

論 文 要 旨

2023 年 1 月 10 日

※報告番号	第	号	氏 名	Intui, Sutasinee
主論文題名				
Geotechnical Research for Impacts of Groundwater Level on Ground Deformation in Bangkok, Thailand (バンコクにおける地下水位が地盤変動に及ぼす影響に関する地盤工学的研究)				
内容の要旨				
<p>The groundwater level has a huge effect on both ground deformation and pile-bearing capacity. The leading causes are over pumping of groundwater and the soil characteristics. The Thai government has solved this problem by controlling groundwater pumping. Therefore, this research focuses on the behavior of ground deformation and pile-bearing capacity while the groundwater level recovers to the ground surface. The objectives of this research are: to clarify the consolidation behavior of clayey soil during the drawdown and recovery of the groundwater level, to predict the possible behavior of ground deformation and the pile-bearing capacity during groundwater recovery, to evaluate the effect of ground deformation based on the Terzaghi's one dimension consolidation theory and to verify and compare the results of ground deformation and the pile-bearing capacity acquired by the centrifuge test PLAXIS3D and that by previous research by another researcher. The methodology used in this research can be separated into three parts: the theoretical calculation method, the geotechnical centrifuge test, and the Finite Element Method (FEM) by PLAXIS3D software. The theoretical calculation during the groundwater level recovery implies the ground deformation rate can be 0.001 cm/yr to 0.35 cm/yr. The centrifuge test divides the process of groundwater level change in Bangkok plain into three stages. The results of the centrifuge test show that the ground deformation rate is 0.01 cm/yr. The result of the PLAXIS3D shows that the ground deformation rate is mostly at about 0.09 cm/yr. There was no difference in ground deformation in the centrifuge test and the PLAXIS3D test. Additionally, the results of the PLAXIS 3D software confirm that the suction value has little effect during groundwater recovery. The pile-bearing capacity is presented by the results of the geotechnical centrifuge test and that of PLAXIS3D. According to the results of the centrifuge test, there was more load at the water recovery stage than at the water decrease stage. On the other hand, the pile settlement has the highest settlement rate in the groundwater recovery stage. The centrifuge test shows a decrease in the bearing capacity by about 25% at the point when the groundwater level equals the ground surface. In contrast, the results of PLAXIS3D show a decrease in the pile-bearing capacity by about 8.33%. The results from the centrifuge test and the PLAXIS3D software tend to be similar for the soil strength under the effect of fluctuating groundwater levels. All the results exhibit the effect of ground deformation and the soil strength depending on the various groundwater levels and the soil characteristics.</p>				

※印欄記入不要