limit of treated and untreated expansive soil was determined in accordance with the procedure laid down in IS: 2720 part 4 (1970).

4. RESULTS AND DISCUSSIONS:

The results of liquid limit and plastic limit for untreated soil sample and treated soil sample with admixtures at varying percentages (15%, 20%, 25%) are as follows:

DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
Untreated soil	56%	31%	25%
15% admixture	64%	40.17%	23.83%
20% admixture	73%	54.45%	18.55%
25% admixture	78%	61.95%	16.05%



5. CONCLUSIONS

The addition of ash of powered date seeds has an effect on liquid and plastic limits of the soil and thus on plasticity of the soil. The results of the research thus indicate a reduction of plasticity index in each sample after addition of various percentages of ash of wood shavings. The plasticity index of untreated soil sample is 25 which reduces gradually and comes down to 16.56 at 25% of admixture added by weight of soil.

6. ACKNOWLEDGEMENT

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REFERENCES

1. Phanikumar, B.R., Ramesh, V. and Shastry, M.V. (1998), Efficiency of calcium chloride in stabilizing swelling soils, Proc. IGC-1998,Vol. 1., 245-246.
2. Rashmi Bade, Syed Sohailuddin, Tasneem Khan, Er. Imran Sheikh, Effect Of Coconut Shell Ash On Properties Of Expansive Soils, IRJET, volume 3, issue 12, Dec 2016

3. Combining Industrial Wastes with Lime for Soil Stabilization by Kamon, M. and Nontananandh, S. (1991)
4. Soil Stabilization by Calcium Carbide Residue and Fly Ash by Horpibulsuk, S., Phetchuay, C., and Chinkulkijniwat, A. (2012)
5. Soil Modification by Cement Kiln Dust by Baghdadi, Z., Fatani, M., and Sabban, N. (1995)
6. Effect of Wood Shaving Ash on Index Properties of Black Cotton Soil by RashmiBade,NuzraZainab Khan, Jaya Sahare, Faisal Ameen, Danish Ahmed.

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BIOGRAPHIES

Er. Mrs. Rashmi G. Bade,
(M.Tech-Geotechnical Engineering)

Mr. Atik Bakshi,
Student of Graduation,
Nagpur University

Mr. Prakash Mate,
Student of Graduation,
Nagpur University

Mr. Pawan Sinha,
Student of Graduation,
Nagpur University

Mr. Ashraf Pathan
Student of Graduation,
Nagpur University