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A REVIEW ON THE SOIL STABILIZATION USING CEMENT

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ABSTRACT

There are many barren lands which are unfit for any construction due to weak soil which do not have enough stability to bear the heavy loading of vehicles and buildings. The main aim of this review is to stabilize that soil by using suitable stabilization methods like chemical additives, rewetting, moisture control, compaction control. Additives like cement, fly ash, lime, bitumen, Portland cement etc are used to improve the properties of soil like consistency limit, shear strength, permeability, bearing capacity etc. This paper mainly concerns about stabilizing soil with cement.

Keywords- *soil stabilization, objective of study, material used, cement stabilization, tests performed.*

1. INTRODUCTION

Stabilization of soil is a method of improving or altering the properties of soil for a construction purpose. The changes in the properties can be done by chemical additives or by mechanical blending of different soils. Through soil stabilization with cement unbound material of soil can be bound together to get the desired strength and properties. The stabilized soil has lower permeability, lower compressibility, than the native soil.
Some stabilization methods are as follows:

1.1 Mechanical stabilization
1.2 Chemical stabilization
a) Cement stabilization
b) Fly ash stabilization
c) Rise husk ash stabilization
d) Lime stabilization
e) Bitumen stabilization

OBJECTIVE OF STUDY

1.) To check the properties of the simple soil.
2.) Reinforcement of cement in the native soil to alter its properties.
3.) To compare the properties of both simple and reinforced soil.

2. MATERIAL USED

SOIL – Soil which is to be reinforced in this project is collected from Noida sector 75 near Gaur city.

CEMENT – Portland cement of required grade.

CEMENT STABILIZATION

Soil stabilization with cement is a process in which soil particles are bonded by the hydration of cement particles. The cement particle needs to cover the entire soil particle to establish high compressive strength. Mixing of cement and soil with certain particle size distribution is necessary to get high strength bond between the particles. The void ratio of the soil is reduced as the cement fills up the voids between the soils particle. Further when water is added the cement reacts with water and becomes hard. Due to hardening of cement the bearing capacity and shear strength of the soil increased. Cement helps in decreasing the liquid limit and increasing the plasticity index of soil. Reaction of cement is not dependent on soil minerals, but its main reaction is with water [1]. This can be one of the reasons why cement is widely used with various soils.

3. METHODOLOGY OF STUDY

Firstly, take some soil and perform all the required test on simple soil, then reinforced soil with cement and again perform all test on reinforced soil. Test to be performed are listed below:

1) **Moisture content –** This test is done by oven dry method.
2) **Consistency limit –** To determine consistency limit of soil.
   a) Liquid limit test
   b) Plastic limit test
   c) Shrinkage limit test
3) **Particle size analysis –** To determine various factors of particles such as uniformity, grade etc.
4) **Shear strength –** To determine shear strength of soil. i.e. direct shear test, CBR test.
5) **Compaction test –** To determine strength of soil by standard proctor test and modified proctor test.

Percentage of cement is added in the soil by weight in different proportion such as 2%, 4%, 6% and 8% respectively and then compares the properties of simple soil and reinforced soil to determine the required increase in properties of soil.

4. CONCLUSION

Through the studies of different research paper, we are expecting that by the stabilization of soil with cement will bring about the change in properties of soil like permeability, shear strength, bearing capacity and make the soil suitable or fit for any construction purpose. Soil stabilization will bring economy in the cost of foundation. In addition, also to find out different additives to be used which are not yet discovered which can contribute to improve the durability, strength and other properties of soil.

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