

The Effects of Different Types of Cement on the Permeability of Deep Mixing Columns

Authors : Mojebullah Wahidy, Murat Olgun

Abstract : In this study, four different types of cement are used to investigate the permeability of DMC (Deep Mixing Column) in the clay. The clay used in this research is in the kaolin group, and the types of cement are; CEM I 42.5.R. normal portland cement, CEM II/A-M (P-L) pozzolan doped cement, CEM III/A 42.5 N blast furnace slag cement and DMFC-800 fine-grained portland cement. Firstly, some rheological tests are done on every cement, and a 0.9 water/cement ratio is selected as the appropriate ratio. This ratio is used to prepare the small-scale DMCs for all types of cement with %6, %9, %12, and %15, which are determined as the dry weight of the clay. For all the types of cement, three samples were prepared in every percentage and were kept on curing for 7, 14, and 28 days for permeability tests. As a result of the small-scale DMCs, permeability tests, a %12 selected for big-scale DMCs. A total of five big scales DMC were prepared by using a %12-cement and were kept for 28 days curing for permeability tests. The results of the permeability tests show that by increasing the cement percentage and curing time of all DMCs, the permeability coefficient (k) is decreased. Despite variable results in different cement ratios and curing time in general, samples treated by DMFC-800 fine-grained cement have the lowest permeability coefficient. Samples treated with CEM II and CEM I cement types were the second and third lowest permeable samples. The highest permeability coefficient belongs to the samples that were treated with CEM III cement type.

Keywords : deep mixing column, rheological test, DMFC-800, permeability test

Conference Title : ICCGE 2023 : International Conference on Civil and Geological Engineering

Conference Location : New York, United States

Conference Dates : March 20-21, 2023