

Sarawut Yodmune 2008: Experimental Study on Corrosion of Steel Bar in Geopolymer Reinforced Concrete. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Wanchai Yodsudjai, D.Eng. 161 pages.

The purpose of this research is to study corrosion of steel bar in geopolymer reinforced concrete. The optimum $Na_2O.SiO_3 / NaOH$ ratio, corrosion of reinforcement, bond strength and flexural behavior of geopolymer reinforced concrete beam are studied. The $Na_2O.SiO_3 / NaOH$ ratio for the mix proportion of geopolymer concrete varies from 0.7 to 1.6 by weight and the concentration of the sodium hydroxide solution is 14 molar and the geopolymer concrete is cured at 65°C for 24 hours.

It is found that the compressive strength increases as the $Na_2O.SiO_3 / NaOH$ ratio increases; however, the workability decreases as the $Na_2O.SiO_3 / NaOH$ increases. The optimum $Na_2O.SiO_3 / NaOH$ by weight ratio varies from 0.9 to 1.3 and with these ratios the average maximum compressive strength at 28 days is attained. There is an influence of $Na_2O.SiO_3 / NaOH$ ratio on the corrosion of rebar in geopolymer reinforced concrete. The bond strength of corroded steel bar in geopolymer reinforced concrete decreases as the $Na_2O.SiO_3 / NaOH$ ratio increases. In addition it is found that the bond strength between rebar and geopolymer concrete is higher than that of between rebar and control concrete in every mix proportions. The flexural capacity of geopolymer reinforced concrete beam decreases as the degree of rebar corrosion increases. It is also found that the geopolymer reinforced concrete beam has a higher corrosion rate than that of control reinforced concrete.

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Thesis Advisor's signature

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