



Ultrasound velocity test to decay evaluation on decorative stone after different artificial ageing treatments

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Ultrasound propagation velocity depends on several physical properties, for instance density, porosity and textural discontinuities within stones. These properties are strongly influenced by state of conservation of materials and their modification can be considered decay markers; therefore, ultrasound velocity measurement represents a non-destructive technique to evaluate the decay underway on employed stone.

In this study, samples of the Avorio variety, an Apulian limestones, were processed to artificial ageing treatments, in particular thermal shocks, extreme thermal exposure at high temperatures between 200 and 600°C, and cycles of immersion of rock samples into saline solution alternating with drying phases in muffle furnace. Effects of induced deterioration were examined by comparing p-wave ultrasound velocity values, visual appearance and mass loss with water absorption values and capillarity test results.

This research suggests first that the ultrasound velocity test can be considered a valuable non-invasive technique to assess the state of decay of decorative and building stones. Furthermore, in order to simulate dangerous and extreme environmental conditions and study their influence on the stone decay patterns, new considerations and suggestions about ageing test and procedures were proposed.