Mohammad Shahsavari Goughari

B. Sc., Shahid Bahonar University of Kerman, Iran (2008)

Effect of Initial Shear Stress Direction and Stress History on the Undrained Behaviour of Sands under Triaxial Loading

Abstract

An experimental study of the monotonic and cyclic response of Fraser River sand under triaxial loading has been conducted. Effects of a wide range of initial states characterized by the magnitude and the direction of the initial static shear stress level, loading mode, relative density, and stress history are covered. The main objective of the cyclic tests was to assess the effect of initial state, especially the direction of the initial static shear stress and OCR on correction factor K_α.

Undrained monotonic response of Fraser River sand is highly dependent on both the direction and the magnitude of the initial static shear. It has been shown that ignoring this factor would lead to unsafe designs when the monotonic load is of extension type. On the other hand, higher OCR values lead to a more dilative response, and cyclic resistance increases significantly with OCR. A 'negative' initial static shear stress significantly reduces the cyclic resistance. The K_α correction factor is influenced by the direction of the initial static shear stress and OCR level. The results indicate that, ignoring the effect of the direction of the initial static shear stress and OCR in K_α could lead to unsafe designs.

Degree

Master of Applied Science in Civil Engineering

Date Completed

2012

Supervisor

Siva Sivathayalan