

An Experimental Investigation of Bond Properties of Reinforcements Embedded in Geopolymer Concrete

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Abstract : Geopolymer concretes are a new class of construction materials that have emerged as an alternative to Ordinary Portland cement concrete. Considerable researches have been carried out on material development of geopolymer concrete, however, a few studies have been reported on the structural use of them. This paper presents the bond behaviors of reinforcement embedded in fly ash based geopolymer concrete. The development lengths of reinforcement for various compressive strengths of concrete, 20, 30 and 40 MPa, and reinforcement diameters, 10, 16, and 25 mm are investigated. Total 27 specimens were manufactured and pull-out test according to EN 10080 was applied to measure bond strength and slips between concrete and reinforcements. The average bond strengths decreased from 23.06MPa to 17.26 MPa, as the diameters of reinforcements increased from 10mm to 25mm. The compressive strength levels of geopolymer concrete showed no significant influence on bond strengths in this study. Also, the bond-slip relations between geopolymer concrete and reinforcement are derived using non-linear regression analysis for various experimental conditions.

Keywords : bond-slip relation, bond strength, geopolymer concrete, pull-out test

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