

Jirasak Augsornkarn 2014: The Effect of Calcium Hydroxide on the Strength of Fly Ash Geopolymer Paste. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Prasert Suwanvitaya, Ph.D. 71 pages.

This study aimed to find the effect of calcium hydroxide on fly ash geopolymer. Calcium hydroxide was added to increase the compressive strength of fly ash geopolymer paste. Three weight percentages of fly ash were used, 60, 65 and 70 for class C and 50, 55 and 60 for class F respectively. The amounts of calcium hydroxide added to fly ash were 2, 4 and 7% and 10, 17 and 22.5% for classes C and F by weight respectively. Alkaline activation was by 12 M sodium hydroxide. Curing of the the geopolymer was in room temperature at 24 °C for 24 hours, 3 and 7 days under dry environment or 70 °C for 24 hours. The specimens were then tested for compressive strength and microstructure.

The result indicated improvement in microstructure of geopolymer paste. Adding calcium hydroxide enhanced the compressive strength compared with control sample. The increase in compressive strength was in the range 3.7-38.5 %. The addition of 7 % calcium hydroxide to 70 percent of solid under room temperature curing for fly ash class C appeared to improve the strength of fly ash class C and class F respectively. This study indicated the potential for improvement of mechanical properties of the fly ash based geopolymer with the addition of calcium hydroxide.

Paste with class C fly ash cured at room temperature, when calcium hydroxide was added, was more compressed, had less pores and less unreacted fly ash. When cured at 70 °C, the surface of geopolymer paste was smooth and nearly uniform, because of a near completion of geopolymerization reaction.

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Thesis Advisor's signature

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