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Microstructure of Undisturbed and Reconsolidated Ariake Clay

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Abstract

In this study, the microstructure of Ariake clay is investigated using Scanning Electron Microscopy (SEM) and Mercury Intrusion Porosimetry (MIP). Microstructure of Ariake clay is observed on three types of specimens, undisturbed specimens, reconsolidated ones under high temperature(80 °C) and room temperature(20 °C). The observations by SEM show that the microstructure of Ariake clay is formed by the aggregations of soil particles containing diatom earth and its broken pieces, the linkage of the aggregations and pore. The results of MIP show that pore size distribution of Ariake clay at three types of specimens are different. The difference in microstructure for above three types of specimens is shown by a schematic diagram.

Key Words: Ariake clay, diatom, high temperature consolidation, microstructure, pore size distribution, room temperature consolidation, undisturbed.

1. Introduction

It is well known that mechanical properties of undisturbed natural deposit soil are different from remolded ones. It is reported that mechanical properties of clayey soil which is reconsolidated under high temperature resemble to those of undisturbed ones (Tsuchida et al, 1991). In this study, the microstucture of Ariake clay is investigated using Scanning Electron Microscopy (SEM) and Mercury Intrusion Porosimetry (MIP). Microstructure of Ariake clay was observed on three types of specimens, undisturbed(UD-specimen), reconsolidated ones under high temperature(80°C, HT- specimen) and room temperature(20°C, RT- specimen). The difference in microstructure for above three types of specimens is shown by a schematic picture.

2. Soil specimen and experimental method

The soil investigated in this study is the Ariake clay obtained from Ashikari Town of Saga Prefecture. The geotechnical indices of Ariake clay are shown in Table-1.

Table-1. Geotechnical indices of Ariake clay

Density of Soil particle ρ_s (g/cm^3)	2.57
Natural water content w_n (%)	133
Liquid limit w_l (%)	126
Plasticity Index I_p	81
Grain Size distribution (%)	
Sand	1.5
Silt	33.0
Clay	65.5

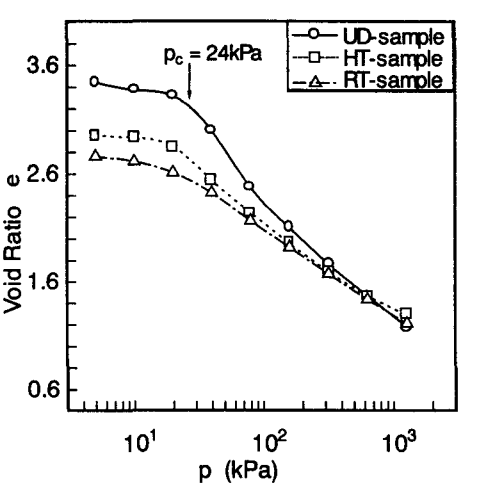

Fig.1 e-log p curves of undisturbed and reconsolidated Ariake clay