

Vimantana Tanomgitnuruk 2013: Improvement of Compressive Strength of Geopolymer with Soil Sediment from Water Supply System. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Technology and Management. Thesis Advisor: Assistant Professor Jukkrit Mahujchariyawong, Ph.D. 82 pages.

This research is the waste utilization of coal fly ash from lignite and soil sediment from water supply system in power plant for producing geopolymer. Fly ash and alkaline solution were mixed at ratio of 1:0.45 (w/w) which solution content was sodium silicate and sodium hydroxide solution concentration 10 M at ratio of 1:1 (w/w). The result showed compressive strength of geopolymer treated at 65°C was higher compressive strength and faster forming than the one treated at room temperature. The different contents of geopolymer samples were treated at 65°C for 48 hours and compressive strength were tested at the sample ages 3, 7, 14 and 28 days, compressive strength of geopolymer (fly ash and alkaline solution) and geopolymer with sand were 336 and 442 ksc. Alkaline solution ratio were tested at 1:0.45 1:0.7 and 1:1 and the result showed compressive strength decreased when alkaline solution ratio increased. Geopolymer with sediment weight at ratio 10, 20, 30 and 40 % of fly ash, showed compressive strength 312, 375, 445 and 471 ksc respectively, while geopolymer with sand and sediment which replaced sand at ratio 10, 20 and 30 % by weight were 485, 549 and 573 ksc, respectively. Mixing sediment in geopolymer enhanced compressive strength, but mixing sand and sediment showed higher effect. However, mixing limitation was related to water absorption property of sediment. Feasibility Study of geopolymer utilization was interlock-block making. Geopolymer blocks were tested at sample ages 14 and 28 days to compare with cement mixing interlock-block, and compressive strength of geopolymer interlock-block was higher. The result of mixing sediment, sand and sediment showed compressive strength at the block age 28 days were 35 and 43 ksc. This research showed the potential of sediment from water supply system for utilization as mixing material in geopolymer and for product development.

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