



Proceedings of the International Conference
Preventive and Planned Conservation
Monza, Mantova - 5-9 May 2014

4

Metodi e strumenti per la prevenzione e la manutenzione



A cura di **Stefano Della Torre**
Curatela editoriale **Maria Paola Borgarino**



NARDINI EDITORE

Proceedings of the International Conference
Preventive and Planned Conservation
Monza, Mantova - 5-9 May 2014



**POLITECNICO
DI MILANO**



Metodi e strumenti per la prevenzione e la manutenzione

Proceedings of the International Conference
Preventive and Planned Conservation
Monza, Mantova - 5-9 May 2014

Comitato scientifico

Carlo Blasi, *Università di Parma, Italy*
Federico Bucci, *Politecnico di Milano, Italy*
Fausto Cardoso Martinez, *University of Cuenca, Ecuador*
Angelo Ciribini, *Università di Brescia, Italy*
Nigel Dann, *University of the West of England, United Kingdom*
Stefano Della Torre, *Politecnico di Milano, Italy*
Sasa Dobričić, *University of Nova Gorica, Slovenia*
Xavier Greffe, *Université Paris 1 Panthéon-Sorbonne, France*
Massimo Montella, *Università di Macerata, Italy*
Elena Mussinelli, *Politecnico di Milano, Italy*
Christian Ost, *ICHEC Brussels Management School, Belgium*
Ana Pereira Roders, *University of Eindhoven, Holland*
Pietro Petrarola, *Eupolis Lombardia, Italy*
Mario Santana Quintero, *Carleton University, Canada*
Koenraad Van Balen, *UNESCO Chair for PRECOMOS, KU Leuven, Belgium*
Minja Yang, *RLICC, KU Leuven, Belgium*
Rossella Moioli, *Distretto Culturale Monza e Brianza, Italy (coordinamento)*

Segreteria scientifica del convegno:

Maria Paola Borgarino, Stefania Bossi
Politecnico di Milano, Dipartimento ABC - Architecture, Built Environment and Construction Engineering

Atti a cura di Stefano Della Torre

Curatela editoriale: Maria Paola Borgarino
Impaginazione e collaborazione alla revisione dei testi: Cristina Boniotti

Politecnico di Milano - Dipartimento ABC - Architecture, Built Environment and Construction Engineering
Fondazione Cariplo, progetto Distretti Culturali
Distretto Culturale Evoluto di Monza e Brianza - Provincia di Monza e della Brianza
Distretto Culturale Le Regge dei Gonzaga

Con il patrocinio della



Regione Lombardia

@ 2014 Politecnico di Milano e Nardini Editore
Tutti i diritti sono riservati

Copertina Ennio Bazzoni

Stampato per Nardini Editore

Le immagini contenute in questo volume sono fornite dagli autori al Politecnico di Milano e all'editore sotto la propria esclusiva responsabilità e sono state utilizzate per scopo didattico e per divulgazione. L'editore è disponibile a riconoscere la paternità delle immagini ad altri che la dimostrino, e a citare gli aventi diritto nelle successive edizioni.



Proceedings of the International Conference
Preventive and Planned Conservation
Monza, Mantova - 5-9 May 2014

4

Metodi e strumenti per la prevenzione e la manutenzione



A cura di **Stefano Della Torre**
Curatela editoriale **Maria Paola Borgarino**

Indice

PLANNED AND PREVENTATIVE CONSERVATION & ENGLAND: EXPERIENCES, OPPORTUNITIES AND REQUIREMENTS Nigel Dann	pag. 1
LEARNING TO GIVE CLIENTS WHAT THEY DON'T WANT. CONSERVATION EDUCATION AND POST-TREATMENT MONITORING AND MAINTENANCE Francesca Piqué, Julian James	” 11
FROM A WORKING DEFINITION OF PREVENTIVE AND PLANNED CONSERVATION TOWARDS THE INNOVATIVE SERVICES OF MONUMENTENWACHT VLAANDEREN Aziliz Vandesande, Elisabeth Michiels, Koen Van Balen	” 25
THE ROMAN WALLS OF LUGO MAINTENANCE PLAN: A TOOL FOR PREVENTIVE AND PLANNED CONSERVATION OF A UNESCO SITE Giorgio Faraci	” 35
PREVENTIVE CONSERVATION VERSUS RISK MANAGEMENT. APPLYING AN INNOVATIVE METHODOLOGY DEVELOPED BY ICCROM, CCI AND RCE Carla Pianese, Giorgia Bonesso	” 47
TOWARDS A PPC FOR AN HISTORICAL AQUEDUCT. Anna Decri, Cristina Pastor	” 57
LA PRATICA DEI PROCESSI DI CURA NELLA CONSERVAZIONE DEGLI EDIFICI ECCLESIASTICI Paolo Gasparoli, Chiara Livraghi, Fabiana Pianezze, Matteo Scaltritti	” 67
SURVEY AND ASSESSMENT OF A MASONRY CHIMNEY IN MILAN Giulio Mirabella Roberti, Andrea Castiglioni	” 79
ALCUNE CONSIDERAZIONI SUL CONTROLLO DELLE OPERAZIONI DI RESTAURO E SULLA CONSERVAZIONE PROGRAMMATA DEI DIPINTI MURALI Paolo Bensi	” 91
PRESERVATION STRATEGY OF HISTORIC TOWERS BASED ON CONTINUOUS DYNAMIC MONITORING: A CASE STUDY Antonella Saisi, Carmelo Gentile	” 101
UN PIANO DI CONSERVAZIONE PREVENTIVA PER LA REGGIA DI VENARIA: DAL CASO DI STUDIO AL PROGETTO PER IL SISTEMA DELLE RESIDENZE SABAUDE Stefania De Blasi, Marco Nervo	” 113

segue

segue **Indice**

THE IMPORTANCE OF RISK PREVENTION FOR THE PROTECTION OF BUILT CULTURAL HERITAGE: DRAFTING DISASTER RISK MANAGEMENT PLAN FOR CIMITERO MUNUMENTALE DI STAGLIENO (GENOVA) AND THE CULTURAL LANDSCAPE OF PORTOVENERE, CINQUE TERRE AND THE ISLANDS Barbara Caranza, Paola Mussini	” 127
PPC AT LAVELLO CONVENT: TOWARDS A SUSTAINABLE CONSERVATION PLAN AFTER THE RESTORATION Bruno Daniotti, Silvia Erba, Rossella Moioli, Elisabetta Rosina, Antonio Sansonetti	” 137
PIANI DI CONSERVAZIONE DEL PATRIMONIO STORICO ARCHITETTONICO: OPPORTUNITÀ E CRITICITÀ ATTRAVERSO ALCUNI CASI STUDIO Stefania Bossi	” 151
CONSERVARE, MANTENERE E VALORIZZARE NELLA DIOCESI DI MILANO: STATO DELL'ARTE E POSSIBILI SVILUPPI Laura Lazzaroni	” 161
LA CONSERVAZIONE DEL PATRIMONIO ECCLESIASTICO DIFFUSO IN ITALIA Silvia Salvini, Valentina Cinieri	” 169
L'ESPERIENZA DEI CASTELLI DELLA VALTENESI COME VOLANO PER LA PROMOZIONE DELLA CONSERVAZIONE PROGRAMMATA Barbara Scala	” 179
MONITORING OF THE TEMPERATURE-MOISTURE REGIME OF ST. MARTIN CATHEDRAL IN BRATISLAVA L. Kubičár, J. Hudec, D. Fidiriková, V. Štofanič, P. Dieška	” 191
PIANIFICAZIONE DEI CONTROLLI ED AZIONE PREVENTIVA NELLO SVILUPPO DEL NUOVO SISTEMA DI VALUTAZIONE GBC HISTORIC BUILDING™ Marco Zuppiroli	” 203
ASSESSING TIES OF “DUOMO DI MILANO” WITHIN THE CONSERVATION STRATEGY Mira Vasic, Dario Coronelli, Carlo Poggi	” 213
THEORETICAL CONSTRUCT, METHOD AND WORKING TOOL OF THE “PREVENTIVE RESTORATION”. THE ELECTRONIC BOOK FOR THE PRE-ARRANGED MAINTENANCE OF ARCHITECTURAL HERITAGE Gaspere Massimo Ventimiglia	” 221

THEORETICAL CONSTRUCT, METHOD AND WORKING TOOL OF THE “PREVENTIVE RESTORATION”. THE ELECTRONIC BOOK FOR THE PREARRANGED MAINTENANCE OF ARCHITECTURAL HERITAGE

Gaspare Massimo Ventimiglia

Università degli Studi di Palermo, Department of Architecture, LIRBA Laboratorio di Indagini e Restauro dei Beni Architettonici

Abstract

A restoration may constitute a positive moment to guarantee the conservation, transmission and a compatible use of an historical architecture, but it is often the result of a long and guilty omission of care, attesting a lack of interest in the architectural heritage we are late forced to heal with extensive and invasive interventions that, in most cases, could be prevented.

Clear maintenance programs and a correct and well-planned preventive action could be sufficient to avoid unexpected interventions when it is too late; such simple concepts - apparently shared by everyone - however, remain relegated to a level of brainy attitudes or protocols that do not produce any advantage in terms of sustainability.

This contribution develops by recalling the historical roots of prevention, highlighting the relevance of maintenance and, finally, showing the results of a research project conceived and launched in 2008, as part of L.I.R.B.A. Laboratorio di Indagini e Restauro dei Beni Architettonici (University of Palermo).

Evolution of the concept of maintenance in history

The desire to begin preservative strategies for significant architecture emerged in the past when it was considered advantageous to imagine new uses for existing buildings or when they possessed the value of historical and artistic testimony. The ancient sources report events that can be seen as real actions of maintenance, implemented after the attribution of the inalienable quality of document to the material evidence of the past.

One of the oldest information about the maintenance dates back to the fourth century AD, when the Syrian philosopher Libanius delivered his speech, addressed to the Roman Emperor Theodosius I, against the destruction of pagan temples that were “cost a lot of work and time and a multitude of workers and the amount of money” and being a property of the empire it would

have been more advantageous for them to imagine “another new use” rather than destroy the products of human labour (Romano, 2007). The cultural orientation suggested by Libanius will be considered valid, to the point of finding a practical application in the *Codex Theodosianus*, an official collection of laws promoted by the Roman Emperor Theodosius II, which came into effect in 439. The code required conservation of pagan buildings and their “appropriate use and in the public interest” (Zarbo, 2010).

One of the feelings often noticed about the testimonies of the past has been the need to plan supervisory actions against corruption and pass them on to future generations: the bull *Cum almam nostram urbem* of Pope Pio II in 1462 and the appointment of Raffaello Sanzio as *Praefectus marmorum et lapidum omnium* by Pope Leone X in 1515, attest to this attitude.

The bull of Pio II, in particular, condemned anyone who was identified as the culprit of the damage or destruction of public buildings to the penalty of excommunication. It was followed a few years later, in 1474, by the bull *Cum providem Sanctorum Patrem* of Pope Sisto IV, that scourged the removal of marbles and ancient ornaments from the Churches (Mancuso, 2005). The need for a rigorous supervisory action on the treasures of art and history had suggested appointing Raffaello Sanzio as *Ispettore generale delle Belle Arti*, believing that the authority and competence of a great artist were necessary. The inspector should also take all necessary action to prevent the old gravestones and inscriptions to be destroyed; but Raffaello immediately became a promoter of a large defensive action that was not limited only to contemporary works, but was also extended to the archaeological remains in Rome (Camesasca, 1956). The Papal States will issue fifteen protective measures pursuing the address of maintenance between 1624 and 1821.

Towards the middle of the eighteenth century, the Papal States and the Bourbons initiate decisive preventive actions that go beyond the simple imposition of penalties against the spoliation of the abandoned buildings and organize a field that will acquire the character of a specific public sector more and more, which covers an important issue for the community: the protection of monuments and sites.

The viceroy Bartolomeo Corsini in 1745 promulgated a law to protect the remains of the ancient theatre of Taormina; in fact, the vandals had removed the old stones, weakening the structure and causing continuous slumping.

Just a few years after, the first real organization for the active protection of monuments will be born in Sicily: with the royal dispatch of Ferdinand IV on August 1, 1778, the territory of the island is divided into districts and two *Reggi*

Custodi (Royal Guardians) are made responsible for protecting the monuments. The dispatch order that “all the antiquities in the Kingdom of Sicily must be conserved as far as possible, and should not be exposed to the discretion of the time, without someone who take care of them, so [...] the Prince of Torremuzza for the Val di Mazara and the Prince of Biscari for the Val di Noto and Valdemone, have the care of all the ancient remains [...] both guardians form a *Plano* of their consistency, of the budget which is necessary to maintain and preserve them, and of anything they believe to be necessary for the purpose, prepare them as soon as possible” (Tomaselli, 1985).

The measure marks the beginning of a state organization aimed at protecting monuments and sites for the first time in history. The guardians must write a catalogue that goes beyond the mere listing of monuments; the *Plano delle antichità* indeed had to include a description of the conservation state, of the works of consolidation to be done and the estimate of the amount required to realize them. The *Plano* was therefore not just a simple catalogue, but it became a tool for planning conservation interventions in the medium term: the priorities and hierarchy of works to be carried were indicated in it. A year after its activation, in 1779, the structure increased with the establishment of a technical department, under the direction of the architect Carlo Chenchi, nominated *Architetto delle Antichità di Sicilia*. The *Disegnatore di prospettive* (designer of perspective) Luigi Mayer and the *Capomastro* (master builder) Domenico Russo helped Chenchi to carry out its activities; Moreover, in the same year, the newly formed office is expanded with “local correspondents [...], appropriate persons to ensure the care and custody of these ancient rests” (Tomaselli, 1985). The funding made available to the guardians consisted of 600 ounces per year.

The structure of prevention works in Sicily since 1778 and anticipates any other organization that was later to rise in other places. The goals of prevention and preservation through minimal maintenance works are incontrovertible because declared as such, and also documents concerning to the works carried out confirm that the stylistic restoration was not taken into consideration, preferring the reinstatement with materials easily available in site. After the unification of the Kingdom of Italy, the protection model already tested in the former Bourbon Kingdom has been adopted in other regions of the new Kingdom, with the creation of the *Commissione di antichità e belle arti* and, subsequently, with the appointment of the *Regi commissari* (Royal Commissioners) and the establishment of the *Uffici regionali per la conservazione dei monumenti*.

A specific regulation which provides for the appointment of an *Architetto direttore di antichità e belle arti della Sicilia* was elaborated in 1863 by Michele

Amari, Minister of Education, in agreement with the Commission of Antiquities and Fine Arts. The first to hold this office was Francesco Saverio Cavallari, who had a long experience in the field of archaeological research and restoration (Tomaselli, 1994). For its massive amount of archaeological remains, Sicily is involved in a real project of prevention at the regional scale, with a budget of fifty thousand pounds every year. The Royal Decree no 722 of May 3, 1863, approved the regulations of the Commission of Antiquities and Fine Arts and, about the functions that the architect had to explicate, underlines that “he will visit at least once a year ancient monuments of the Middle Ages in the island, remarkable for architectural beauty, or historical character; he will propose to the Committee the necessary action, and ensure the execution”. The network of correspondents established in Sicily since the Bourbon was still efficient and the Commission had the right to propose the appointment of correspondents, even for those sites they had already been appointed, in order to give birth to the Peripheral Committees. Local correspondents are asked to perform “twice a year inspection of the monuments and works of art and antiquities in their compartment, and send a report to the Commission”. The structure of protection guaranteed a capillary action of control based on a double comparison that was necessary to make prevention strategy effective, reaching the execution of maintenance work of minor entity but sufficient to ensure conservation.

The directive of 1863 entrusts the Commission of Antiquity with the task of “compiling immediately a general catalogue of works of art that are found in sacred and profane public places in the island, which must remain under the protection of government”. It is important to note that, for this purpose, to ensure the best preventive actions the regulation included a model of questionnaire that had to be completed by cataloguers writing down, among other information, “the preservation status, and the necessary restoration”. Each cataloguer had to verify that “the signature of the responsible of the ancient work” was affixed to each form.

In the first half of the nineteenth century, the practice of liberation and stylistic restoration of buildings became popular especially on medieval architecture. But after the international campaigns of protest against the restoration of the Basilica of San Marco in Venice, and the Churches of Santa Maria dell’Ammiraglio, San Giovanni degli Eremiti, and San Cataldo in Palermo, which also induced the censure of British intellectuals, the Ministry of Education was in a certain state of embarrassment. A deep reflection will lead to the introduction of more stringent verification of projects and action of control over the entire national territory will be made effective by the enactment of the

Ministerial Decree of 21 July 1882 and the *Explicative Circular 683 bis*, that unified represent the first *Italian Restoration Charter* (Tomaselli, Ventimiglia, 2013).

After the State initiative to regulate the delicate area of conservation of monuments, an internal committee of the National Congress of Engineers and Architects held in Rome in 1883, of which Camillo Boito was a member, while praising the ministerial initiative proposes and approves *eight amendments* to the decree of 1882. The introduction of the paper read by Boito and the first amendment deal with the subject of prevention: “as the architectural monuments of the past, are not only necessary to study architecture, but as essential documents to clarify and illustrate the history of the various times and of the various peoples in all its parts, so must be scrupulously respected, just like documents, where even a slight modification, which may seem original work, is deceptive and leads gradually to wrong deductions, 1° The architectural monuments - if indisputably demonstrated a need to intervene - should be consolidated rather than repaired, repaired rather than restored, avoiding the additions and renovations in them anyway” (Boito, 1893).

The determinations of the International Conference held in Athens (1931) are based on conservative principles and reject the generalized reconstructions. Preventive actions and the constant maintenance of the historic architecture are placed in the foreground and, in the second article of the *Athens Charter*, it is now clear that “a general tendency to abandon the complete rebuilds and avoid the risks by means of the imposition of regular maintenance and permanent measures of preservation of the buildings predominates in the various States represented” and therefore, the restoration will occur only exceptionally.

The *Italian Restoration Charter of 1932* is addressed to the same ethical perspective. It was promulgated by the Superior Council for Antiquities and Fine Arts, and diffused by the Art Bulletin of the Ministry of Education together with the *Rules for the Restoration of Monuments*. The first article orders that “more than any other target, the greatest importance must be attributed to assiduous maintenance and consolidation works, to give back resistance and durability decreased from damage or degradation” (Carbonara, 1997).

The means of prevention and prohibition of stylistic reconstruction are reiterated in the *Instructions for the restoration of monuments*, developed in 1938, which firmly prescribes the respect for the value of material authenticity. The text is compiled by the committee made up of Gustavo Giovannoni, Carlo Calzecchi, Guglielmo De Angelis D'Ossat, Biagio Pace, Roberto Longhi, Filadelfo La Ferla and Marino Lazzari. The Instructions assert that “the early prevention is the fundamental need, through careful maintenance, against all causes of dete-

rioration of monuments and works of art; the activity of the offices responsible for the protection of artistic heritage, with the participation of all public and private institutions, should especially be directed towards prevention, for the preservation of historical significance in its entirety”.

Since the beginning of the twentieth century, the protection and preservation of cultural and environmental heritage are considered essential aspects for the development of the Nation. The *Istituto Centrale del Restauro* was founded in 1938, directed by Cesare Brandi until 1961. The protection laws no 1089 and 1497 were adopted in 1939, and remain in force for nearly sixty years. But the century is marked by conflicts and the extraordinary devastating fury of aerial bombardment during the Second World War will produce an extensive destruction of the architecture; such as to make unworkable the interventions suggested by the Charters and the Instructions. In the following years - and not only in Italy - the reconstruction of the destroyed buildings will start giving ample space to that kind of restoration Charters had tried to forbid.

Prevention after the Second World War

Completed the post-war rebuilding phase, the interrupted debate reopens at international level during the second Congress of Architects and Technicians of Historical Monuments, held in Venice in 1964. The *Venice Charter for the conservation and restoration of monuments and sites* is the document proposed and approved as part of the conference; Roberto Pane and Piero Gazzola gave a special contribution to its definition. The destruction of whole cities and the psychological wounds inflicted by the war had caused the spread of restoration practices oriented towards the stylistic reconstruction, in whole or in part, of the buildings destroyed or damaged, with an aspiration to the recreation of the past. The argument of prevention is not absent in the *Venice Charter*, and article 4 recommends that “the preservation of monuments requires first of all a systematic maintenance”.

In the seventies, the Ministry of Education emanates the *Italian Restoration Charter 1972* and the concept of “protection” is understood as “a protective measure that does not involve the direct intervention”. The *Instructions for the execution of architectural restoration* (attachment b) introduces an initial recommendation: “since maintenance works promptly carried out ensure long life to monuments, avoiding the aggravation of damages, the greatest possible care in continuous surveillance of buildings for preventive measures is recommended, in order to avoid interventions of greater amplitude too. All restoration work shall be considered under the substantial conservative profile, respecting the

added elements and avoiding actions for innovation or repetition of forms of the past. In order to ensure the survival of the monuments, new uses of old buildings should also be carefully considered when they do not appear incompatible with the historical and artistic interests". The document emphasizes the importance of preventive measures and maintenance because they ensure the constant integrity and require minimal intervention, avoiding the execution of more complex restorations.

We must remember that Cesare Brandi had described the "preventive restoration" as the "removal of risks, achievement of favourable conditions for the purpose of transmission to future generations", emphasizing the necessity to consider the environmental conditions of the place where the works are accessible (Brandi, 1956). He also defines the "preventive restoration" in his *Teoria del Restauro* of 1963 and clarifies that it should not be understood as "a kind of prophylaxis, implemented as a vaccination, that can immunize a work of art in the course of time. This prophylaxis does not exist and cannot exist because a work of art, from the monument to the thumbnail, cannot be compared to a living organism, but only intended in its aesthetic feature and in the material in which it exists, and that supports its manifestation as pure reality. Every work of art is in fact composed of a number and quantity of matter, which, in its connection, and for an unknown and unavoidable combination of circumstances and specific agents, can lead to changes of various kinds that are deleterious for image, matter, or both, and determines the restoration. The capability to prevent these alterations depends on physical and chemical characteristics of the material of the work of art" (Brandi, 1963: 53).

Giovanni Urbani resumes some aspects of Brandi's theory, and conceives the first concrete draft law in order to institute the "maintenance schedule" as a regular and periodic practice for the historical and artistic heritage; the bill is drawn up under the Ministry of Cultural Heritage (Urbani, 1973, 1980). Urbani resigned from the direction of the ICR in 1983 because of the indifference of the Italian political system to prevention strategies he conceived. The Institute tried to continue the action launched by Urbani on a national scale with the pilot project called "Protection of monuments from the seismic risk" in 2000. The project included the development of the "risk map of the cultural heritage", but it was stopped after a short period.

The analysis of "risk" continued to be proposed in Sicily between 2007 and 2008 as a prevention tool, trying to overcome the difficulties felt at the national level. The general design of the Sicilian "Risk Map" proposed an articulation more complex than the national, as determined by the need to analyze prob-

lems that were more closely related to Sicilian monuments. The *Centro Regionale per la progettazione e il restauro* coordinated the activities of data collection, but the catalogue drawn up in two years did not make any significant increases in knowledge of the state of conservation of the architectural and archaeological heritage of Sicily. The analysis parameters “structural damage, material disintegration, moisture, biological attacks, alteration of the superficial layers, missing parts” were insufficient to establish a depth knowledge of historic buildings; an ineffective analysis for a correct approach to a serious program of prevention, for which upgrades or integrations have not been planned.

The electronic book for maintenance of monuments

A system of effective prevention has been proposed as part of a research developed by the Laboratorio di Indagini e Restauro dei Beni Architettonici L.I.R.B.A. “Salvatore Boscarino” (University of Palermo) between 2008 and 2009. The prevention system is an application for “continuous monitoring” that suggests affordable and minimal maintenance operations. The system is now being improved by its implementation combined with the wireless control units and sensors of various kinds. To make the maintenance system active, it is necessary a *Prevention Manager* professionally trained to use the *Monument logbook*, a work tool that progressively becomes a database of information concerning the state of conservation of historic architectural organisms. The prevention managers must monitor and collect data, recording the results of inspections. The monument logbook software is developed on the basis of simple algorithm, and composed by a series of graphical user interfaces accessible through some menu items (Fig. 1, 2); each item refers to one of the architectural units which the building has been ideally divided in graphical interfaces of each unit consist of three sections: the records of *inspection*, *maintenance* and *intervention*.

Alteration and defects (degradation or static instability) commonly found in buildings must be listed in the inspection record. The first part contains general information about each architectural unit in process of examination. The timetable and frequency of inspections have been set up in relationship to the durability of building components. If the manager selects an architecture unit, characterized by an alphanumeric code, a drop-down menu is activated. The specific characteristics of structure or material in question must be selected in the menu. The second section of the tab contains the “list of defects” menu, which changes depending on the features of the architecture component. The manager will have to mark the presence and classify the extent of the defect, identified by choosing the correct menu item; in addition he must indicate the exact loca-

tion. Each defect corresponds to a specific maintenance action, consisting of certain operations to be performed, including any diagnostic tests on-site or on material sample to be taken (Ventimiglia, 2004, 2013b).

The maintenance section includes a list of specific interventions for each architectural unit; interventions that operators will have to perform according to the method and frequency recommended by the software.

The level of risk is calculated as a function of defects in the intervention section. Conservation interventions the staff has to perform are described in the same section. The screen also shows a list of norms and standards regarding the diagnostic investigations to be carried out and the identification of defects in structures and materials (classified with unified vocabulary).

The monitoring system experienced by the LIRBA lab offers a simple way to keep under observation every monument. The detection of the defects, the percentage of damage and the historical value determine the action to be performed or suggest further investigation.

In conclusion, it may be observed that after more than two centuries of attempts - substantially without significant results - the Italian legislation on environmental protection is resolutely oriented towards preventive activities; direction confirmed in the *Conservation measures* of the *Codice dei Beni Culturali e del Paesaggio*: “1. The preservation of cultural heritage is ensured through a consistent, coordinated and planned activities of study, prevention, maintenance and restoration; 2. Prevention is the set of activities that reduce risk situations related to cultural property in its context; 3. Maintenance is the complex of activities and interventions to supervise the conditions of the cultural property and preserve integrity, functional efficiency, identity of cultural heritage; 4. The restoration is the direct intervention that consists in a series of operations that ensure the integrity, recovery, security, and the transmission of cultural values. In case of immovable property situated in seismic risk areas, the restoration includes the structural improvement”.

Bibliographic references

Boito C. (1893), *Questioni pratiche di belle arti: Restauri, concorsi, legislazione, professione, insegnamento*. Milano: Hoepli. 58.

Brandi C. (1956), Cosa debba intendersi per restauro preventivo, *Bollettino dell'Istituto Centrale del Restauro*, 27-28. Roma, 87-92.

Brandi C. (1963), *Teoria del Restauro*, Roma, (ed. 1977).

Camesasca E. (1956), *Raffaello Sanzio. Tutti gli scritti*. Milano: Rizzoli, 52-53.

Carbonara G. (1997), *Avvicinamento al restauro*. Napoli: Liguori.

Ferrara M. L. (2009), *Il culto delle ruine. Storia del restauro archeologico in Sicilia*. Palermo: Flaccovio.

Mancuso S. (2005), *Per una metodologia della valorizzazione dei beni archeologici: analisi e prospettive in Calabria*. Soveria Mannelli: Rubettino, 18-19.

Romano R. (2007), *Libanio di Antiochia. In difesa dei templi*. Napoli: D'Auria, 563.

Tomaselli F. (1985), L'istituzione del servizio di tutela monumentale in Sicilia ed i restauri del tempio di Segesta tra il 1778 e il 1865. In *Storia Architettura*, VIII. 149-170.

Tomaselli F. (1994), *Il ritorno dei Normanni. Protagonisti e interpreti del restauro dei monumenti a Palermo nella seconda metà dell'Ottocento*. Roma: Officina, 55.

Tomaselli F., Ventimiglia G. M. (2004), *Le indagini diagnostiche per il monitoraggio e la verifica della conservabilità degli intonaci a "finte pietre" del Novecento*, *Scienza e Beni Culturali*, Proceedings, XX. Venezia: Arcadia Ricerche, 729-738.

Tomaselli F. (2013), La prima carta italiana del restauro del 1882. In Tomaselli F. (ed.) *Restauro anno zero*. Roma: Aracne, 161-208.

Urbani G. (1973), *Problemi di conservazione*. Bologna: Compositori.

Urbani G. (1980), Dal restauro alla manutenzione, *Bollettino di Italia Nostra*, 187-188, 19-21.

Urbani G., Zanardi B. (ed.) (2000), *Intorno al restauro*. Milano: Skira, 31-35.

Ventimiglia G. M. (2013), Il ruolo della cultura inglese nella definizione del restauro come disciplina. In Tomaselli F. (ed.), *Restauro anno zero*. Roma: Aracne, 283-332.

Ventimiglia G. M. (2013b), L'intonaco Li Vigni nell'architettura del XX secolo a Palermo. Nuove conoscenze e applicazioni diagnostiche per la manutenzione. In Aveta A., Di Stefano M. (ed.), *Filosofia della conservazione e prassi del restauro*. Napoli: Arte Tipografica, 373-381.

Zarbo F. (2010), *Dal Paganesimo al Cristianesimo: l'adattamento degli edifici religiosi pagani in Sicilia in età medioevale*. Napoli: Fedoa.

Websites

- The news on the risk map of Sicily are taken from the website: cartadelrischio.sicilia.it.

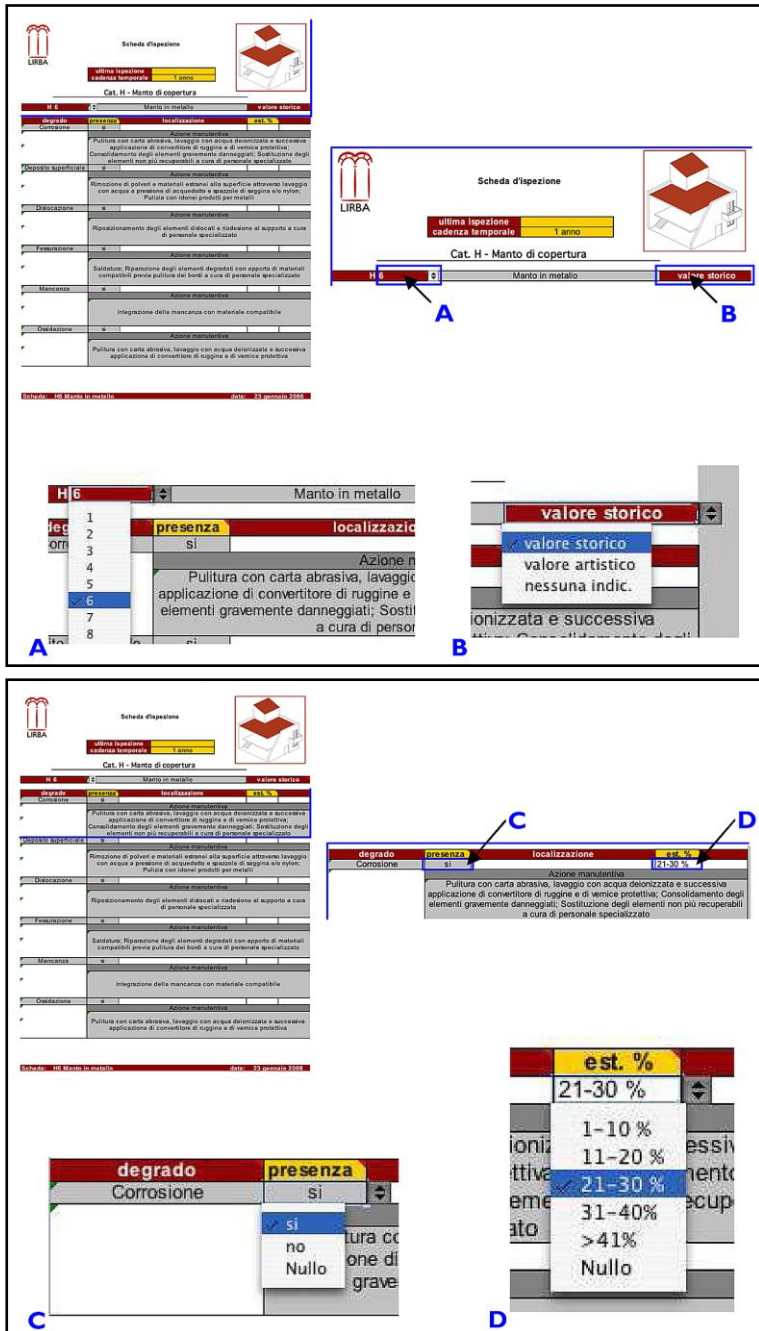


Fig. 1, 2 - Electronic Book, software. Organization of graphical user interfaces, designed to suggest a work of maintenance for each defective components.