

Pitchaorn Sripanich 2013: Utilization of Kaolin Waste to Produce Cements for Soft Clay Stabilization. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Supakij Nontananandh, D.Eng. 177 pages.

The research attempts to produce the cement burned from kaolin waste, lignite fly ash and combined with industrial wastes. The study includes characterization of Kaolin waste as a substrate for producing cement and the chemical composition as well as the reaction mechanism. The composition of the cement crystal structure was studied using analysis techniques of X-Ray Diffraction Analysis (XRD), X-Ray Florescence (XRF) and Scanning Electron Microscope (SEM), to select the best composition to improve the quality of soft clay.

The experimental results showed that the most suitable proportion of good quality cement from industry waste is the combination of the ask shell in the range 40-50%, lime powder in the range of 15-20%, kaolin waste about 15% and about 10% fly ash. The main chemical composition in the cement such as C_3S and C_2S , is similar to ordinary Portland cement. The paste sample has self-hardening property cement with hydration reaction with water as CSH and $Ca(OH)_2$. The product concentration of $Ca(OH)_2$ was decreased in pozzolanic reaction with the curing time, which makes products such as CSH increased. As a result the mortar compressive strength increased with curing time. The results of the uniaxial compressive strength of soil cement from industry waste showed that the cement compressive strength increased with increasing of cementitious material and curing time. Moisture content in soil decreased significantly in the early part of the hydration reaction and constant rate during the curing time of the CSH and $Ca(OH)_2$. It has also been found that compressive strength tends to increase with increasing concentration of CSH in long term as a result of pozzolanic reaction, the CSH has increase and $Ca(OH)_2$ tended to decrease. The compressive strength of the cementitious material 150, 200 and 250 kg/m^3 at 28 and 90 days were 0.28, 3.87, 10.13 and 0.37, 12.21, 21.97 ksc, respectively.

Student's signature

Thesis Advisor's signature