

Influence of Fiber Content on the Interfacial Bond Strength of Synthetic Polypropylene Fiber Concrete

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ABSTRACT

This paper presents the results of an experimental study on the interfacial bond strength (IBS) of polypropylene fiber concrete (PFC). The experimental program consisted of testing 24 concrete cylinders (100 mm diameter × 200 mm length) at 7 and 28 days for different inclusion of fiber dosages (4.5, 6.0 and 9.0 kg/m³). The specimens are prepared according to ASTM standards. The test results showed that the IBS of the PFC is inconsistent by increasing the polypropylene fiber dosages compared to plain concrete. At 7 days, the strength efficiency for dosages 4.5, 6.0 and 9.0 kg/m³ is 7.3%, -22.8% and -25.5%, respectively. At 28 days, the strength efficiency for dosages 4.5, 6.0 and 9.0 kg/m³ is -2.6%, -0.6% and -3.6%, respectively. Correlation between interfacial bond strength and dosage levels for synthetic polypropylene fiber produce good relationship up to 50% and below 60% at age of 7 and 28 days, respectively. However, concrete containing fibers exhibited no breaking of concrete and no debonding of reinforcement. Overall the effect of fibers on IBS was minimal and at the same time greater than the minimum specified value.

Keywords: *Polypropylene fiber, interfacial bond strength, debonding*

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