COMPARISON OF VERTICAL AND VOLUMETRIC SWELLS OF COMPACTED EXPANSIVE SOILS

Dr. Mosleh A. Al-Shamrani* and Dr. Abdullah I. Al-Mhaidib*
*College of Engineering, King Saud University, Riyadh

ABSTRACT: Swell percentage of expansive soils is commonly obtained from oedometer swell tests under fully lateral restraint condition. In situ heave, however, is not a one-dimensional volume change but more likely a three-dimensional process. Consequently, surface heave predicted from results of oedometer tests is usually conservative and largely differs from heave actually observed in the field. To account for the discrepancy between oedometer and in situ boundary conditions, some researchers have suggested a lateral restraint factor to be applied to heave predictions evaluated based on parameters obtained from oedometer swell tests.

This paper describes a laboratory testing procedure by which the vertical and the volumetric swells of compacted expansive soil samples were concurrently measured using a hydraulic triaxial stress path apparatus. A set of triaxial swell tests was conducted and the ratio of swell in the vertical direction to the volumetric swell, SR, was evaluated. The test results indicated that for a particular swell test, SR is not constant but rather changing with elapsed swelling time. Besides, the value of SR increases as the applied confining pressure increases.