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

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and the Research Centre
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Warning Signs of Alteration: a Key Element for the Assessment Method. Objectives and Research

Abstract

The research on observable alteration indicators on historic houses' collections represents a fundamental step in the EPICO programme, in line with the objectives all partners share. Supervised by the Versailles team, who provided a visual glossary of alteration as a support tool for the in situ testing, the research focused on two key elements for the EPICO programme: the cause–effect relationship of alteration and the assessment method's systematic approach.

Alteration indicators research was conducted with the understanding that it would facilitate the examiner's object observation work during the in situ assessment. Thus it was essential to propose indicators easily observable and measurable with the naked eye or with simple tools (cameras, magnifying glass 10x, visible/UV light torch, caliber, etc.).

The research carried out by the CCR team in 2016 saw the collaboration of a multidisciplinary team of conservators-restorers, specialised in several materials, experienced in the maintenance and treatment of the collections of the royal residences of Savoy. This explains why although some indicator definitions were found in the literature, many others are derived from the direct observation of this type of collection, in order to create an immediate access vocabulary.

This research needed to go beyond a simple vocabulary of definitions: for each alteration indicator it was necessary to identify the specific phenomena that would cause it, to identify the plausible causes, to bring into focus the cause–effect relationship of alteration. This exercise was sometimes complex because a single type of alteration can have several causes.[1]

Keywords

Alteration indicators, alteration cause.

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A global approach to the preventive conservation of Cultural Heritage necessarily implies that the research activity aimed at studying the state of preservation of the works of art in the historical houses should start from the analysis of the object within its "environment system," from which both the equilibria and the alterations of the materials may depend.

The Centro Conservazione e Restauro La Venaria Reale has selected an interdisciplinary team composed of conservators-restorers

Table 1
Classification of alterations in a selected list according to the type of alteration.

Abrasion / Wear / Scratch / Fraying
Burn
Corrosion / Oxidation
Craquelure / Crizzling
Pulverulence
Yellowing / Fading / Colour change
Efflorescence / Exudation
Disjoints, detached / Moving element, lost element
Exogenous material
Crack / Tear / Split / Fracture / Crack / Disjoints
Warping / Deformation / Crease
Graffiti / Tag
Hole / Loss
Dust / Surface dirt / Grease / Grime / Soil particles
Presence of mould
Cleavage / Flacking
Stain / Mark
Tarnishing / Dulling
Signs of insect attack

specialized in organic and inorganic materials, already active in condition reporting campaigns and ordinary and extraordinary maintenance programs in the historical residences of Piedmont.[2]

Research on indicators of deterioration and on the definition of alteration phenomena and their visible effects on the works of art has represented, since the start of the EPICO project, a fundamental step in the programme.

The aim of the research fit the need emerging clearly in all the campaigns for the analysis of the state of preservation in a collection: to connect, in an objective, scientific and documentable manner, the alterations detected with the most correct, concomitant or independent, cause or causes.

Respecting the guidelines of preventive conservation, that never separates the evaluation of the conditions of the works of art from those of their "environment system," the research on alteration indicators and their causes followed a methodological approach, starting from the material of which the object is made, through its alterations, up to the evaluation of the relationship between the material itself and the environment in which the object is located, in this case a historical residence, today normally open to the public. To start from the analysis of the state of preservation of the works of art in their "environment system" allowed to reach the purpose both for on-site and bibliographic research phase: identify the possible cause-effect relationships of the

Old treatment (Conservation / Restoration treatment)
Visitors transit
Climate
Wrong manufacturing
Natural instability of the object (Manufacturing / Patina)
Water
Continuous and repeated housekeeping / Incorrect housekeeping
No housekeeping
Fire
Pest / mould
Light and UV
Handling / Transport / Accident
Display mode / Storage mode
Pollutants
Past use / Current use
Vibration
Criminals / Theft / Dissociation

Table 2
List of causes used in the EPICO method tests in 2017, before the last update.

alterations detected on the collections.

Among the numerous types of objects most present and widespread in the historical collections of the residences, the constituent materials considered most representative were selected, also as samples to be tested in the in situ sessions.

For each material the possible alterations were then listed. The choice to use the term "alteration" instead of "degradation" arises from the recommendations of the UNI NORMAL commissions[3] that indicate "the alteration is a modification of the material that does not necessarily imply a worsening of its characteristics in terms of conservation," while the term "degradation" means a modification which "always implies a deterioration." Therefore, the study on the indicators was based on the visual analysis of the surface of the works of art searching "visible alterations," without the presumption of defining the alteration as a process of deterioration in progress.

Based on the need to have a list of alterations easily identifiable by the simple visual observation of the objects, an initial list was drawn up, including a glossary with a description of the items (table 1 – drafted in 2016 by the team of Versailles).

To obtain a list of the causes to be linked to the conditions of the object under test, the team of conservators-restorers of the CCR la Venaria Reale, with the support of the Scientific Laboratories, started a campaign of bibliographic research to deepen the knowledge of the

Visible alteration indicator (specific term)	Description of visible alteration: what we see on the object	Generic alteration cause (main cause)	Generic alteration cause (secondary cause and\or aggravating cause)
Dust cementation	Alteration caused by the addition of substances (deposition of dust, dirt or other impurities) which may cause the surface appearance of the work to change	Lack of housekeeping (of the rooms / of the collections)	Climate

Specific damage factor	Bibliographical source	Diagnosis
Incorrect RH: RH> 65% The chemical process of dust cementation can be quite rapid at high relative humidity (80%) such that the cements may form in less than a day	Helen Lloyd, Caroline Bendix, Peter Brimblecombe, David Thickett, 'Dust In Historic Libraries,' in *Museum Microclimates*, Contributions to the Copenhagen conference 19-23 November 2007, Edited by Tim Padfield and Karen Borchersen	Cementation tends to occur at high humidity and can be driven by biological, physical and chemical processes. Humidity cycles cause physical movement of fibrous material that allow dust to embed deeper into porous surfaces. At high humidity calcium ions can leach from dust particles, and re-deposit as microcrystalline calcite, which cements the dust particle to the substrate in much the same way as lime mortars recrystallise. This chemical process can be quite rapid at high relative humidity (80%) such that the cements may form in less than a day. At high humidity, dust adheres very effectively to organic materials such as cotton and silk. The cementation process increases dramatically at high RH values.

Table 3, 4
Example of research on damage factors and visible indicators.

cause / effect relationship (table 2). In total, around one hundred papers, conference proceedings and specialised websites were consulted.

The existing data in the scientific literature were collected in a system of tables, subdivided by materials and alterations, which forms the basis of the new assessment method of the EPICO programme.

Considering the large amount of data collected, only one example will be presented here, representative of the problems that normally arise in the fact-finding and conservative reporting campaigns of cultural heritage. The subjectivity of the scheduler is perhaps the main factor that can influence the condition report campaign. For all the alterations detected during the test, the evaluation of the causes will depend not only on the knowledge of the constitutive materials and the executive techniques of the artefact, knowledge directly observable from the appearance and the type of degradation, but also by the critical capacity to reconstruct

the conservative history of the work of art itself (previous interventions, internal and external movements, permanence in storage, etc.) and to evaluate the conditions of the environments.

The example shown in table 3 refers to the textile covering of a stool dating back to the end of the 18th century belonging to the collections of the Stupinigi Hunting Palace: the silk fabric with application of embroidery shown an accumulation of exogenic material of grey colour, compact, hard, and of variable thickness, modifying the surface morphology and colours of embroidery. In the testing phase this alteration could be classified as accumulation of dirt caused by a lack of maintenance of the fabric, not subjected to planned cleaning operations in the past. The detailed study on the conservation history of the artefact, that it was possible to reconstruct only thanks to the interviews with the staff of the Piedmontese residence, has led us to consider a possible cause aggravating the alteration detected: in the reconstruction of the handling inside the Palace it emerged that the stool has been moved to a non-air-conditioned warehouse and that the packaging helped to create a microclimate with relative humidity values favourable to the process known and verified in the bibliography as "dust cementation" [Lloyd, 2007, p. 138] (table 4).

The intrinsic limitation of this approach to the study of artefacts in their exhibition context lies in the fact that the alterations are observed on the objects themselves. In the case of an ongoing degradation this means observing it when it is already potentially dangerous for the work of art. We have the list of alterations and the list of related causes, the next step is to identify sample materials to be inserted in the same environment in order to evaluate the "aggressiveness" of the environment itself. These materials must interact with the environment in the same way that the constituent materials in order to highlight the cause of alteration present in it, but in a quickly manner and maximising the effect of the cause. It is important to be able to highlight the causes of alteration before their effect is visible, but above all before it can cause damage to objects. Furthermore, these materials must be able to emphasise in particular those causes that produce alterations not immediately highlighted only by the visual inspection carried out by the conservator-restorer.

Conclusions

Taking into account the complex work of observation of collections on site and of critical analysis of the possible causes that in the "environment system" of a historical residence contribute to an alteration of the materials, it is important to clarify here some considerations. A fundamental assumption for the research on the indicators of alteration was the knowledge of the materials: the phenomena of alteration of the state of conservation of the

various artefacts can be correctly identified, defined and critically linked to the causes only starting from the constitutive material and from the executive technique of the works of art under test.

In work on site the professional figures in charge of the tests must submit the collected data to a critical check, through a system of relations between the artefact, the environment system and the conservative history of the work of art in its context. Purpose of this check is to limit the errors introduced by the subjectivity of the evaluation in the cause / effect relationships of the alteration.

The work done so far should not be considered finished, but rather is being continued with the elaboration of data collected during the test.

Finally, based on the experience gained over the years, we have understood how the visitor, here indicated as one of the possible causes related with some alterations, can be invested with a different role in the system of preventive conservation: it is an element to be taken into account for the management of anthropic risks but also it represents the "raison d'être" of the Residences open to the public.

Endnotes

[1] Excerpt from document "Objectifs du programme de recherche EPICO – 2014-2017," Palace of Versailles' staff, 2015.

[2] Paolo Luciani (wooden furniture), Marco Demmelbauer (metals, ceramic, glass), Valeria Arena (paper), Ilaria Negri (painting on canvas and on wood), Roberta Genta (tapestries, textiles).

[3] UNI 11182 - April 2006 - ICS 01.020; 91.100.15; Cultural Heritage – Natural and artificial stone – Description of the alteration – Terminology and definition.

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