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Evaluation of Superplasticizer Effects on the Properties of Workability and Water Absorption of Concrete Mixes

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Abstract

In order to satisfy the needs of engineers and contractors, this research aims to examine the effects of superplasticizers on the qualities of workability and water absorption of concrete mixes when combined with local materials. The methodology used to accomplish the research's goals focuses mostly on data gathering from many sources, a thorough evaluation of prior studies, creating concrete mixes, and conducting several laboratory trials utilizing various ratios of superplasticizer with low water concentrations. By creating 12 cubes for each sample, the ratios of superplasticizer applied were 0.0 (as a reference mix), 0.4, 0.8, 1.2, and 1.5 liters/50 kg cement for concrete ages of 3, 7, and 28 days. Graded natural coarse and fine with local ordinary Portland cement (OPC) were used for all concrete mixes conducted in this research. The experimental findings showed that the ratio of superplasticizers with a reduction of 15% (w/c) to 50 kg of cement (0.8 liters) significantly improved the workability of concrete. Additionally, there has been great workability with the ratios of 1.5L per 50 kg of cement with a 30% reduction in water/cement and 0.4L per 50 kg of cement with a 10% reduction in water/cement. However, the absorption values exhibited no variations with respect to the SP or w/c content ratios that were utilized. According to the results, superplasticizers increase the workability of the concrete mix while lowering the water-cement ratio to improve its characteristics.

Keywords: Superplasticizer, workability, absorption , concrete mixes, (W/C) Ratio.