

Early-Age Behaviour of Fiber Reinforced High Performance Concretes

New Gen Materials for Structural Concrete Building

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Abstract— The aim of this experimental activity was to study the early-age behavior of several Fiber-Reinforced Concretes (FRCs) containing expansive agent. The investigation concerned the evaluation of the influence of different amounts of fibers (dosages of 2.0%, 1.75% and 1.5% by volume of FRCC) on the mechanical performance of FRCs. In particular, hooked brass-coated fibers were used and dead-burnt calcium oxide based expansive agent was employed at a dosage of 40 kg/m³. The attention was focused on the strength development at early ages. Mechanical tests were carried out at 0.25 (i.e. 6 hours, that is time of demolding), 1, 2, 7 up to 28 days of curing. The properties of FRCs were characterized at the fresh state, by measuring flow ability and consistency as well as at hardened state by measuring compressive and flexural strength up to 28 days. Flexural strength was measured on prismatic specimens according to the procedure described in EN 12390-5. The different dosage of fibers did not influence the values of compressive strength, while there is a significant difference in terms of 28-day flexural strength between the several mixtures depending on the different amount of fibers. In all cases at least 20 MPa of 28-day peak flexural strength were achieved.

Index Terms— Advanced Materials, Building, Early age, Fiber Reinforced Concrete, High Performance Concrete, UHPC