Phimluk Sapsongsaeng 2013: Acid Resistance of Geopolymer Paste. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Prasert Suwanvitaya, Ph.D. 100 pages.

This research presents the results of experiments to study the durability of geopolymer materials. Geopolymer specimens were manufactured from Class C fly ash (60, 65 and 70 percent content) and Class F fly ash (50, 55 and 60 percent content) activated by sodium hydroxide (at the concentration at 6M, 10M and 14M) and sodium silicate solution at room temperature, then exposed to 5% solutions of acetic and sulfuric acids. The parameters studied were the weight change, appearance of specimens, change in compressive strength and porosity which were tested by Mercury Intrusion Porosimetry (MIP). The deterioration of geopolymer paste specimens from both classes of fly ash showed varying degrees of deterioration when prepared with different concentrations of NaOH exposed to acetic and sulfuric acids

In acidic environment, the geopolymer paste specimens with high concentration of NaOH and fly ash content did better than others. For the class C fly ash specimens and 70% fly ash content did well in weight loss. Strength loss was moderate after exposure to acetic attack but was significantly higher under sulfuric. The specimens with 14 M NaOH and 70% type C fly ash showed the best acid resistance, but the strength was too low. The class F fly ash geopolymer paste specimens had high performance when the content of fly ash was higher. The best resistance to acidic attack was obtained from 60% type F fly ash specimens when submersed in acetic and sulfuric acids in terms of strength and weight loss.

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