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Immediate and Long-Term Effect of the Sawdust Usage on Shear Strength of the Clayey Silt Soil

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Abstract : Using some additives is very common method to improve the soil properties such as shear strength, bearing capacity; and to reduce the settlement and lateral deformation. Soil reinforcement with natural materials is an attractive method to improve the soil properties because of their low cost. However, the studies conducted by using natural additive are very limited. This paper presents the results of an investigation on the immediate and long-term effects of the sawdust on the shear strength behavior of a clayey silt soil obtained in Arnavutkoy in Istanbul with sawdust. Firstly, compaction tests were conducted to be able to optimum moisture content for every percentage of sawdust. The samples were obtained from compacted soil at optimum moisture content. UU Triaxial Tests were conducted to evaluate the response of randomly distributed sawdust on the strength of low plasticity clayey silt soil. The specimens were tested with 1%, 2% and 3% content of sawdust. It was found that the undrained shear strength of clay soil with 1%, 2% and 3% sawdust were increased respectively 4.65%, 27.9% and 39.5% higher than the soil without additive. At 5%, shear strength of clay soil decreased by 3.8%. After 90 days cure period, the shear strength of the soil with 1%, 2%, 3% and %5 increased respectively 251%, 302%, 260% and 153%. It can be said that the effect of the sawdust usage has a remarkable effect on the undrained shear strength of the soil. Besides the increasing undrained shear strength, it was also found that the sawdust decreases the liquid limit, plastic limit and plasticity index by 5.5%, 2.9 and 10.9% respectively.

Keywords : compaction test, sawdust, shear strength, UU Triaxial Test
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