



Preventive
Conservation
in Historic Houses
and Palace
Museums:
Assessment
Methodologies
and Applications

SilvanaEditoriale

Preventive Conservation in Historic Houses and Palace Museums: Assessment Methodologies and Applications

Conference of the National Museum of the Palace of Versailles (EPV), the Association of European Royal Residences (ARRE), and the Research Centre of the Palace of Versailles (CRCV)

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Under the scientific direction of
Danilo Forleo
*in charge of preventive conservation
and head of EPICO programme,
National Museum of the Palace
of Versailles and Trianon*

Editorial coordination
Nadia Francaviglia
*research assistant for EPICO programme,
Research Centre of the Palace of Versailles*

Translations
Clarisse Le Mercier, Camila Mora

This book brings together the presentations of the speakers at the international symposium organised as part of the EPICO (European Protocol in Preventive Conservation) research programme, by the National Museum of the Palace of Versailles:

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Tierry Gausseron, *deputy head*
Association of European Royal Residences (ARRE)
Research Centre of the Palace of Versailles (CRCV)

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Royal Palace of Caserta, Preventive Conservation of Stone Facings of Huge Facades

Abstract

As a result of the collapse of some fragments of the stone cladding, recent restoration work began on the façades of the Royal Palace of Caserta. Work was carried out on over 64,000 m², lasted for three years and cost 16 million euros. It has therefore become essential to define a strategy to prevent the causes of stone deterioration while at the same time monitoring the conditions of architectural mouldings, in order to avoid the risk of fresh damage or detachment as well as limiting future intervention costs.

Flavia Belardelli

Responsible for the architectural conservation of the Royal Palace of Caserta
flavia.belardelli@beniculturali.it
www.reggiadicaserta.
beniculturali.it

Keywords

Caserta, Royal Palace, stone deterioration, monitoring system.

Diagnostic studies and tests performed during restoration work revealed that detachments were generally due to the infiltration of water into the limestone.

On the top of the outer wall there is a gutter built into the masonry, which collects rainwater from the roof. The growth of weeds, or even shrubs, on top of the outer walls had obstructed the gutter thus blocking the drainage system and has caused the penetration of rainwater into the joints between the blocks and the core of the stone. The water absorbed by the stone froze into ice in winter, thus damaging the limestone, consuming the calcite along the lines of the geological veins and causing both large and small fragments of masonry to break off and fall to the ground. In fact, most cracks were concentrated in the big projecting cornice immediately below the gutter.

Therefore it has proved necessary to define a strategy in order to protect cornices, pillars, columns, capitals and coatings from damage caused by water infiltration and to monitor the state of conservation of the stonework, in this way taking the first steps towards a general system of preventive conservation.

As an experiment, an automatically timed system was installed to spray the gutter at the base of the roof with an herbicide, to prevent the growth of weeds. The device is operating on the crowning of the southern and western external façades.

Fig. 1
Before restoration:
degradation of stone
mouldings caused by rain
water.



All horizontal surfaces of the mouldings of the façades, which are exposed to rain, have been covered with coatings of water repellent to prevent water infiltration into the stone material.

A monitoring system was installed in the corner of the main façade, one of the most critical areas of the building, to verify stability and measure the effect of external temperature variations and environmental vibrations on stone blocks. It consists of a series of sensors connected to some data loggers that transmit temperature values and any micro-routing to a peripheral device. The system monitors the most vulnerable stone blocks, with regards to geometric configuration, projecting dimension, rain exposure, and precise location in the architectural structure. Specialised software records the data and gives off alarm signals when the values exceed the safety threshold, allowing the control of the slightest deviation from the horizontal axis, which would in turn indicate the need to check the conditions of the façade stones using a basket lift.

All the information obtained during the restoration, through instrumental surveys such as 3D laser scanners, infra-red thermography and magnetometry, have been collected on a single platform (Integrated Diagnostic System).

The system will make it possible to compare the state of conservation of the façades before restoration with those that will be recorded after a few years, repeating the survey by use of a laser scanner. It will thus be possible to monitor the state of conservation of the façades and plan maintenance work in a timely manner to prevent the deterioration of building materials.

Bibliography

M. DE GENNARO, D. CALCATERRA, A. LANGELLA, *Le pietre storiche della Campania dall'oblio alla riscoperta*, Luciano Editore, Naples, 2013.



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Silvana Editoriale S.p.A.
via dei Lavoratori, 78
20092 Cinisello Balsamo, Milan
tel. 02 453 951 01
fax 02 453 951 51
www.silvanaeditoriale.it