Research Project Title	Compressive Strength Development of Concrete with Fly-Ash and High-Volume Fly Ash Concrete with Nanosilica
Credits	6
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Abstract

This research presents the compressive strength development of concrete with fly-ash and high volume fly-ash concrete with nanosilica having particle size of 12 nm. This research consists of two parts. The first part investigates the behavior of concrete with fly-ash and presents the effect of fly-ash replacement content on the properties of concrete. The replacement contents are varied from 40% to 60% The second part of the research focuses on the behavior of high volume fly-ash concrete with nanosilica and presents the influence of nanosilica content by varying the amount of nanosilica at 4%, 7%, and 10% The results indicated that the compressive strength decreased as the content of fly-ash and water/binder (W/B) ratio increased. However, the strength development increased as the final age. By using 40% fly-ash and W/B of 0.35, the compressive strength at 90 days was 0.97 time of the control concrete. The content of nanosilica affected directly the strength development of high volume fly-ash concrete with nanosilica. By using W/B of 0.35 and the curing time of 28 days, the high volume fly-ash concretes containing nanosilica of 4%, 7%, and 10% gave the higher compressive strength than that of control concrete by about 1.09, 1.39, and 1.42 times, respectively. These results demonstrate the influence of nanosilica content that the higher the nanosilica content, the higher the strength development. In terms of cost, high volume fly-ash concrete with nanosilica increased the initial cost.

Keywords: Compressive strength / High-volume fly ash concrete / Nanosilica