

Orawin Numnim 2014: Development of Compressive Strength of Geopolymer from Bottom Ash Using Mixed Aggregate. 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. 86 pages.

This research focused on the development of geopolymer using bottom ash from lignite power plant as the main material instead of fly ash. Sediment from water supply system in power plant was mixed to improve the compressive strength of concrete element. The study on ratio of bottom ash and alkaline solution (sodium silicate and 10 M sodium hydroxide at ratio of 1:1 (W/W) showed ratio 1:0.7 (W/W) gave the highest compressive strength at 38.40 Kgf/cm<sup>2</sup>. However in the case of mixing aggregate, the proper ratio of geopolymer with sediment is 1:1 (W/W). The result also showed geopolymer which treated at 65°C for 48 hours was higher compressive strength and faster forming than the one treated at room temperature. The compressive strength test of geopolymer mixing the different kinds of aggregate, different ratio and different curing time (7, 14 and 28 days) showed that geopolymer with sand at ratio 1:1.35 was decreased to 11.62 Kgf/cm<sup>2</sup>, geopolymer with sediment at ratio 10, 20, 30 and 40% of bottom ash weight was 26.08, 67.78, 106.07 and 104 Kgf/cm<sup>2</sup>, respectively. Geopolymer with sand and sediment (ratio 1:1.35) which replaced sand at ratio 10, 20 and 30% of sand, were 45.25, 87.43, and 97.77 Kgf/cm<sup>2</sup>, respectively. Therefore, kind and quantity of aggregate were the important factor concerning to select for concrete element application, and alkaline solution could be limited factor and affect to mixing aggregate for the compressive strength property of geopolymer.

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