

30 CUBIC METERS BATCHING, DELIVERING, AND POURING OF ACTIVATED FLY ASH CONCRETE

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ABSTRACT: Mae Moh power plant (Thailand) has expelled fly ash more than 1.5 million tons each year for almost 2 decades. Around two thirds of them was managed to sale in cement and concrete industry. The Minority of fly ash was sale to other industries such as fertilizer. The deeper coal mine lead to the fly ash become high CaO and free. The leftover fly ash has sent to landfill because it failed to meet Thai standard specification of using fly ash in concrete. Electricity Generating Authority of Thailand (EGAT) has sought the sustainable way to maintain the use of fly ash in cement and concrete industry. So, EGAT begin pay attention to alkali-activated fly ash concrete as pilot project. It aims to enhance the turning research to be commercial product.

The pilot project was set up in the power plant area with 120 square meters (30 cubic meters) of alkali-activated fly ash concrete. It was planned to overlay in a truck yard which was 20 minutes far away from the batching plant. Several mixtures were pretested in laboratory to achieve the compressive strength more than 28 MPa at 28 days while provided at least 10 cm slump after pouring 2 hours. The mix required 4.5 tons of NaOH 6M and 1.7 tons of sodium silicate to be prepared and stocked in the existing OPC ready mixed plant. These two chemicals had to be well mixed in activator tank to reduce the temperature then rise to ambient before discharging to the batch.

The project underwent some problems the process of mixing, delivering, pouring and finishing. The mix of chemical solution in activator tank has condensed and settled due to dramatically temperature drop at night. High moisture in sand made the NaOH more caustic. Problems and solutions are report in this paper. The result showed that the slump of concrete is 22 cm and after 2 hours, it lose to 10 cm. The compressive strengths of concrete at 3, 7 and 28 days in air cured condition were 8.7, 18.8 and 36.3 MPa respectively. Moreover, this project is the first alkali-activated fly ash concrete construction in Thailand.



Figure 1 – Batching Plant



Figure 2 – Pouring Process



Figure 3 – Overlay in truck yard