

Accepted Manuscript

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PII: S0958-9465(17)30619-4

DOI: [10.1016/j.cemconcomp.2017.07.010](https://doi.org/10.1016/j.cemconcomp.2017.07.010)

Reference: CECO 2860

To appear in: *Cement and Concrete Composites*

Received Date: 13 December 2015

Revised Date: 20 March 2017

Accepted Date: 11 July 2017

Please cite this article as: L. Ferrara, V. Krelani, F. Moretti, M. Roig Flores, P. Serna Ros, Effects of autogenous healing on the recovery of mechanical performance of High Performance Fibre Reinforced Cementitious Composites (HPFRCCs): Part 1, *Cement and Concrete Composites* (2017), doi: 10.1016/j.cemconcomp.2017.07.010.

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**Effects of autogenous healing on the recovery of mechanical performance of
High Performance Fibre Reinforced Cementitious Composites (HPFRCCs): part 1**

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ABSTRACT

This paper presents the results are shown of a thorough characterization of the self-healing capacity of High Performance Fibre Reinforced Cementitious Composites (HPFRCCs). The capacity of the material will be investigated to completely or partially re-seal the cracks, as a function of its composition, maximum crack width and exposure conditions. The analysis will also consider different flow-induced alignments of fibres, which can result into either strain-hardening or softening behaviour, whether the material is stressed parallel or perpendicularly to the fibres, respectively. Beam specimens, initially pre-cracked in 4-point bending up to different values of crack opening, were submitted to different exposure conditions, including water immersion, exposure to humid or dry air, and wet-and-dry cycles. After scheduled exposure times, ranging from one month to two years, specimens were tested up to failure according to the same test set-up employed for pre-cracking. Outcomes of the self-healing phenomenon, if any, were analyzed in terms of recovery of stiffness, strength and ductility. In a durability-based design framework, self-healing indices quantifying the recovery of mechanical properties were also defined and their significance cross-checked.

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