Thesis Title	Classifying and Selecting of Mae Moh Fly Ash for Using in High Strength Concrete
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Abstract

In this thesis, fly ash from Mae Moh power plant was classified and selected for small particle size with mean diameter of 2.8 micron. The classified fly ash was used to replace Portland cement Type I of 15, 25, and 35 percent by weight to make high compressive strengths of mortar and concrete. The high compressive development strengths were proposed at the early ages and also compared with high compressive strengths of mortar and concrete made from condensed silica fume with 0, 7.5, 10, and 12.5 percent replacement of Portland cement type I by weight.

In case of mortar, mortar cube of 5 cm and Briquette specimens were used to study compressive and tensile strengths, respectively. For concrete, concrete cylinder of diameter 10x20 cm was prepared to test for compressive and splitting tensile strengths. The water-cementitious material ratios of 0.40 and 0.26 were specified for mortar and concrete, respectively. High range water reducing agent, naphthalene based, was used to keep the flow of mortar between 105 to 115 and the slump of concrete to be higher than 50 mm.

The results of mortar showed that the replacement for classified fly ash 15 and 25 percent by weight of cement increased the compressive strength of mortar higher than that of mortar without classified fly ash after the age of 7 days. At the age of 14 days, mortar with fly ash up to 35 percent had compressive strength as high as the strength of mortar mixed with condensed silica fume. Fly ash-cement mortars had compressive

strength about 102 to 114 percent of the standard mortars at 14 days, depending on the amount of fly ash, and increased to be 136 to 147 percent of the standard mortars at the age of 90 days. The compressive strengths of fly ash-cement mortar were between 633 to 773 ksc at the age of 28 days. However, the tensile strengths of standard, fly ash-cement, or silica fume-cement mortars were found not be significant different.

For concrete, it was found that the use of classified fly ash 15, 25, and 35 percent by weight of cement gave higher compressive strength than that of concrete without fly ash. The strengths of fly ash-concrete were be 101 to 105% of the control concrete at the age of 7 days. This findings can encourage the concrete engineers to use fly ash in concrete without facing the problem of low early strength development. The compressive strengths of fly ash concrete were 801 to 847 ksc at the age of 28 days. However, the splitting tensile strengths of concrete with and without fly ash were not much different and were 99 to 103% of the control concrete at the age of 365 days. The results also indicated that classified fly ash was more effective in increase compressive strength than tensile strength. This may be the packing effect which has more influence on compression than in tension.

Keywords: Fly Ash / Classified Fly Ash / Condensed Silica Fume / High Compressive Strength / Tensile Strength / Naphthalene Based / Packing Effect