

Comparitive Study of Silt Soil by Various Admixture

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Abstract- This paper describes comparative study of silt soil reinforced with waste plaster of Paris in sample (A), fly ash in sample (B), coir fiber in sample (C). With the inclusion of these materials there is a significant effect on the testing of the silt soil. There is a scope that the properties of the sand gets enhanced with the inclusion of the fly ash, coir fibre or Plaster of Paris in the sample of Soil. This will also enhance and give a brief insight about the engineering properties of the soil sample and ways to stabilize the sample according to the needs can be found out.

Keywords — California bearing ratio(CBR), Stabilizatio, Silty Soil, Plaster of Paris, Coir fiber.

I. INTRODUCTION

In Sitapura area of Jaipur District of Rajasthan high-silt contents are generally found in soil. Minimum bearing capacity and low strengths are the basic problem associated with silt soil. In 2009 Minard Hall, originally named Science Hall, is located on the campus of North Dakota State University (NDSU) was fails due to Collapse of silty soil.

The water table of Sitapura area is very low, due to this reason construction should be easily performed. And there are no any needs of pumping action.

The engineering properties of silt soil is increased by using the admixture plaster of Paris (POP), fly ash

Although another solution for treating the silt soil is mixing the admixture plaster of Paris.

II. OBJECTIVE

The main targets of this investigation are to find out the properties and characteristics of silt soil to provide a guidance for alternative solution.

III. RESEARCH APPROACH

Standard laboratory test recognize the fundamental characteristics parameter of the natural sample.

The acknowledgement and strength of the silt soil under loading with different water level and compaction effort were also try out.

Sensitivity to bearing capacity was examined in the terms of the physical characteristics of the sample. The probable for stabilization of the difficulty silt soil was also calculated.

To finding the engineering properties the laboratory test were selected with construction need. The effective additive

were used on their capacity to dry the sub grade silt, so that they can be more compacted with the power to provide for the fabrication of foundation

California bearing testing was conducted on wet silty soil sample to stabilize with different percentage of plaster of Paris, fly ash and coir fiber.

Another tests were also performed to determine the long term stability of the stabilities silt soil.

IV. MATERIALS

The following materials are used in the study for Stabilization of Silty soil. From Sitapura area of Jaipur District of Rajasthan (India) the soil were collected. The soil was kept air dried and grind topass through IS425 microns sieve and then oven dried at 1100 C Before conducting the test.

Table 1: Properties of Silty Soil

Grain Size Distribution	
Gravel (%)	0
Sand (%)	11.25
Silt (%)	88.75
Specific Gravity	02.69

Plaster of Paris is used for the test if clean and pass through 4.25 micron IS sieve was oven dried for 24 hours. The specific gravity of plaster of Paris is equal to 1.8 gm/cc. *Fly ash*: - The fly ash is used is purchased from the market having specific gravity of 2.5 gm/cc. *Core fiber*: - The coir fiber is residue which is collected from temple. The diameter of coir fiber is .48mm with specific gravity of 0.87 gm/cc.

V. MODUS OPERANDI

Properties of soil are determine at initial stage, then the soil is stabilized by using Used POP, fly ash and coir fiber.

Quantity of Waste POP, Fly ash and coir fiber is taken as 0.25%, 0.5% and 1.0% of dry weight of soil respectively.

Using these mix proportion a set of laboratory tests were to determine the index properties and CBR values of both silt and mixed proportion sample, mix proportion sample of soil, Used POP, fly ash and coir fiber is used for stabilization.

Natural soil
 Soil + 0.25% POP
 Soil + 0.50% POP
 Soil + 1.00% POP

Natural soil
 Soil + 0.25% fly ash
 Soil + 0.50% fly ash
 Soil + 1.00% fly ash

Natural soil
 Soil + 0.25% coir fiber
 Soil + 0.50% coir fiber
 Soil + 1.00% coir fiber

VI. EXPERIMENTATION

Classification of soil is carried out to find the ease for construction

1. *Grain size analysis*:- Grain size analysis is done by hydrometer test as the particle size is less than the grain size is found as 0.003mm which is found as silt according to IS classification.
2. *Atterberg Limit*:- Critical water content of a fine grain soil is done Atterberg limit such as shrinkage limit, plastic limit, and liquid limit. But in the case of silt the plastic limit does not exist and liquid limit has very small value.
3. *California Bearing Ratio (CBR)*:- A test performed by California department of transportation before world war 2nd is a penetration test for evaluation of strength of sub grade, natural ground and base course beneath new carries way construction.

VII. RESULT

For simple soil:-

Deflection	Penetration
1	2
2	4
2.5	4.1
3.0	5
4.0	6
5.0	4

For simple soil + POP
 (A)Admixture when 25 gm

Deflection	Penetration
1.0	1
2.0	3
2.5	4
3.0	4.8
4.0	6.6
5.0	7.4

(B)Admixture when 50 gm

Deflection	Penetration
1.0	3.4
2.0	5.2
2.5	5.6
3.0	6.0
4.0	6.8
5.0	7.0

(C)Admixture when 100gm

Deflection	Penetration
1.0	1
2.0	1
2.5	2
3.0	2
4.0	3
5.0	5

For simple soil + Fly ash

(A)Admixture when 25 gm.

Deflection	Penetration
1.0	2
2.0	4
2.5	5
3.0	5
4.0	7
5.0	8

(B)Admixture when 50 gm

Deflection	Penetration
1.0	1
2.0	2
2.5	2
3.0	3
4.0	3
5.0	4

(C)Admixture when 100gm

Deflection	Penetration
1.0	1
2.0	5
2.5	6
3.0	8
4.0	11
5.0	13

For simple soil + coir fiber

(A)Admixture when 25 gm.

Deflection	Penetration
1.0	1
2.0	3
2.5	3
3.0	3
4.0	2
5.0	2

(B) Admixture when 50 gm.

<i>Deflection</i>	<i>Penetration</i>
1.0	1.2
2.0	1.0
2.5	1.0
3.0	1.0
4.0	1.0
5.0	1.0

(c) Admixture when 50 gm

<i>Deflection</i>	<i>Penetration</i>
1.0	1
2.0	2.0
2.5	2.0
3.0	3.0
4.0	4.8
5.0	6.0

VIII. CONCLUSION

Study shows that CBR value increase with increase in waste POP and Fly ash. We generally take soaked CBR for pavement design. The CBR value for soaked soil increases maximum with 1.0 % of POP from 0.570 to 3.56% and maximum CBR value attained when 1.0 % of fly ash is used and it increase from 0.570 to 9.26%.

IX. REFERENCES