Clay Soil Treatment using Water Soluble Polymer

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Abstract: In this study, the effect of adding water soluble polymer on the index properties of clay soil was investigated. The water soluble polymer effect on the soil resistivity was also investigated. Varying percentages of polymer was added into the clay soil, the index properties were found . Addition of 1% polymer reduced the liquid limit of CH clay from 70 percent to 55 percent.

1. Introduction

The United States Department of Agriculture estimates that one half of the homes in the United States are built on expansive soil and the American society of civil Engineer estimates that a quarter of all homes have suffered damage caused by these soils. Expansive soil pose a considerable hazard to foundations and roadways .The small size of the particles and its unique crystal structure gives the clay material special properties including cation exchange abilities, plastic behavior when wet ,catalytic abilities ,swelling behavior and low permeability. To resist the volume change characterization, improve the strength of wetting and improve the soil properties admixtures are being added.

In the present investigation, various percentage of polymer is added and the index properties are investigated.

2. Objective.

The overall objective was to modify the index properties of the CH clay soil by adding water soluble polymer. The change in index properties such as liquid limit is investigated. The resistivity of the soil before and after polymer addition is examined

3. Materials and Methods.

Field CH soil with a liquid limit of 70 % was treated with a water soluble polymer. The polymer was formed by mixing the chemical grout, catalyst and accelerator. The way the polymer is absorbed to soil is the key to effectiveness as soil amendment. Addition of 1% by weight of polymer was added into the soil and considerable effect was observed in index properties. The polymer gelling time was delayed by using different combination and it was dispersed well over the clay soil, in order to get the required property.

4. Results and Discussion

Polymer of varying concentration was added to the moist CH soil of liquid limit 70%. Concentration of polymer was varied in preparing the admixture. From the results, it was found that lower polymer concentration was more effective at changing the index properties. Lower concentration of polymer, takes a longer time to polymerize and easily forms a coat over the clay particles. From the results illustrated below, it is clear that polymer helps to reduce the index properties of CH soil.

In addition to it, the electrical resistivity of the clay was studied before and after the addition of polymer. Electrical resistivity of clay was affected by the addition of the polymer .The resistivity of the clay was measured by using Soil Test Direct Soil EC Tester. The change in the resistivity of the soil indicated the change in clay property and provides a tool to distinguish between treated and untreated soil.

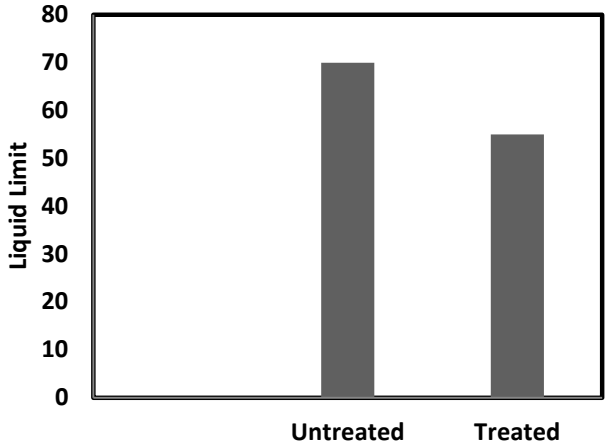

Fig 1 Liquid Limit variation with Soil Type

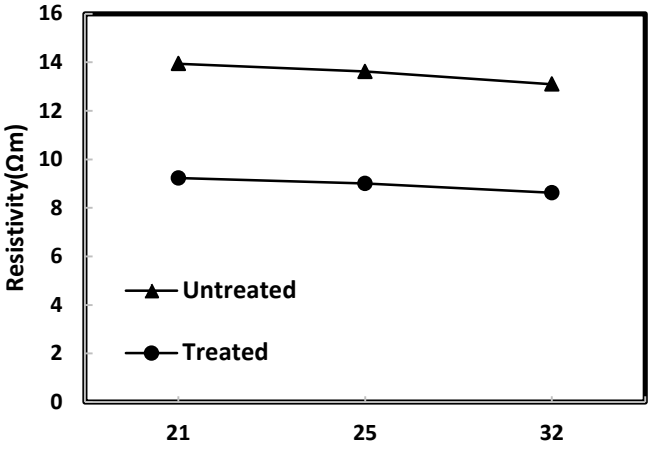

Fig2 Resitivity change with Temperature (C°)

5. Conclusion

1) Liquid limit of CH soil is reduced after the addition of polymer into it. Polymer addition, help to modify the index properties.

2) Resistivity of soil gets affected by addition of polymer into soil. From fig 1, reduction in resistivity is found after addition of polymer.

6. Acknowledgements

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7. References

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