COMPATIBILITY OF RENDERING SYSTEMS WITH SALT LOADED ORDINARY MASONRY WALLS

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ABSTRACT

Salt damage results from the crystallization of soluble salts inside the pores of construction materials. It may cause numerous problems to the built heritage, namely, degradation of the health conditions or loss of historic material, as well as the high costs associated to the (usually recurrent) repairs. A progressive decrease of the structural resistance of ancient load-bearing walls is also a negative, but unfortunately common, consequence. Most of the historic buildings in Portugal are composed, similarly to what happens in many southern Europe countries, of thick load-bearing ordinary masonry walls, which are made of irregular stones of small size and a week lime-bedding-mortar. Soluble salts are usually very active in this kind of walls, that were built directly over the terrain, are composed of very porous and hydrophilic materials and have often been subjected to periods of constructive deterioration leading to an internal accumulation of moisture and salts. Furthermore, ordinary masonry walls are particularly sensitive to salt damage. Sanding of the bedding-mortar and further disaggregation of the masonry easily occur if proper protection is not provided by adequately compatible plasters and renders. Indeed, many of the problems result from the poor protection provided by plasters and renders with a too fast decay rate or that that are incompatible with the masonry.

The present research aimed at evaluating the compatibility of eight different rendering systems with salt loaded ordinary masonry walls. Test panels of five traditional mortars and of three industrial systems (specific for salt loaded walls) were made at S. Sebastião Chapel, in Almada, Portugal. Their execution technique and overall performance along three years were evaluated on the basis of the panels' observation.

The masonry was characterized in terms of its hydric behaviour and salt / moisture load by means of Karsten pipe measurements, ion chromatography analysis and the obtention of profiles expressing the variation (in height and in depth) of the actual and hygroscopic moisture contents.

The rendering systems hydric behaviour was evaluated by on-site measurements with the Karsten pipe, as well as by means of laboratory capillary absorption tests. The systems' performance in relation to the action of soluble salts was evaluated through the determination of profiles expressing the in depth variation of the hygroscopic moisture content.

The compatibility of each one of the rendering systems with the masonry is discussed on the basis of all the results obtained.