



Characterization of mortars used since baroque period on altar of St. Jacob Church (Ljubljana, Slovenia)

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Determination of the type of mortars has an important meaning for monuments preservation. Such identification enables reconstruction of original mortar composition, helps to identify provenience of the applied raw material and can prove the technology of mortar manufacturing. Restoration intervention demands use of material which resembles the original material or producing appropriate material which is compatible with the properties of original material. Thus, first step for production of new repair mortar that can be used is in determining the composition of original mortar, the technology of its manufacturing and its deterioration phenomena.

Present study deals with characterization of some mortar samples taken from altar in St. Jacob Church in Ljubljana, which have been applied since baroque period, in sense to determine original historical mortars and those which represent the repair mortars, applied during later restoration intervention. Special attempt was put on presence of soluble salt crystallization as one of the significant reason for mortar deterioration. Within the framework of research optical microscopy, scanning electron microscopy (SEM), coupled to energy dispersive x-ray spectrometer (EDX), X-ray diffraction techniques were used to determine mineralogical composition of mortar samples and to determine present soluble salts. Characterization of these mortars based on petrological and mineralogical composition of used aggregates and binder in particular mortar sample, grain size, shape and particle size distribution of aggregate. In samples of mortars considered as original mortars aggregate/binder ratio was determined as well.

Results show that during this period a different types of mortars were used, differ in place and time of their application. It is obvious that mortars of original application are all lime mortars. We could distinguish two types of lime mortars, one with crushed limestone and wood particles and the second with river sand as aggregate. Original lime mortars differ in type of aggregate dependent on place of mortar application. Aggregate/binder ratio in these mortars varies between 1/1, 5 and 1/3. Latest repair mortars were mainly cement - lime mortars with aggregates of different petrological composition. As a result of degradation processes some soluble salt present on and within mortars were determined (gypsum and magnesium sulphate hydrate in different hydrated states). In determining different type of mortars, we tried to give a reliable instruction for place of application of different type of mortars for the needs of restoration intervention.