



The Importance of Incorporating Hydraulic Modifier Function versus Step Loading in Ground Improvements Including Vacuum Preloading

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ABSTRACT

One of the new technology that is widely used in all the world is the vacuum preloading that accelerate the process of dewatering and consolidation process along with prefabricated vertical drains (PVD)s with or without surcharge preloading. In the finite element modelling (FEM) modelling process, the reduction in conductivity due to the consolidation and increase in stress of underneath layers, plays a dramatic role in prediction of the settlement. Applying a modifier function is a good means to account for reduction in the hydraulic conductivity in FEM modelling. To illustrate the importance, the importance of applying this function in the modelling, TV2 trial embankment in Bangkok airport was appointed as a case history. After the verification of the model, the model was run in the absence of hydraulic modifier. It was observed that the predicted final settlement after 160 days is increased from 0.94 m to 1.19. Also the curve pass is unreal base on the verified model, and the quantity of the calculated settlements are 10 to 25 percent overestimated. Since the clogging of PVDs pore, is one the obstacles in modeling procedure of the vacuum preloading, the clogging effect can be applied as a modification in the resultant hydraulic modifier function derived from lab tests. By applying the proper modifier function, more realistic results can be obtained in FEM modelling in such models including PVDs and vacuum and/or surcharge preloading.

Keywords:

Vacuum preloading, Consolidation, Hydraulic modifier, PVD, Clay.