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Effect of age and level of damage on the autogenous healing of lime mortars

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Abstract

Natural hydraulic lime-based mortars are recommended for retrofitting operations in historical buildings, primarily because of their high chemical, physical and mechanical compatibility with the existing ones; moreover, their autogenous and engineering self-healing capacities make them a more suitable material for the aforementioned interventions.

This work proposes a methodology to quantify the autogenous self-healing in terms of recovery of the compression strength and ultrasonic pulse velocity in samples made of natural hydraulic lime mortars; specimens were pre-cracked at different ages (14 - 84 days) and levels of damage (70% of the compression strength in pre-peak regime; 90% of the compression strength in post-peak regime), and then cured under water up to 28 days.

The capacity of healing after two loading/healing cycles has been also investigated.

An interdisciplinary approach has been pursued characterising the mechanical aspects of the healing and the chemical nature of the products via SEM/EDS analyses.

The results provide useful indication about the dependence of the self-healing capacity on the aforementioned variables.

Keyword: autogenous self-healing, compressive strength, UPV, lime-based mortar