HASAN KALYONCU UNIVERSITY
Civil Engineering Department

CE 499 Project Proposal Form

Part I. Project Proposer

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Part II. Project Information

Starting Term	2020 / 2021
Title of the Project	Shear Strength Behaviour Of Clay-Sewage Sludge Ash Mixtures

Project Description

A clean sand having about 5 % fines has been mixed with 5 to 40 % commercial sewage sludge ash to form different sand-clay soil mixtures. The purpose of making this study is to observe the effects of fraction of fine materials in the soil mixture on the behavior of shear strength. Six series of experiments have been performed throughout the study. Undrained triaxial compression tests (series 1) are performed on specimens taken out from homogeneously mixed soil mixtures at specified sewage sludge ash contents consolidated in a box without keeping the mixture under water. In series 2 experiments specimens are taken from a box where soil mixtures are consolidated under water and undrained triaxial compression tests are performed on the samples. Drained direct shear tests are performed on samples prepared without performing initial consolidation in large boxes but directly prepared in the direct shear boxes and consolidated prior to shear. It has been found that about 20 % sewage sludge ash - 80 % clay mixture seems to be at threshold composition and changes in both undrained and drained shear stress-strength
behaviour occur afterwards with increasing fine material content.

Project Justification

Novelty	
New aspects	In this project, the students will be able to deal with the geotechnical tests which are done in the laboratory such as Direct Shear Test. The methods and techniques, which are required to connect between the soil properties and calculations will be also studied. In addition, result parameters will be used to draw figures and understand the behavior of sewage sludge ash on shear strength of a clayey soil.
Complexity	
Challenging problem and issues	The main challenge in this project could be addressed as how to make the student able to contact between his theoretical background, according to his previous undergraduate courses, and this practical project. The student should improve his skills to know how to collect all required information from separated resources and how to use it for study and design
Related civil engineering science fields and subfields	Geotechnical Engineering, Soil Mechanics, Engineering Geology, Laboratory Tests,
Tools	ASTM, BS, and ASHTTO standards
Risk involved	
Potential problems and alternative solutions	The availability of computer programs. Alternatively, hand methods will be applied using equations according to geotechnical standards such as ASTM, ASHTTO and BS

Minimum work required	• Sufficient knowledge and skills related Soil Mechanics and the ASTM Test standards. Therefore, to accept the student in this project he should be passed in introduction to soil mechanics, soil mechanics and foundation engineering. • 1-2 Students can be accepted in this project.