



***(The Improvement of Mechanical Properties for Soft Clayey Soils by  
Electrokinetic Geosynthetic (EKG) in Persian Gulf Water Condition)***

**[Alireza . Merikhi علیرضا مریخی]**

**[Nader . Shariatmadari نادر شریعتمداری]**

**[saeid . saeidijam سعید سعیدی جم]**

**[saeid . saeidijam باقر ذهبیون]**

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**Abstract**

*The usage of soft and very soft clays often has problematic issues on shear strength and bearing capacity. Increasing the drainage velocity by using electro-osmosis effect can be so much effective improving the soft soils' shear strength. This effect can be mixed with geosynthetic advantages in drainage. Mechanical properties of soils can be improved by applying electrical current to soil, so called "electrokinetic improvement".*

*In this research, EKG has been used in some bench scale tests on soft kaolinite clay. It is tried to find out if this method is effective increasing drainage and improving the mechanical and hydraulic properties of soft soils in Persian Gulf water condition. Results showed that EKG method is much more effective in low-saline water condition than high-saline water condition.*

**Introduction**

*Soft soils and marine deposits are very common around the world. There are many infrastructure projects and coastal high-rise buildings that their foundations are often supported by such soils of low shear strength and high compressibility. The construction of these projects on soft soils can lead to a very expensive foundation system.*

*Generally problematic clays are characterized by low shear strength, high compressibility, and high water content will caused these clays to lose the bond of soil particles and its bearing capacity will decreased. Also dewatering under self-weight consolidation is very slow which takes an inappropriate long time. This characteristics cause many problem for soft clay and tailings for instance, dewatering rate, drainage, settlement, etc. which need high effort to challenge.*

*In situ dewatering of such problematic material is highly desirable. The most likely technique to achieve this dewatering would traditionally include the installation of prefabricated vertical drains (PVDs). In order for these drains to work it is necessary to create a flow gradient in it, which is traditionally achieved by the application of a surcharge load. The drawbacks of this approach include the cost of importing and placing the fill and potential instability of the fill because of the low shear strength of the in situ material [1].*

*Recently there are many significant developments in soil improvement methods as the solution for problems on soft soils on new or existing construction. One of those soft soil improvements is the application of electrokinetic geosynthetics for strengthening soft soils. One way of reducing the water content of such material is by electro-osmotic dewatering [2], [3].*