

COMPARATIVE STUDY AMONG THE POSSIBLE BINDERS FOR THE RESTORATION OF HISTORICAL BUILDINGS AND IN PARTICULAR OF THE SAN FRANCESCO BASILICA IN ASSISI

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ABSTRACT:

We have compared different binding systems not only from the analytical point of view but also from the physical-mechanical properties in order to find the connections between the characteristic of products and their performances, even and above all, as a guarantee of durability of the products for the restoration of ancient buildings.

Our analyses were particularly focused on the calcium hydroxide present in different forms in all the binders.

Thanks to our studies onto the original materials used for the building of the S. Francesco Basilica, we verified that the action of the calcium hydroxide contained into the mortars sometimes can be “dangerous” for the structure of the bricks.

The binding systems that we proposed for the restoration, even if they contain the calcium hydroxide, behave in such a way to reduce its concentration to zero, practically one week after the application.

According to these considerations the proposed systems are preferable to the normal cementitious or hydraulic lime based binders. In fact, they show the best characteristics of the first ones (good mechanical resistance, short setting time) without their negative properties (high elastic modulus, etc); while, compared with the second ones, they have an adjustable setting time, a higher mechanical strength and above all the calcium hydroxide disappears after few days.

INTRODUCTION

Further to the work already presented to the ICMA '98 Congress, concerning the study of samples of mortars and bricks used for the building of the S. Francesco Basilica in Assisi, we present the results obtained from the comparison among four possible binding systems to use as base of products for the restoration of ancient buildings. The use of SEM as instrument of morphological analysis, coupled with the analysis of superficial area (BET), allowed us to verify a great similarity between the “modern lime”, cured only for 4 weeks, that we proposed and the original mortar of 1200 used for the building of the Basilica.