Stress Path Behaviour and Friction Angle Transition Due to the Cyclic Loading Effects

ABSTRACT

In various aspects, peat soil is different from mineral soil. Peat is a biogenic deposit that emerged within the last 10,000 years, during the post-glacial (Holocene) era. Peat is a soft soil that is unable to support external loads without experiencing significant deformations. Tyre pressure from automobiles and/or aero plane wheels on paved surfaces creates traffic load, which can manifest as static or dynamic types of loading. To resolve the problem with peat soils, a thorough understanding of the static and dynamic behaviour of peat is still required. Many people who live near regularly used highways feel traffic vibration, and it is important to comprehend the nature of this issue to make predictions about potential solutions to this problem. As such, this study aims to investigate the cohesion (c) and friction angle (φ) properties of peat soil after it has been subjected to cyclic stress. Monotonic triaxial tests are conducted to ascertain the initial shear strength characteristics of the soil. Cyclic triaxial tests are performed with half of their maximum deviator stress to simulate the behaviour of peat soil under various effective stresses and frequencies of loading that are applied with 100 number of cycles. After applying various numbers of cycles of dynamic loading, the post-cyclic monotonic shear strengths were subsequently evaluated. It has been noted that irregular behaviour tends to occur more frequently at higher frequencies, particularly between 2 and 3 Hz. With higher frequencies being applied, the reduction in cohesion and friction angle becomes more evident.