A Study on the Mechanical and Chemical Characteristics of Pohang Area Mudstone
As Material for Reclamation

Kyuwhan Lee
Konyang University, Nonsan, Chungnam, Korea

Sungwook Kim
G.I Construction Co, Busan, Korea

Daesuk Jung
Joongbu University, Geumsan, Chungnam, Korea

ABSTRACT
The supply of high quality filling materials for pavement base course or reclamation is getting harder. So, there is an attempt those soft mudstones as an earth filling material for such applications at Pohang area in Korea. But, the engineering properties of the soil deposit placed with soft mudstones have not been clearly evaluated yet. We investigate these features; the water absorption and softening, the slaking behavior and the geological mechanism, in order to obtain an effective way for estimating the magnitude of land subsidence and the reduction of soil strength. The applicability of soft mudstones is examined by a variety of laboratory tests and pilot-scale field tests. In addition, it is necessary to consider the environmental characteristics of soft mudstones as a reclaiming material. Consequently, the results from the current study can be used to prevent any construction defects due to the careless use of soft mudstones for the pavement base course or reclamation.

KEY WORDS: reclamation, soft mudstone, softening, slaking behavior

INTRODUCTION
The demand for high quality filling materials as a road work or a reclamation material for port construction are more and more increased in Korea’s Pohang area. But the supply of land filling materials is so limited that the demand and supply in land material is appearing an imbalance. The Pohang area where weakly bonded geological strata are developed and good quality of soil is very few so that a weakly bonded sedimentary soil of the Cenozoic era is used as a reclamation material for port construction work and its usage frequency is increasing little by little. Since mudstone of Pohang area is sediment of the Miocene of the Tertiary, crust is uplifted and the sediments are exposed to the surface during the digenesis so that it shows characteristics of soft rock, weathered rock, and weathered soil simultaneously according to the engineering experimental results. During that time, when a weakly bonded sedimentary layer called a mudstone did not use almost for large-scale civil engineering work like port reclamation because it doesn't maintain intensity or engineering property such as the slaking phenomenon that it seems to be scattered for a short term like soil due to dry and wet repetition. In particular, mudstone of the Cenozoic era includes sulphuric acid group causing acid rock drainage (ARD), which creates sulfuric acid water and underground water pollutions often, so the verification is demanded when it is used as a reclamation materials. This study analyzed engineering characteristics of mudstone by conducting the basic property test such as a liquid limit, absorption of mudstone and the mineral composition analysis test to identify a characteristic of slake durability, geochemical characteristics, mineral composition as well as a scanning electron microscope (SEM) and soft X-ray image. Also, compaction test was performed to identify characteristic of mudstone.

CHARACTERISTICS OF THE SOFT TERTIARY SEDIMENTS
Sedimentary rocks are solidified by the physical and chemical changes in a sedimentary rock after its deposition, excluding weathering and metamorphism are divided into hard rock-weak rock-weathered rock. While a soft sedimentary strata stops solidified action due to uplift of the crust and shows characteristics of rocks and sediments simultaneously. Weakly bonded sedimentary layer is not perfectly hardened, cemented and re-crystallized so that the durability is evaluated smaller the weathered rock when it is exposed to earth’s surface. The average 60% of Duho formation Mudstone is composed of the clay mineral. The type of clay which is included in the clayey rock appears differently according to the geological time. Also, the stratum which comes to make recently is plentifully included the swelling characteristic clay. Mudstone in Pohang area has the layered structure with repeated conglomerate, sand, and mud layers, and conglomerate and sandy layers are more hardened compared to muddy layers, therefore engineering properties are very complicated according to