

Piyanut Muangtong 2012: Partial Replacement of Clinker by Agricultural Waste, Bagasse Ash, for Type I Portland Cement Production. Master of Engineering (Materials Engineering), Major Field: Materials Engineering, Department of Materials Engineering. Thesis Advisor: Assistant Professor Duangrudee Chaysuwan, Ph.D. 104 pages.

There are various kinds of agricultural waste ashes throughout the industrial processes in Thailand such as bagasse ash (BA), rice husk ash, oil palm ash etc. They are currently exploited as pozzolanic materials and supplements to improve the compressive strength in terms of chemical composition of cement by partly replacement of clinker for cement production with them. One of their advantages is to decrease CO<sub>2</sub> gas emission from decreasing consumption of clinker to produce cement. Either mortar or concrete production needs cement as main material. Appropriate ratio of clinker replacement by fine (<45 micron) BA and w/c ratio as well as effects of BA on properties of cement were investigated in this research. Initially, BA was designed to replace clinker with the weight percentage of 0, 10, 20, 30 and 40, respectively, whereas gypsum was constantly added. Specimens were casted as cement mortars and pastes and, finally, analyzed for particle size, fineness, compressive strength, normal consistency, setting time, flowability, chemical composition and microstructure according to curing ages of 3, 7, 28, 56 and 90 days. Their properties were carried out and compared with the results of commercial type I Portland cement. The increasing amount of BA affects the increase of w/c ratio and setting time of resultant cement. Furthermore, clinker replacement with BA is a process for reduction of cost of cement raw materials. The experimental results indicated that clinker replacement with 20 wt% BA was appropriate for production in laboratory scale and it would be benefit for scale expanding as production scale in the near future.

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