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Effect of Polypropylene Fibers on Concrete Deformation

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Abstract

In this study, the effect of polypropylene fibers added to the fresh concrete mixture on the deformation of the compressive strength test of concrete was investigated. 8 different types of polypropylene fibers were used in the studies. These fibers were added to the concrete mixture in three (3) different ratios. In the mixtures, hyper-plasticizing additives were utilized. Slump and compression factor tests of fresh concrete were performed. It was found that polypropylene fiber additive reduced the slump value of fresh concrete. Therefore, as the amount of polypropylene fibers in the mixture increased in the experimental specimens, the amount of hyper plasticizer was increased to a certain degree. The water-cement ratio in all mixtures is 0.52. It was found that polypropylene fiber additive decreased the compressive strength of concrete in some mixtures, while it increased the compressive strength of some mixtures. While the compressive strength of the control concrete is approximately 38 MPa, the compressive strength of polypropylene fiber additive concrete varies between 32 MPa and 45 MPa. In the compressive strength test of the concrete, the unit deformation under the highest load and the unit deformation at the time of crushing were measured. The minimum unit deformation values were measured in polypropylene fiber-free concrete. It was observed that polypropylene fiber additive increases the unit deformation value of the concrete. Polypropylene fiber additive increased the splitting-tensile strength and bending strength of the hardened concrete. Upward wear test of hardened concrete was performed, and it was found that upward wear values of polypropylene fiber additive concrete increased.

Keywords: Fiber; Compressive Strength; Deformation; Upward Wear; Bending; Tensile-Splitting

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