e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:01/January-2021 Impact Factor- 5.354 www.irjmets.com

EFFECT OF CORN HUSK FIBER ON THE CONSISTANCY OF EXPANSIVE SOIL

Shubhendu Mishra[*1], Dr. Bipin Prajapati[*2]

[*1]PG Student, Department of Civil Engineering, KNIT, Sultanpur, Uttar Pradesh, India.

[*2]Assistant Professor, Department of Civil Engineering, KNIT, Sultanpur, Uttar Pradesh, India.

ABSTRACT

Soil is the basis for every Civil engineering construction. All the construction whether light or heavy in supported on the soil. We can say that the soil bear the load of all type of structure. Now a days major problem that civil engineers facing is the problem of its moisture content. Expansive soils are characterized by volumetric changes due to dampness varieties and being a wellspring of danger to the population as it eventually causes heavy monetary misfortunes, extraordinary damage to structures and structure. They may cause some damage to common developments, particularly to light weight structures, including breaks and gaps. This audit paper manages the adjustment of soil utilizing Corn Husk Fiber. Corn husk buildup gathered from the removal of the little road market. Each example of corn husk is being sun dried cleaned physically again, choped into little pieces, ground in a mallet plant. Corn husk has lignin content and comparative measures of hemicellulose and α-cellulose. What's more, the corn husk fiber demonstrated preferable elastic property over piassava and coir and comparative most extreme security temperature to that of caroa and olive husks.

Keywords: Corn Husk , Lignin Content, Hemicellulose, Tensile strength.

I. INTRODUCTION

Nowadays, problem of expensive soil is major concern, it is necessary that it have sufficient strength. This importance motivates researchers to develop new solutions, which can be mentioned in the various technical papers that uses the waste material such as Lime, bagasse ash, Rice Husk ash, Ground graduated blast furnace slag, waste glass material, sisal, polypropylene, hybrid fiber, compacted cement dust etc. to reduces the swelling potential of soil and increases the strength of soil.

If there was an incident of using lime as a stabilizer, leading to the use of waste, the infinite pressure strength of the massive soil improved further than that. The trend of changes is basically like waste, with the difference that lime intensity increased further, the expansion of waste used and lime allowed the pH estimates of dirt to expand[1].Concrete caused the most extreme expansion in fluid cutoff. It is fascinating to take note of that with the expansion of 9% lime, 9% concrete, 9% Sarooj and the blends of 3% lime + concrete, as far as possible qualities were diminishes. The swell weight was at first decreased with the expansion of 3% Sarooj, 3% lime+3% concrete, and 5% lime+3% concrete.

The main material used in this study was waste corn husk that had an average length and width of 240–245 mm and 110–135 mm, respectively. The selection process was aimed at maintaining the uniformity of the selected CHFs.

II. METHODOLOGY

Corn Husk have high Lignin Content, Hemicellulose and have high flexibility, which give strength to the soil. Firstly consistency of untreated soil is determined ,then again consistency is checked on different percentage of corn husk.

In the present investigation, expansive soil was procured from a site having as **Khala Bazar, haiderganj, Lucknow, U.P**. The soil was collected by method of disturbed sampling after removing the top soil at 500 mm depth and transported in sacks to the laboratory. Little amount of the sample was sealed in polythene bag for determining its natural moisture content. The soil was air dried, pulverized and sieved with 4.75 mm Indian as required for laboratory test. The various geotechnical properties has been Investigated.

‘‘Test method for liquid limit, plastic limit, and plasticity index of soils’’ defined in ASTM D4318-84 were used for the determination of liquid and plasticity limits of the soil. Various test are to be performed on engineering properties of soil.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:01/January-2021 Impact Factor- 5.354 www.irjmets.com

Different Geotecnical properties are determined for untreated soil sample.

Table-1: Geotechnical Properties of Expansive soil

S.NO	PROPERTIES	VALUE
1	Coefficient of uniformity (Cu)	2.82
2	Coefficient of curvature (Cc)	1.18
3	Specific gravity (G)	2.64
4	Maximum dry density (MDD)	1.55 gm/cc
5	Optimum moisture content (OMC)	23.31%
6	Natural moisture content	7.11%
7	Liquid limit	72%
8	Plastic limit	21%
9	Classification	CH

III. MODELING AND ANALYSIS

"Test method for liquid limit, plastic limit, and plasticity index of soils" defined in ASTM D4318-84 were used for the determination of liquid and plasticity limits of the **soil with Corn Husk**. Various test are to be performed on engineering properties of soil.

Consistency limits

Table presents the liquid limit, plastic limit, and plasticity index of the stabilized soil treated with different percentage of Corn Husk.

Table-2: Change in plastic properties with different percentage of Corn Husk

Samples	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
Untreated soil	72%	21	51%
3% CH	69.2%	20.2	49%
5%CH	65.2%	19.34	45.86%
9% CH	63.3%	18.22	45.08%
10%CH	61.4%	17.63	43.77%
12% CH	61.5%	17.55	43.95%
15%CH	58.45%	16.90	41.55%
18%CH	56.3%	16.20	40.1%
20%CH	55.5%	16.11	39.39%
25%CH	52.64%	15.32	37.32%
30 %CH	51.54%	15.01	36.53%
32%CH	50.23%	14.89	35.34%
35%CH	48.40%	14.40	34%

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:01/January-2021 Impact Factor- 5.354 www.irjmets.com

IV. RESULTS AND DISCUSSION

The Corn husk stabilized soil presents a marginal decrease in liquid limit, which decreased from 72% to 48.40 % on the addition of Corn Husk by weight.

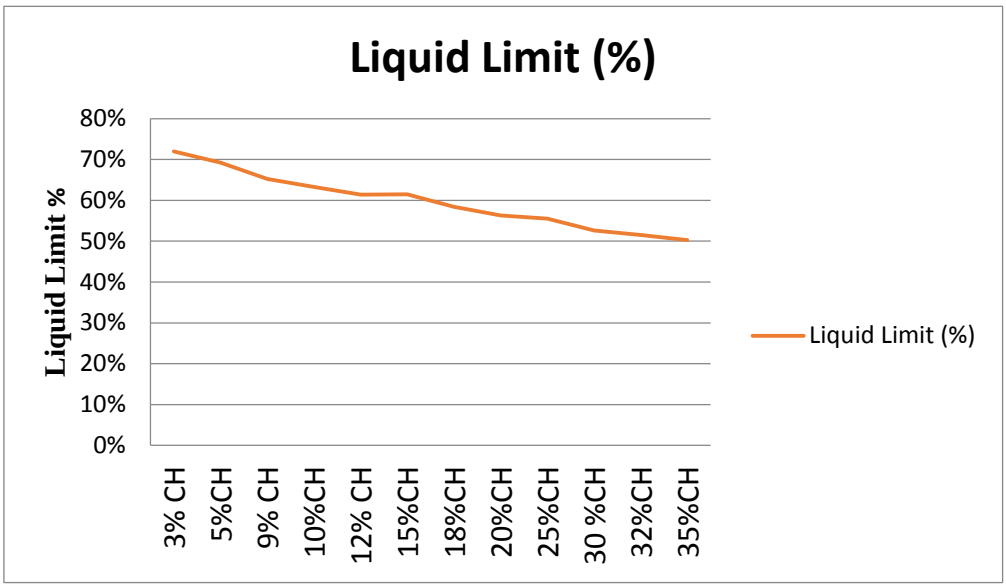

Fig.-1: Liquid limit with Different percentage of Corn Husk

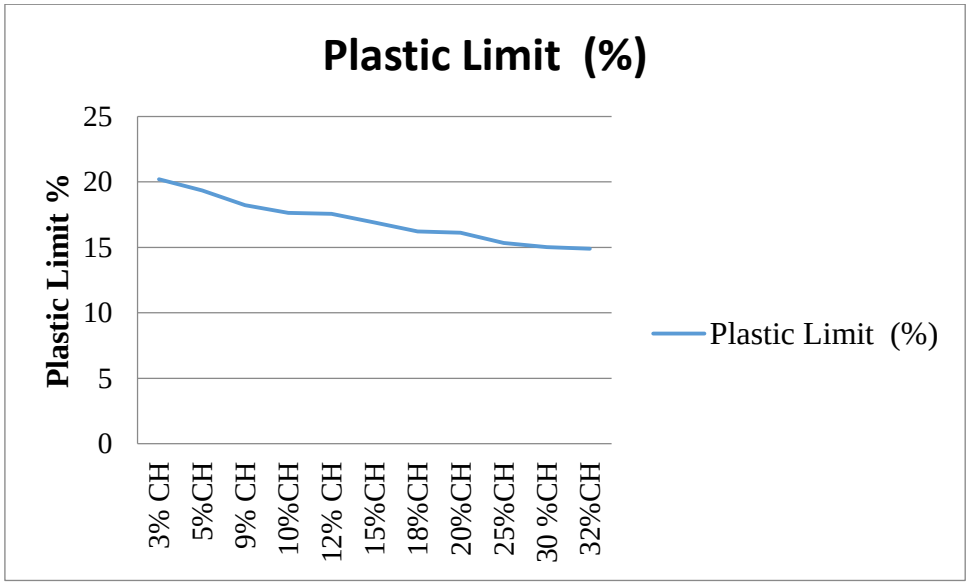

Fig.-2: Plastic limit with Different percentage of Corn Husk

V. CONCLUSION

The stabilization of expansive soil has drawn attention to avoid its disastrous effect on infrastructural components like road, building etc. In this work a new idea of stabilizing the expansive soil using Corn Husk was discussed. The method of sample preparation and changes in basic geotechnical properties of expansive soil is discussed.

Based on the obtained results and discussion there of following conclusions can be made.

1. 12 corn husk samples have been prepared for finding out plstic property of soil.

2. Liquid limit of soil sample is reduced from 72 % to 48.40 % on increasing the CH content to 0 % to 35 % of the weight of the soil.

3. Plastic Limit of soil has also shown corresponding decrease in the value from 21 % to 14.40 % on adding the corn husk contebt from 0 to 35 % of the weight of the soil sample.

4. Plasticity index has also reduced from 51 % to 34 % .

5. On adding the Corn Husk fibre the I_P value reduces due to which the soil changes from High Plastic to Medium plastic.

VI. REFERENCES

[1] Khazaei Jahangir, Moayedi Hossein; Soft Expansive Soil Improvement by Eco-Friendly Waste and Quick Lime; Arab J Sci Eng; 2017.

[2] Al-Rawasa Amer Ali, Hagoa A.W, Al-Sarmib Hilal; Effect of lime, cement and Sarooj (artificial pozzolan) on the swelling potential of an expansive soil from Oman; Building and Environment 40 (2005) 681–687.

[3] Leite Rafaella, Cardoso Rodrigo, Cardoso Carlos, Cavalcant Erinaldo and Freitas Osvaldo de; Lime stabilization of expansive soil from Sergipe – Brazil; web of conference 9;2016.

[4] Fattah Mohammed Y, Rahil Falah H., Kawther Y. H. Al-Soudany; Improvement of Clayey Soil Characteristics Using Rice Husk Ash; Journal of Civil Engineering and Urbanism; Volume 3, Issue 1: 12-18 (2013).

[5] James Jijo, Pandian P. Kasinatha; Bagasse Ash as an Auxiliary Additive to Lime Stabilization of an Expansive Soil: Strength and Microstructural Investigation; Hindawi; Advances in Civil Engineering; Volume 2018, Article ID 9658639.

[6] Mir B.A.; Some studies on the effect of fly ash and lime on physical and mechanical properties of expansive clay; International Journal of Civil Engineering; Vol. 13, Nos. 3&4B, Transaction B: Geotechnical Engineering, September & December 2015.

[7] Sharma, A.K.; Sivapullaiah, P.V.: Ground granulated blast furnace slag amended fly ash as an expansive soil stabilizer. Soils Found. 56(2), 205–212 (2016).

[8] Mendes carlos augusto de carvalho, Fernando antônio de oliveira adnet, Márcia christina amorim moreira leite, Cristina russi guimarães furtado, Ana maria furtado de sousa**;** Chemical, Physical, Mechanical, Thermal and Morphological characterization of corn husk residue; 2014.

[9] Jan R. Prusinski And Sankar Bhattacharja; Effectiveness of Portland Cement and Lime in Stabilizing Clay Soils; Transportation Research Record 1652.

[10] Benazzoug R. Bahar a, Kenai M. a; Performance of compacted cement-stabilised soil; Cement & Concrete Composites 26 (2004) 811–820.