Abstract

Consolidation testing was performed with three different sample geometries on two different types of clay to determine and compare the radial consolidation coefficients of these samples and whether or not the type of drainage path has a significant impact on the results. Basic consolidation theory is discussed for one-, two- and three-dimensional consolidation. The purpose, design, and installation of prefabricated vertical wick drains is discussed as well.

The specific gravity and Atterberg limits were determined for the kaolinite and ball clay to be used for consolidation testing. Each sample was first vertically preconsolidated to give the sample a past pressure history. For each type of clay, one sample with an outflow drainage path was tested, and two different sized inflow drainage paths were tested. The time$^{0.83}$ method, which is similar to the square root of time method used with vertical consolidation, was used to convert the raw compression versus time data to the radial consolidation coefficients.

The water content and void ratio of each sample during and after testing were determined. The Casagrande construction was used to determine the maximum past pressure of each clay sample, which was lower than the known past pressures applied during preconsolidation. The results of the experiment demonstrate that the circumference of the clay sample adjacent to the drainage path had more of an effect on the results than the type of drainage path itself. The samples with an outflow drainage path and inflow drainage path with the same circumference yielded consolidation coefficients with similar magnitudes. The samples with an inflow drainage path with a smaller circumference than the other two samples had much larger consolidation coefficients, possibly because it was affected by smear to a lesser degree.