E06

Interactive Behavior of the Pleistocene Reclaimed Foundations due to Construction of the adjacent Airport Island

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1. Introduction

A series of elasto-viscoplastic finite element analyses is conducted to assess the stress and deformation of the Pleistocene marine foundation due to construction of the twin islands of Kansai International airport in Osaka Bay. The foundation is modeled by following the stratification at the offshore reclamation site (Figure1). Attention is also paid to the modeling of permeability for Pleistocene sand gravel layers considering the sedimentation environment because the performance of excess pore water pressure is strongly dependent on the extent as well as the change in thickness of those permeable sand gravel layers. The mechanism for the propagation of excess pore water pressure is also discussed. In this paper, the long-term settlement of the Pleistocene deposits of the reclaimed foundation of 1st phase island of KIA due to the propagation of excess pore water pressure that is generated by the adjacent reclamation of the 2nd phase island is discussed with priority. The calculated performance is validated by comparing with the measured results.

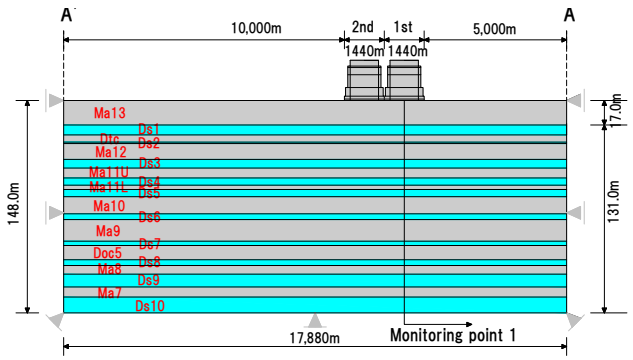

Figure 1. Model foundation of Kansai Int. Airport.

2. Results and discussions

The propagation of excess pore water pressure due to adjacent reclamation of the 2nd phase island is predicted toward the 1st reclaimed marine foundation through the sand gravel layers (Figure2). The calculated performance can also predict the long-term settlement in the 1st reclaimed Pleistocene clay layers generating the propagation of excess pore water pressure by the effect of the adjacent reclamation of the twin islands of KIA (Fig3).

3. Conclusion

The propagation of excess pore water pressure in the permeable sand gravel layers is a key to explain the actual behavior of the Pleistocene deposits of KIA foundation. Finally, the consideration of the predicted settlement during and after construction should be reflected for the disaster risk management.

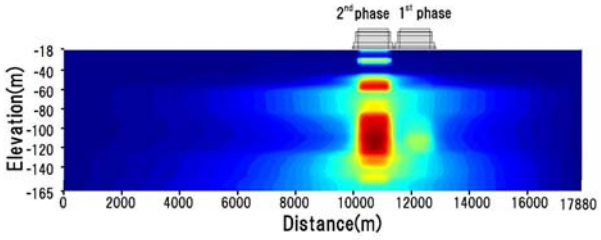

Figure 2. Calculated distribution of excess pore water pressure

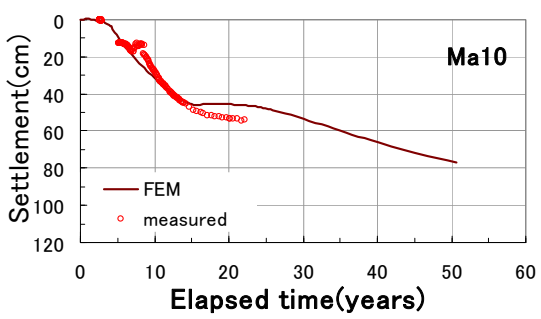

Figure 3. Comparison of measured and predicted settlement