Some aspects of the cyclic degradation of clays

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Abstract

Fine-grained soils often “degrade” when subjected to cyclic loads, such as those related to storms and earthquakes. The term “degradation” includes the following responses: loss of shearing resistance, generation of excess porewater pressure, accumulation of shear strain, and loss of shear stiffness. All of these pose a major threat to the stability and serviceability of offshore or onshore infrastructure founded on clays. Therefore, it is important to understand how clays respond to cyclic loads and the major factors influencing their behavior. This seminar will provide a brief introduction to the behavior of clays during and after undrained cyclic loading. The following four aspects of the cyclic behavior of clays will be discussed.

1. Typical undrained cyclic behavior. How do clays typically behave under cyclic loads?
2. Post-cyclic shearing resistance. What affects the strength available after a cyclic event?
3. Reconstituted clay cyclic behavior. How does the cyclic behavior of a reconstituted clay compare to that of an intact clay?
4. Shear modulus degradation of clays from small to large strains. How do we quantify and predict shear modulus degradation for clays for different strain levels?