

Abstract Details

Title: Use of High Volume Fly Ash to Enhance Performance of Concrete

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Abstract: Higher values of cement replacement with fly ash will require lower water contents to achieve the same compressive strength. The long term compressive strength of HVFAC normally exceeds that of conventional concrete. The ratios of the flexural and tensile strength to the compressive strength are comparable to conventional concrete. The foamed concrete mixtures with high ash contents might need a longer period of time to reach their ultimate strength. This strength could be higher than the ultimate strength that can be achieved using only cement. The long-term gain of strength observed was for well-cured samples and this gain of strength might not be as great with specimens that have not been so well-cured. Replacing high proportions of cement with fly ash does not significantly affect the long-term compressive strength of well cured foamed concrete. The compressive strength of the mixtures decreased with the increase of rubber waste particles for all curing periods tested (7, 14 and 28 days). The strength of the mixtures increased with an increasing fly ash content. Compressive strength is slightly influenced by the particles size. The mixtures with a 20% rubber waste content present the maximum compressive strength of 4.84 MPa at 28 days. Some fly ashes shows significant decrease in heat generation as the concrete hardens and strengthens. It generally provides increased concrete strength for much longer periods than mixes with Portland cement only. Fly ash also improves the permeability of concrete by lowering the water-to-cement ratio. Fly ash will require lower water contents to achieve the same compressive strength. For mass concrete placements such as mat or raft foundations, the use of even higher quantities of fly ash is recommended.

Keywords: Fly Ash, Concrete.