STEEL AND POLYPROPYLENE FIBER AS A MECHANISM IN CONCRETE PROPERTIES IMPROVEMENT

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ABSTRACT

The effects of steel and polypropylene fibers on properties of concrete have been investigated. Concrete mixes with a characteristic strength of 30 MPa at 28 days were prepared. Steel fiber was used at dosage levels of 15, 25 and 45 kg/m^3, whereas polypropylene fiber was included at dosage levels of 4.5, 6 and 9 kg/m^3. It was found that the inclusion of both types of fibers reduce the workability of concrete with greater reduction at higher fiber dosage. Compressive strength was not significantly affected by the inclusion of fibers, but the inclusion of fibers seemed to reduce the tendency of concrete to undergo brittle failure under compressive load. Both types of fibers significantly enhance the flexural strength of concrete with steel fibers showing greater effect. Concrete containing fibers exhibited greater toughness and residual strength factor. Steel and polypropylene fibers did not have significant effects on splitting tensile strength and interfacial bond strength between steel and concrete. However, observation on failure pattern showed that the inclusion of both types of fibers prevented the concrete from breaking and splitting as well as reduced the tendency of steel reinforcement to undergo debonding.

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