

Multidisciplinary diagnostic processes aimed to treatment of stone's lacune. Analysis and restoration of the balustrade of Villa Cerami in Catania

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This paper explains as an interdisciplinary study applied by geologists, architects and restorers can be very useful to the planning and performing the conservation measures of a monument through the description of the restoration's case of Villa Cerami balustrade.

This restores carried out in 2015 and was commissioned to the University of Catania. The balustrade adorns and protects the steps of Villa Cerami, which is an example of 18th Century "urban villa" located in the historic center of Catania. Sadly, these stunning steps, whose magnificence and placement characterizes the outdoor environment of the building at present suffer from bad decorative details adorning the baluster are affected by irreversible damage.

The scientific approach, described below, was apply preliminary to the restoration and allowed to identify the materials and the type and the causes of degradation forms with the aim to plane and perform the conservation measures. In particular, the study was planned in several operating steps: i) Historical research; ii) Geometric survey (it was performed by means direct and/or instrumental methods as 3D laser scanner); iii) analyses of building techniques (materials, construction techniques, functional and structural performance etc.); iv) analysis of damage (it was developed by means of both traditional and no-destructive surveys and mapping) (Sanfilippo et al., 2015). Static verification was performed to choose if preserve or replace some of the more degraded balusters. In particular, the 3D survey has allowed a more accurate assessment of the degree of structural risk.

The petrographic features of the materials were analyzed using a Zeiss polarized optical microscope while the qualitative mineralogical composition was determined through X-ray diffraction. With the aim to investigating possible change in the physical properties of stone material due to degradation, a physical characterization using the distribution of pore access size and pore volume was determined with mercury intrusion porosimeter (MIP).

The purpose of the work was to contribute to the understanding the degradation's state of the balustrade and to the planning of the restoration and protection of the artefact aimed to decrease the water's circulation and polluting agents deposition. For this last reason was tested a polymethylsiloxane reactive oligomer with protective action (Silo 111-CTS) on the lithotype by way of efficiency and compatibility tests according to UNI 10921:2001.

Furthermore this paper provide a multidisciplinary method applicable to all severely degraded architectural elements in order to evaluate the residual cultural (aesthetic and material) and functional (degree of structural risk) content and therefore to perform the correct project choices.

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