

Nanocomposites and nanomaterials

Effects of tuff as additive on geomechanical properties of clay

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In the recent years using of nanocomposites and nano sized materials have been gradually increasing in civil engineering applications. These type materials are widely used for soil improvement works. Main problems related to the soils such as clay is that they have low strength and make excessive settlement when the load is applied on [1]. If the load transferred to foundation by structural elements is greater than the allowable load the foundation can carry, or foundation makes excessive settlement, failure based on soil is unavoidable. To prevent this one procedure is to improvement of the soil supporting foundation [2].

In this study, experimentally improvement works were performed on various of clay – tuff mixtures. Clay used was obtained from Campus of Bartın University. Tuff is natural tuff in region of Isparta,Turkey. According to Unified Soil Classification system, the clay is classified as high plasticity clay (CH). To more understand the engineering properties of the clay and tuff, scanning electron microscope (SEM) photomicrographes were presented in the study. Clay – tuff mixtures were prepared in the weight ratios of 5%,10%, 15%, 20% by considering natural water content and dry unit weight of the clay in the field. Unconsolidated undrained triaxial compression tests were performed on the clay – tuff mixtures and consistency limits were determined. Results showed that undrained shear strength increased as as result of the addition tuff into clay. Consistency limits such as liquid limit and plastic limit decreased with increasing tuff.

1. *Das B. M.*, Principles of Foundation Engineering. Global Engineering, USA, 2010, 794 p.

2. *Terzaghi K., Peck R.B., Mesri G.*, Soil Mechanics in Engineering Practice, John Wiley & Sons, Inc., USA, 1996, 549 p