

Electrohydraulic shock wave generation as a means to increase intrinsic permeability of mortar

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Abstract :

This article discusses the influence of compressive shock waves on the permeability of cementitious materials. Shock waves are generated in water by Pulsed Arc Electrohydraulic Discharges (PAED). The practical aim is to increase the intrinsic permeability of the specimens. The maximum pressure amplitude of the shock wave is 250 MPa. It generates damage in the specimens and the evolution of damage is correlated with the intrinsic permeability of the mortar. A threshold of pressure is observed. From this threshold, the increase of permeability is linear in a semi-log plot. The influence of repeated shocks on permeability is also discussed. Qualitative X Ray Tomography illustrates the evolution of the microstructure of the material leading to the increase of permeability. Comparative results from mercury intrusion porosimetry (MIP) show that the micro-structural damage process starts at the sub-micrometric level and that the characteristic size of pores of growing volume increases.

Keywords : Microstructure (B); Microcracking (B); Permeability (C); Mortar (E); Mechanical properties (C).

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