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Contribution to the technological characterization of two widely used Portuguese Dimensional Stones: the "Semi-rijo" and "Moca Creme" stones

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The durability of building material is a matter of paramount importance for the preservation/conservation and rehabilitation of the worldwide cultural heritage as well as for the management and maintenance of ancient and new building constructions. In order to contribute to the understanding of building stone decay and also to propose safe and correct applications of construction material, this paper intends to complement some of the technological data existing in the Portuguese Catalogue of Dimensional Stones regarding two commercial varieties of the Portuguese limestones that are widely used mainly in pavement and cladding inside and outside the buildings. These are both calciclastic limestones and represent different facies (the "Semi-rijo" is a pelbiomicrosparite and the "Moca Creme" is a biopelintrasparite)) exploited from the same Bathonian age (Middle Jurassic) "Valverde" formation belonging to the Limestone Massif of Estremadura (Mesocenozoic Occidental Border of Portugal). New data obtained in the framework of the research Project PORENET-Pore-Structure Geometry Measurement, Visualization and Modelling of some Portuguese, Ornamental and Building Limestones, on the pore structures (fluid transport related properties) and the durability (salt crystallization tests) of the Portuguese "Semi-rijo" and "Moca Creme" stones are presented.

The porous media is one of the most significant petrographical components govern-

ing the durability of natural stones. A full understanding of pore-channel network morphology and size is therefore important, and a classification of such a network system should be included in any technological characterization of stones. The pore space represents the preferred area for physico-chemical and biological weathering processes. The methodological approach used to get a visual and quantitative view of the pore-structure geometry was based on the combined application of classical and modern techniques usually used in the context of fluid flow studies in engineering, hydrology, sedimentology, and petroleum industry: optical and electronic scanning microscopy, 2D Computer Aided Image Analysis (CAIA) and Mercury Injection Capillary Pressure (MICP). Besides, fluid migration physical tests (including open, free and trapped porosity, capillary imbibition, Hirschwald coefficient) were also performed on core samples of the limestones, according to European (prEN 1936; NP EN 1936. 2001) and French (N FB 10-504. 1973) Standards. Based on the Portuguese Standard NP EN 12370 (2001), the resistance of these stones to salt crystallization was determined as well. The quite similar results of durability tests obtained for these two calciclastic limestone facies (the “Semi-rijo” pelbiomicrosparite and the “Moca Creme” biopelintrasparite) can mainly be explained by their very similar pore size, geometry and structure as well as related fluid percolation properties, namely by the presence of a homogeneous porous network composed essentially by micropores.