

Title: Influence of Ionic Concentration and Internal Porosity on the Behavior of Diatom-Clay Mixtures

Speaker:

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Abstract

While diatoms are used in many engineering and scientific applications ranging from filtering and construction to animal feed and natural pest control, very few geotechnical applications utilize diatoms. Natural soils containing diatoms are considered highly compressible, difficult to compact, and unstable when subjected to dynamic loads. Yet, given their unique characteristics (i.e., high water absorption and liquid limit and larger friction angle), there is great potential for utilizing diatoms and natural diatomaceous soils in the development of engineered particulate materials for geotechnical and geoenvironmental applications (e.g., hydraulic barrier layers and landfill covers). Two important considerations for clay barrier systems are (1) ionic concentration-induced aggregation leading to crack formation, and (2) water retention during wet-dry cycles. This study investigates the susceptibility of fine-grained mixtures to pore fluid ionic concentration using bench-scale fabric formation tests (Atterberg limits, sedimentation, viscosity) and the measurement of water retention curves and shrinkage for various diatom-kaolin clay mixtures. Preliminary results show that the presence of diatoms reduces (1) the sensitivity of the particulate mixture to increased ionic concentration and (2) the formation of drying cracks in the tested specimens even when water retention increases.

When: [Friday May 7, 2010 @ 3 pm](#)