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Publication date
2016

Document Version
Final published version

Citation (APA)
Barciela Rial, M., Winterwerp, H., van Paassen, L., Griffioen, J., & van Kessel, T. (2016). *The Markerwadden: the influence of the sand fraction on the ripening behaviour of Markermeer sediment*. 10-10. Abstract from NCK-days 2016, Ouddorp, Netherlands.

THE *MARKERWADDEN*: THE INFLUENCE OF THE SAND FRACTION ON THE RIPENING BEHAVIOUR OF MARKERMEER SEDIMENT

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Description of research

The large and shallow Lake *Markermeer*, The Netherlands suffers from ecological problems. Its ecosystem has been affected by high turbidity levels, caused by the resuspension of the oxic and highly bioturbated uppermost layer of the bed. To improve its water quality, a broad and multidisciplinary consortium has been working together since 2013 on the *MarkerWadden*. This Building with Nature (BwN) project aims to improve the ecosystem in the lake by creating a wetland with sediments partly originating from the mud material of the bed of the lake itself. Part of the sediments which is placed above the water level will be exposed to evaporative conditions. Due to evaporation these sediments will consolidate. The deformation behaviour of ripening sediments is significantly affected by its composition. The sediment composition varies enormously in the *Markermeer*, in particular the sand content. In this research the behaviour of sediment while drying was carried out.

Figure 1 shows a fragment of the negative excess pore pressure development in time at the bottom probe of a Hyprop for a natural *Markemeer* Holocene clay sample (containing 10% of sand) and a sieved sample (without sand) during a desiccation test in a climate room with a constant temperature of 24°C.

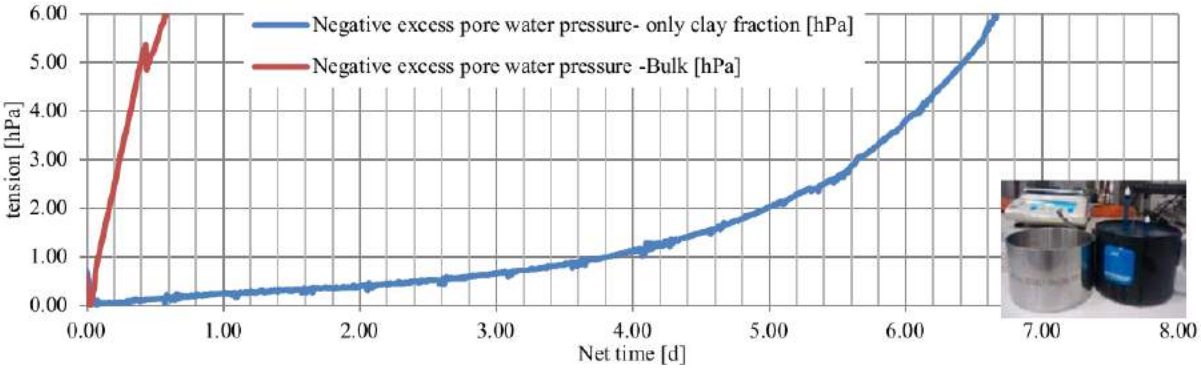

Figure 1. Negative excess pore pressure at the bottom probe corrected for the initial hydrostatic head and the hydrostatic head loss in time as a result of evaporation and shrinkage

From the water loss and measured pore pressures the water retention curves are determined (Figure 2a). The curves have a different starting point and clearly do not aline at higher suction values due to a difference in the initial liquidity and a different composition. Figure 2b shows that the undrained shear strength as a function of liquidity index of the remoulded natural sample clearly fits the empirical correlations available in literature.

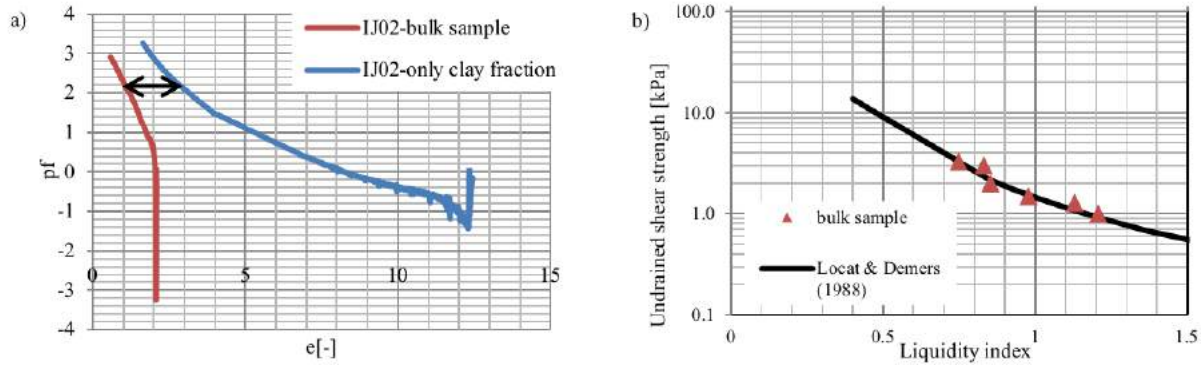

Figure 2. a) Water retention curve of a sieved and a natural sample of Markermeer Holocene clay. b) Correlation between the liquidity index and the undrained remoulded shear strength for a natural sample