Ground Improvement Using Alkali Activated Rice Husk Ash

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Abstract:

Ground improvement is an important part of geotechnical engineering which is essentially performed to minimize the construction cost by improving the existing ground condition of the construction site. The available soil improvement techniques are sand drain, preloading, grouting etc. Sand drain may lead to cavities. For tight construction schedules, preloading may not be a feasible method. On the other hand, cement grouting is an expensive solution. Therefore, the main focus of this study is to determine the effect of alkali activated Rice Husk Ash (RHA) as an additive to improve soft clay as well as cohesionless sandy soil. Loose soil will be stabilized by using RHA, Calcium Carbonate ($CaCO_3$) and certain proportion of Sodium Hydroxide (NaOH) in this study. The loose soils are observed to solidify after few days of curing in this stabilization technique. Then Unconfined Compression Shear Test was conducted and the solidification specimen exhibits the brittle behavior. The failure surfaces can be recognized easily which is diagonally inclined that represents the shear failure of the sample. The brittle behavior may be caused due to the improper curing or drying of the treated sample. It is expected that this research will provide a basic guideline for ground improvement using alkali activated rice husk ash suitable for different types of soil for example cohesive soil as well as cohesion less soil with different fine contents.

Objectives of the Project:

Therefore, the objectives of this study are to:

- Study the applicability of RHA and sodium hydroxide together in soil stabilization.
- Simultaneously, to assess the efficiency of different alkali activator.
- Observe the effect of the combination of RHA, Fly ash and Slag with different proportion in chemical stabilizations.
- Finally access the applicability of this technique in different types of cohesive and cohesion less soil samples.

This research project aims to develop an innovative and low-cost ground improvement technique. The primary purpose of the ground improvement is to increase the bearing capacity of the soil as well as to mitigate the effects of soil liquefaction.

Fig: Ground Improvement using geo-polymer

Research Team:

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