

Electrical Effects during the Wetting-Drying Cycle of Porous Brickwork: Electrical Aspects of Rising Damp

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Abstract : Rising damp is an extremely complex phenomenon that is of great practical interest to the field of building conservation due to the irreversible damages it can make to old and historic structures. The electrical effects occurring in damp masonry have been scarcely researched and are a largely unknown aspect of rising damp. Present paper describes the typical electrical patterns occurring in porous brickwork during a wetting and drying cycle. It has been found that in contrast with dry masonry, where electrical phenomena are virtually non-existent, damp masonry exhibits a wide array of electrical effects. Long-term real-time measurements performed in the lab on small-scale brick structures, using an array of embedded micro-sensors, revealed significant voltage, current, capacitance and resistance variations which can be linked to the movement of moisture inside porous materials. The same measurements performed on actual old buildings revealed a similar behaviour, the electrical effects being more significant in areas of the brickwork affected by rising damp. Understanding these electrical phenomena contributes to a better understanding of the driving mechanisms of rising damp, potentially opening new avenues of dealing with it in a less invasive manner.

Keywords : brick masonry, electrical phenomena in damp brickwork, porous building materials, rising damp, spontaneous electrical potential, wetting-drying cycle

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