


Innovative Solutions for Problematic Soils

Liu Yu

Liuyu@geoharbour.com

Geoharbour Construction Group, China

ARTICLE INFO	ABSTRACT
<p>Published on 22nd of October 2024. Doi:10.54878/kmjqh704</p> <p>KEYWORDS:</p> <p>material, Soil, Construction, Innovative Solutions, Geoharbour Group</p> <p>HOW TO CITE:</p> <p>Innovative Solutions for Problematic Soils. (2024). 1st International Geotechnical Innovation Conference, 1(1).</p> 	<p>Two Innovative Solutions Cases implemented by Geoharbour Construction Group in Indonesia are presented in this paper. Case 1# is the Jawa 7 Power Plant Project which is located in the Baten Province of Indonesia, around 80 km away from Jakarta. The original site condition is a swampy area that contains 12~14-meter depth soft clay. The original water content is more than 100% with Su 5.3 Kpa. Furthermore, there will be excavation works for the main power block area in the future. Geoharbour Group proposes a Vacuum Consolidation & Water Surcharge Method to improve the soft clay. After soil improvement works were finished, the Su of soft clay increased by 18~25 Kpa.</p>
© 2024 Emirates Scholar Research Center	

Introduction:

Two Innovative Solutions Cases implemented by Geoharbour Construction Group in Indonesia are presented in this paper. Case 1# is the Jawa 7 Power Plant Project which is located in the Baten Province of Indonesia, around 80 km away of Jakarta. The original site condition is the swampy area which contains 12~14 meter depth soft clay. The original water content is more than 100% with Su 5.3 Kpa. Furthermore, there will be excavation works for the main power block area in the future. Geoharbour Group proposes a Vacuum Consolidation & Water Surcharge Method to improve the soft clay. After soil improvement works were finished, the Su of soft clay increased by 18~25 Kpa. The excavation became much faster and cost-saving by open cut with slope 1:2 up to -7m and the excavation pit remained stable in 8 months. These innovative solutions saved a lot of time and cost for the client. Case 2# is the Kalibaru Port Project which is located in north Jakarta. The existing international port of Jakarta Tanjung Priok is overloaded for the last 10 years. Indonesia's Government decided to build more terminals in the sea of north Jakarta. To protect the environment, the port authority decided to utilize all dredging material resulting by dredging waterways and ponds for this project to form the land. However, due the soil in the seabed is marine clay, all those materials become dredging slurry after be dredged and put to a reclamation area. The dredging slurry is in extremely high water content and extremely soft condition which means no machines and persons are able to work in that condition. The geotechnical challenge in this project never appears in Indonesia. There are two big challenges in this case: one is how to form a working platform and the second one is how to improve dredging slurry. Geoharbour Group proposed the Double Stage Vacuum Consolidation Method as the solution. The concept is: install short PVD and perform 1st Stage Vacuum Consolidation to improve dredging slurry to become soft clay and form a stable working platform after installing long PVD and perform 2nd Vacuum Consolidation with surcharge to improve soft clay to design requirement. Furthermore, There are papers indicating that there is no stable soil structure in dredging slurry which results in the behavior of dredging slurry is more like a mixture of material between water and soil particles. This behavior will result from the finest soil particle surrounding the PVD if there is consolidation which will form an impermeable layer surrounding the PVD and result from no further consolidation developed. The Double Stage Vacuum Consolidation Method is a much more reliable solution for improving dredging slurry. This case is a very helpful case of an innovative solution for reclamation by using dredging slurry.

REFERENCES:

1. Tang Tongzhi, etal. Experimental research on hydraulic-filled mud consolidated by vacuum preloading method combining long and short boards with thin sand cushions [J]. Chinese Journal of Geotechnical Engineering, 2012.05, 34: 899-905
2. Tang Tongzhi, etal. Analysis and countermeasures for defective water drainage structure of hydraulically filled foundation with large deformation [J]. Building technique development, 2015.08, 42: 40-45.'
3. Liu Aimin, etal. Experimental research on long - term consolidation mechanism of super soft clay[C]. PP.288-293.
4. Sun Liqiang. Theory and model test study of recently reclaimed soil foundation [D]. Tianjing University, 2010.03.
5. Ye Guoliang, etal. Research on secondary treatment technology of super soft clay[C]. PP: 33-540