

Study on Weak Soil Improvement by Using Geopolymer and Paper Fragments

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Landslide or landslip is one of the natural disasters which is unfortunately unavoidable. We have already established the Fiber-Cement-Stabilized Soil Method that can improve the weak soil of actual landslide areas engendered from an earthquake or heavy rainfall by using paper fragments and cement. However, nowadays, the cost of fiber (paper debris) is tending to increase and Portland cement is not environmentally friendly cementitious material for sustainable development. In this research, Geopolymer which expects to modify soft soil (sludge) at low degree Celsius condition and reduces amount additive of fiber is executed. The process of Geopolymerization involving the silicates and aluminates exacted from by-products is contemplated as a mature and cost-effective solution to many problems where hazardous residue has to be treated and stored under critical environmental conditions. This paper presents the details of the study carried out on the characteristic of sludge improved Fiber-Geopolymer-Stabilized Soil Method. The composition of imitation sludge was 60% silt, 40% clay and 70% water content. Sodium hydroxide (NaOH) 12 Molar and sodium silicate solution (Na_2SiO_3) were prepared. The test specimens were made of 50 x 100 mm cylindrical mold and 20°C temperature curing condition. The result of modified sludge shows the improvement in strength, strain and high durability with drying and wetting tests regardless of the increase in experimenting rounds.

Keywords : Sludge, Fiber-Geopolymer-Stabilized soil, drying – wetting test, durability, failure strength, failure strain