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The Effect of Sand Content on Behavior of Kaolin Clay

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Abstract : One of the unknowns in the design of zoned earth dams is the percentage of sand which can be present in a clay core and still retain the necessary plasticity to prevent cracking in response to deformation. Cracks in the clay core of a dam caused by differential settlement can lead to failure of the dam. In this study, a series of Atterberg Limit tests and unconfined compression strength tests have been conducted in the ISU soil mechanics laboratory on prepared mixes of quartz sand and commercial clays (Kaolin and Smectite) to determine the relationship between sand content, plasticity and squeezing behavior. The prepared mixes have variable percentages of sand ranging between 10 and 90% by weight. Plastic limit test results in which specimens can be rolled into 1/8 in. threads without crumbling and plasticity index values which represent the range of water content over which the specimens can be remolded without cracking were used to evaluate the plasticity of the sand-clay mixtures. The test results show that the design mixes exhibit plastic behavior with sand contents up to 80% by weight. However, the plasticity of the mixes decreases with increasing sand content. For unconfined compression strength tests, the same mixtures of sand and clay (Kaolin) were made in plastic limit. The results which were concluded from the UCC tests represent the relationship between sand-clay content and chance of having squeezing behavior, also according to the results from UCC, strength of different samples and stress-strain curves can be obtained.

Keywords : clay's behaviour, plasticity, sand content, Kaolin clay
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