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Changes in the Engineering Properties of Reconstituted Ariake Clay Undergoing Drying

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ABSTRACT

Most natural clays exhibit overconsolidation histories to some degree due to processes of mechanical unloading such as erosion, excavation, changes in groundwater pressures, desiccation, etc. In the present study, we focused on the effects of shrinkage histories due to desiccation caused by sea level regression on the engineering properties of Ariake Clay. The soil stratum consists of a Holocene clay deposit. This paper describes an experimental investigation of the engineering characteristics of reconstituted Ariake clay subjected to differing desiccation histories. We have found that the engineering properties of Ariake clay are strongly influenced by shrinkage due to desiccation.

KEY WORDS: drying shrinkage; consolidation yielding stress; overconsolidation ratio; residual effective stress; unconfined compressive strength; reconstituted clay; compression index.

INTRODUCTION

Most natural clays exhibit overconsolidation histories to some degree due to processes of mechanical unloading such as erosion, excavation, and changes in groundwater pressures. Other sources of overconsolidation include phenomena such as desiccation, secondary compression, and cementation. Geologic evidence, however, suggests that in-situ overconsolidation ratio in waterfront areas may be greatly affected by shrinkage due to desiccation during periods of sea level regression. Due to changes in sea level, coastal areas include ground which has been exposed as dry land and has then again been submerged in the sea. As part of research on soil engineering properties and survey methods, we are conducting research on the regional properties of soil. This work includes sampling of soils in other countries and a comparative study of their engineering properties with those of Japanese soils. In the course of this project, a stratum obtained from the sea floor in Singapore displayed quite high shear strength in relation to

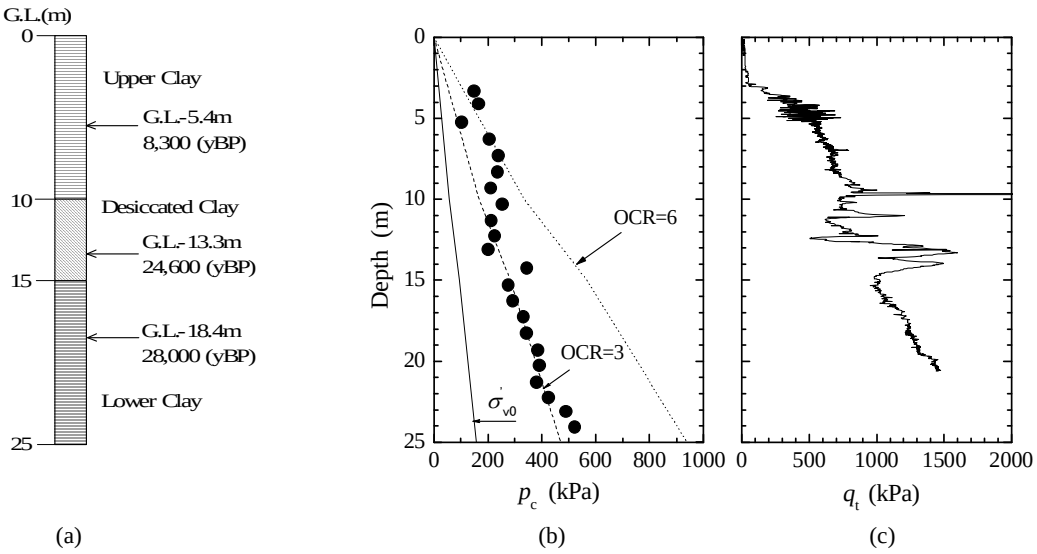

Figure 1 Soil profile of Singapore clay affected by desiccation