



The polymeric Property in stabilization of the clay soils



Author: Mohammad reza Hassan pour

The senior scholar of Geotechnic engineering of Hormozganuniversity

Hassanpour67@gmail.com

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Name Of Presenter: Mohammad Reza Hassan Pour

Abstract:

Soil as a position in the underlying structural forces and moments to get made, and merge them in their role plays. Understanding of soil and its overall profile and offers strategies for improving the platform for the implementation of any building structure is necessary. Today, much of the soil forming the bed of earth in Iran or other countries are clayey soils form. According to clays characteristics such as sensitivity to moisture, having high liquid limit, their structure, activity, and adhesion properties of clay and ... has made to improve clay soil is of particular importance. by plenty of years Consolidation of clayey soils in traditional materials such as bitumen, limestone, cement, lime and fly ash mixture is done. Material and running costs and also rising short duration stabilization, required engineering groups using the processes of polymer and science of chemistry.

In This paper elaborates on the using of polymer's positive ion mode and their influence on soil structure and characteristics such as Consolidation parameters ,Shear

strength of the soil And its effect on the coefficient of friction and cohesion parameters, increasing bearing capacity and...are paid

Key words:stabilization,clay soils, polymeric material, positive corn

1) Introduction

Soil as a position in the underlying structural forces and moments to get made, and merge them in their role plays. Understanding of soil and its overall profile and offers strategies for improving the platform for the implementation of any building structure is necessary. Today, much of the soil forming the bed of earth in iran or other country are clayey soils form. According to clays characteristics such as sensitivity to moisture, having high liquid limit, their structure, activity, and adhesion properties of clay and ... has made to improve clay soil is of particular importance. by plenty of years Consolidation of clayey soils in traditional materials such as bitumen, limestone, cement, lime and fly ash mixture is done. Material and running costs and also rising short duration stabilization, required engineering groups using the processes of polymer and science of chemistry.

2) Research Methodology

Additional polymer with positive ions to absorbed clay minerals and release large amounts of water adsorption is accompanied by reducing property of the swelling clay, low activity clay, neutralize clay minerals, increase clayey soil strength, improve concentration and consolidation of clayey soils.... Will be fully discussed.

In This paper elaborates on the using of polymer's positive ion mode and their influence on soil structure and characteristics such as Consolidation parameters, Shear strength of the soil And its effect on the coefficient of friction and cohesion parameters, increasing bearing capacity and...are paid. Today polymers are very useful in stabilized the bed of rural roads, Airport Runway construction And Control dust rise from the plains and the dirt roads. We note that using too polymer solution can be to cause crumbling susceptible fine clay soils. Also further increases polymer concentration in water on soil properties will decline.

3) Result And Analysis

In this section the results of the use of positive ionic polymers and influence on the structure and properties of soil like about Atterberg Limits, The permeability, Consolidation and its effect on the consolidation parameters, Shear strength of the soil, And its effect on the coefficient of friction and cohesion parameters, Bearing capacity ...Are presented.

3-1)Atterberg Limits

When the positive ions of polymer connect with negative ions of clay , water molecules bind to the free surface of the clay mineral components separated and reduce water sorption, And extra water get out of the soil , Atterberg limit will undergo dramatic changes.

The equation $PI = LL - PL$ Sorption of water out of soil, LL (liquid limit) reduced and the adherence of it, the PL (the plastic limit) increases.Based on this relationship, PI (plasticity index) decreases. Reduced PI reduces water absorption and decreased sensitivity of the clayey soils and results in a stable clay and Interest to survival and stabilization.

3-2) permeability

When positive ions \rightarrow polymer enter the fine soil (C OR M),and connect to negative ions of clay, Due to release of water from Soil structure,free flows are neutralized. Increased the ability of the soil in throughwater means the ability of permeability of soil to increased.In coarse soils, the permeability depends on the particle diameter and added polymer is not much effect on permeability of these soils.

3-3) the angle of internal friction (Φ)

Study this parameter is possible only in coarse soils, According to shear test results on sand and gravel soils.We observed that existence or nonexistence of polymer does not effect on increased or decreased internal friction angle.

3-4) adhesion

According to the results of shear tests on fine soils,We see by adding the positive polymer plasticity index And liquid limit(LL) Due to removal water Are reduced.Soil will lose its adhesive and Thus greatly reduces adhesion. Experiments on the clay soils of the plateau of iran indicates that adhesion is reduced 30 to [50 percent](#).

3-5) other parameters

The other parameters that can be spoken are Dry density of soil (γ_d) and Moisture content (ω).

Entering the polymer to the soil clay and bind to negative particles and leaving water from the soil, the weight of water in the soil is reduced. According to relation $\omega (\%) = W_w / W_s$ soil moisture is reduced. Thus, according to the relationship $\gamma_d = \gamma_{wet} / (1 + \omega)$ that obtained, dry density will increase with decreasing soil moisture. As a result the Density Capability, stability and bearing capacity of clay increases.

4) Conclusion

- polymer solution decreases Liquid limit(LL), Increasing plasticity limit(PL), decreasing (PI) And reduced sensitivity of the clay to the absorption of water and Reduced activity of the clay and results to a stable clay and Interest to survival and stabilization.
- The polymer solution increases the permeability coefficient.
- Polymer solution decreases the cohesion of the fine soil.
- Polymer solution increased the dry density of soil and increase compaction, stability and bearing capacity of the clayey soil.

4) Resources

- Bell, F. G., (1996), "Lime stabilization of clay minerals and soils," engineering geology .volume 42, page 223-237
- Shapour Tahouny "Principles of Geotechnical Engineering", V2
- Mitchell; "A review & Evaluation Of Soils
- Mr. Movahedi Far. "Master thesis". " behavior of clay soils by adding polymer Super 4 to Clay soil ". Ferdowsi Mashhad University "

- Ninov, J. and Donchev, I. and Lenchev, A. Grancharov, I., (2007), "CHEMICAL STABILIZATION OF SAND-SILTY ILLITE CLAY," Journal of the university of chemical Technology and Metallurgy, volume 42, page 67-72
- SiavashLytkuhi(2001).''Soil improvement in the past, present and future of iran". Engineers adviser of engineering services of Soil Mechanics.