Università di Genova

Giovanna Franco, Stefano Francesco Musso, Lucina Napoleone

The School of Specialisation in Architectural Heritage and Landscape of Genoa

Summary of an experience

DIVULGAZIONE

GENOVA UNIVERSITY PRESS

Giovanna Franco, Stefano F. Musso
Lucina Napoleone

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Università di Genova

SSBAP
Scuola di Specializzazione
in Beni Architettonici e del Paesaggio

Lab. **MARSC**
Metodiche Analitiche
per il Restauro
e la Storia del Costruito

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Introduction

The School of Specialisation in Architectural Heritage and Landscape at the University of Genoa (formerly the School of Specialisation in Restoration of Monuments) is located inside Architecture and Design Department (until 2012, the Faculty of Architecture). The complex is situated on the top of the hill of Castello, the oldest part of the city, in the heart of one of the largest historical centres in Europe and includes the reconstruction and restoration of part of the ex-convent of the Nuns of San Silvestro, by Engineer Luciano Grossi Bianchi, and the new building designed by Ignazio Gardella on the site of the convent church and of an attached oratory, destroyed by bombardments during the Second World War. The School was established twenty-five years ago, in a flourishing period of intense urban recovery, when the then Faculty of Architecture provided extraordinary opportunities for study and involvement in the ancient city. It suffices to recall the important season of the *Studio Organico di Insieme del Centro Storico* (organic study of the entire historic centre) and the recovery schemes within it which were entrusted to renowned Italian designers. Then think about the redevelopment of the Ancient Harbour, now partially abandoned by traditional maritime traffic, into a commercial and tourist zone, on the basis of the design plan of Renzo Piano, which saw the active participation, with lively and sometimes heated debates, of many lecturers from the Faculty and the School itself as well as eminent figures from the pantheon of Italian architecture.
Every year, upholding the legacy of the teachings and studies of its founders, the School welcomes postgraduates from various regions in Italy as well as from many European and non-European countries

Fig. 1 - View of Genoa from the Torre Grimaldina of the Palazzo Ducale

who devote themselves to study, research and design simulations on the city's ancient heritage, later returning to their places of origin with a richer fund of knowledge.
The School's ambition is to train highly qualified professionals, who are able to take on the challenges of the contemporary complexity, raised by the progressive broadening of the concept of cultural "heritage" and by the problems of its conservation and its active protection: safety in respect of seismic risk, fire and hydro geological instability, universal accessibility - cognitive, physical and alternative -, resource efficiency, comfort and savings in energy consumption, sustainability and ecological footprint, communication and involvement of local communities and stakeholders.
Faced by a growing, and perhaps inevitable, tendency towards specialisation of the individual competences involved, the School accordingly teaches, first of all, how to hold a discussion with experts in various disciplines and professions, to adopt the tools and the most advanced techniques of survey, diagnosis, data handling, organisation of processes and management of assets. The School also teaches students to engage with each other constantly, taking theoretical and cultural positions which are different and sometimes seemingly alternative or even contentious, as they emerge from the

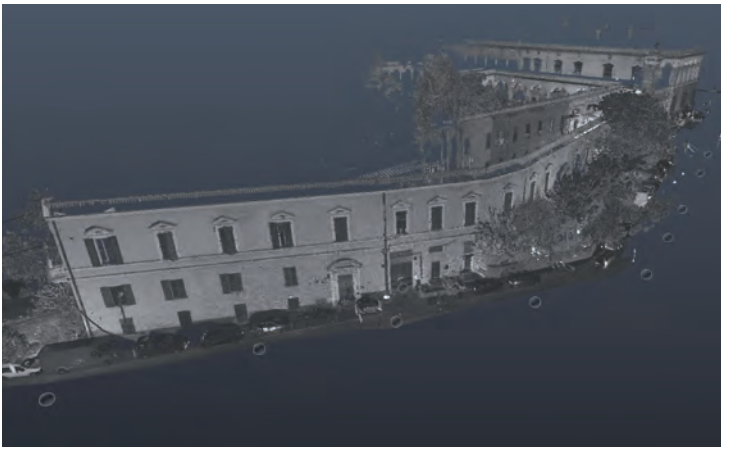


Fig. 2 - View of the point cloud obtained by laser scanner survey. Villa del Principe Doria in Fassolo, Genoa

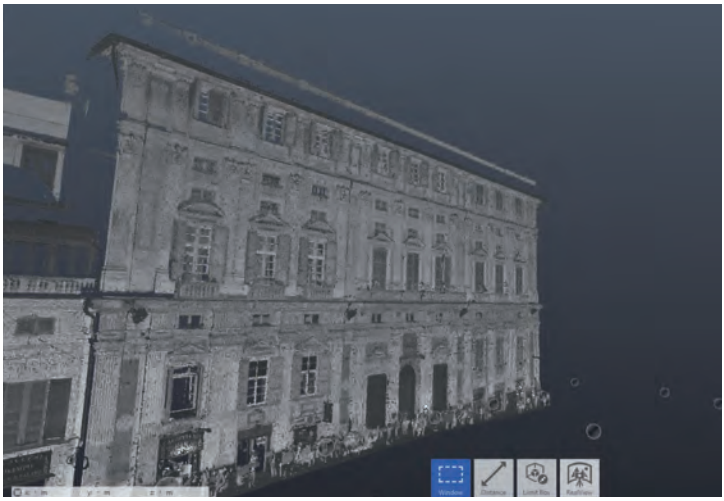


Fig. 3 - View of the point cloud obtained by laser scanner survey. Palazzo Belimbau, facade overlooking Piazza della Nunziata, Genoa

current national and international panorama, accompanying the postgraduates as they build their own solid professional, cultural and scientific profile.
This small book assembles, after the elegant "1998-99 Yearbook", the results of the various educational activities and the summaries of all the specialists that have been followed in twenty-five years of activity. It is a testimony of the vitality of an institution, of the foresight of its founder and the people who, together with him, have worked over the years to keep it constantly updated in respect of the new requirements of a world which is undergoing ever faster and more profound change.
Finally, warm and heartfelt thanks go to Paolo Torsello, who made it possible, and to Stefano F. Musso who preceded me in the role of Principal. I owe much to them both.

Director
Giovanna Franco

School Directors

Prof. B. Paolo Torsello

Formerly Full Professor of Restoration

SSBAP Director (formerly School of Specialisation in Restoration of Monuments) from 1994-1995 at 2002-2003

Prof. Stefano F. Musso

Full Professor of Restoration (ICAR/19)

SSBAP Director from 2003-2004 at 2014-2015

Prof. Giovanna Franco

Full Professor of Architectural Technology (ICAR/12)

SSBAP Director in office from 2015-2016

Co-ordination

Prof. Lucina Napoleone

Assistant professor in Restoration (ICAR/19)

Co-ordinator of the educational activities of the SSBAP

Fig. 4 - Detail of the large barrel vault of the reading room of the former Chiesa dei SS. Gerolamo e Francesco Saverio, formerly the seat of Genoa's University Library

The School of Specialisation in Architectural Heritage and Landscape of Genoa

The School of Specialisation (Post-Graduate Programme) was established upon the initiative of Ennio Poleggi, Gianni V. Galliani, Edoardo Benvenuto, Tiziano Mannoni and Bruno Gabrielli. It was then launched, in 1994, as the School of Specialisation in Restoration of Monuments and included in the Educational Regulations of the University of Genoa.

Prof. B. Paolo Torsello, then full professor of Restoration at the Faculty of Architecture, assumed the office of Director which he maintained until 2003.

The change of name to School of Specialisation in Architectural Heritage and Landscape was necessary following the issuance of DM 31/1/2006 "Re-organisation of the Schools of Specialisation in the field of protection, management and enhancement of the cultural heritage", published in the official Gazette, no. 137, of the 15 June 2006 which altered the set up and denomination of all four of the Schools then operating in Italy (Rome, Naples and Milan, as well as Genoa).

The School has always offered professional training in the field of restoration, in addition to the basic undergraduate training, aimed at the protection and active conservation of the architectural heritage and landscape.

The School's postgraduate masters training programme thus responds to the extreme complexity of the field of architectural restoration, within which numerous specialists operate including: researchers, analysts, chemists, physicists, expert technical operators of the various materials and elements involved, structural engineers, historians, art historians and experts in artistic techniques and many more besides.

Fig. 5 - The cloister of the former Convent of the Nuns of San Silvestro, seat of the Architecture and Design Department, of the SSBAP and of the MARSC Laboratory

The continually expanding universe of monuments, the restoration of which henceforth necessarily draws our attention, on the other hand, is extraordinarily rich in historical, constructive and formal variations which are beyond any claim of total and independent dominance by a specific discipline and, a fortiori, by individual technical operators.
In fact, the forms and spaces of the monuments changes, because of the resources, places and historical moments of their formation, just as change, over time, the building styles, techniques of working with the materials, the enforceable or local measures adopted by metalworkers, bricklayers and carpenters, belonging to the different material cultures involved.
The causes of the phenomena and processes of degradation or of instability which afflict them are also highly changeable, from place to place, from time to time and from building to building and this creates a huge and complex universe of problems which makes the very idea that it could all be addressed by one expert individual unimaginable.
The face to face lessons and laboratory and practical experience which are part of the educational organisation of the School, are therefore geared towards the acquisition of knowledge, ability and the necessary skills to carry out and monitor the principal and most common techniques of analysis and non-destructive diagnosis on the material substance of the architectures and their behaviour over time. This involves much attention being given to archival and documentary enquiries; rigorous metric and architectural surveys, with traditional and innovative techniques; the chemical-physical, mineralogical-petrographical and technical-mechanical characterisation of the materials; the evaluation of the spatial and morphological features of buildings, on the potentials for use and compatible re-use; the examination of their technological and construction components; the analysis and diagnosis of phenomena of degradation and of alteration of the material, of structural instability, as well as of the environmental conditions which affect their consistency, stability, functionality and durability. The skills aimed at acquiring the necessary skills to plan and co-ordinate the different forms and phases of intervention on that which already exists are also subject to close examination: from the preliminary plan

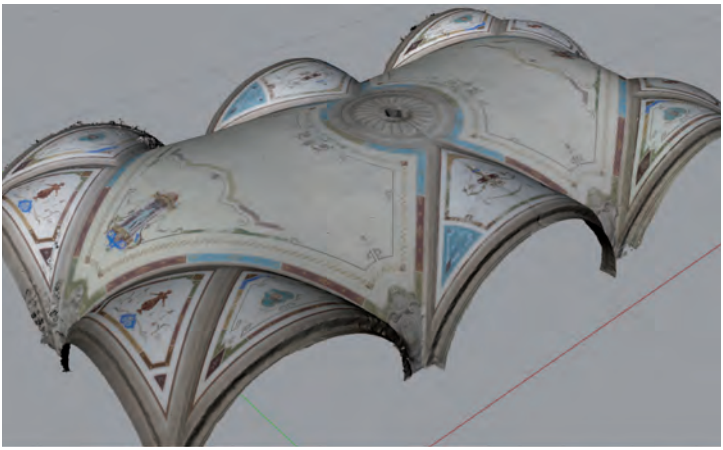


Fig. 6 - Texturised point cloud obtained using Structure From Motion, Ospedale Psichiatrico di Quarto, Genoa

(of economic-technical feasibility) to the definitive and enforceable one, including the methods of steering the entire building process, also using ICT tools, up to the construction phase, the management and inspection of the works, as well as the future of the restored asset (planned maintenance and conservation, means of using it, ways of managing it).
Consequently, the School tends to train professionals who possess a confident and strong technical profile, with considerable intricate, complex, and above all, cultural, ability and skills and with the knowledge and capacity to steer the many aspects, some of which can be contentious, that characterise this delicate branch of study and operability.
To enter the School, possession of a specialist or master's degree in the classes considered relevant is required, in accordance with its rules.

Further information is available on the School website:
https://architettura.unige.it/ssba

Teaching methodology of the School

The School programme runs for two years, provides for the acquisition of 120 training credits and finishes with a discussion of a specialisation thesis.

Since its inception, the School has trained numerous students from many regions in Italy, from other European nations (Spain, France, Switzerland, Greece, Romania and Hungary) as well as from Central and South America (Brazil, Argentina, Chile, Venezuela, Mexico, Colombia and Peru), from the Middle East (Iran, Israel) and from Asia (China, Singapore, South Korea and Vietnam). Some of them have arrived in Genoa supported by educational exchange programmes (Erasmus), by intergovernmental agreements, on study bursaries from Italy, or from their countries of origin or from the European Commission ("Raphael" Programme), or as part of relationships established by the Order of Architects, Landscapers, Planners and Conservationists of Genoa with analogous overseas bodies including, for example, the Order of Architects of Hanoi (Vietnam).

The study programme includes at least 800 hours of teaching, delivered in formal lectures, workshops, seminars with external experts, visits and guided practical activities.

The School of Genoa is characterised, as already mentioned, by a strong focus on professionalism. For this reason, the study syllabus and organisation of the educational activities track the phases and succession of the operations which characterise a real restoration project, albeit in the two year "learning" time of the course. To reinforce this objective, the specialisation thesis also follows the same analytical and design path, tested in the "professional" time of around six months.

Fig. 7 - Detail of the pictorial decoration on one of the wooden boards of the ancient lofts of Palazzo Grillo, Genoa

Fig. 8 - View of the point cloud obtained by laser scanner survey. Vault of the loggia of the "piano nobile" (main floor) of Palazzo Belimbau, Genoa

The design of the courses taught covers the fundamental, scientific, technical and cultural guidelines of restoration, bridging the apparently rigid separation between the two years of the training programme. Lessons are delivered over the course of a full week for ten months, to enable students to continue their existing activities or to begin integrating into the world of work.

Within the teaching programme, at least one whole day is allocated every week to the "Interdisciplinary Workshop". The workshops are the tool, or better still, the space and opportunity, for outlining a pathway, led by the teaching, of an analytical-diagnostic nature in the first year and focused predominantly on design in the second year. They are carried out on a specific building and site, chosen in accordance with the protection bodies and with other local parties for its cultural interest and on which they actually intend embarking on a restoration, at some point in the future. As they work on the building selected, students have the opportunity to carry out clearly targeted studies and, later, to develop a plan featuring proposals and solutions, which are technically correct, culturally sensitive

and consistent with the current regulations, with the different and often contradictory demands of protection, conservation, use, environmental sustainability, improvement in energy and seismic behaviour and of the enhancement and future management of the asset.

The first year of activity therefore includes the study of the building and of the site proposed by the teaching staff comprising, in summary: morphological analyses (longimetric, topographical, photogrammetric surveys, laser scanners, geometric inspections and topological investigations, processing and analyses of digital images, computerised modelling); chronological analyses and of archaeology of architecture (archival investigations and historical research, dating methods, archaeometry, stratigraphy, excavation techniques); analyses of the materials and of construction techniques (chemical-physical examinations, mineralogical-petrographical and mechanical characterisation of the materials, analyses of the phenomena of alteration and degradation of the matter, of the defects and malfunctions of the building components and technological and hygiene-health deficiencies); structural analyses (study of the structural conception and behaviour of traditional and modern masonry buildings, analyses of structural instabilities using non-destructive techniques of diagnosis and trials in situ, consolidation techniques). During the first year, particular attention is given to the use of information technology (ICT), to catalogue and manage the data acquired during the study phases.

At the end of the first year, the postgraduate should have acquired the following knowledge and developed the corresponding skills:

- an understanding of the architectural artefact, through the related study of its geometries, the construction elements and materials, the surfaces, the buildings, the spaces and the functions;
- an understanding of the transformations that the building has undergone over time, comparing the results of historical reconstructions from indirect sources and those of direct archaeological analysis;
- assess the state of conservation of the building, overall and in

its individual parts and construction components, recognising degradation, damage, malfunctions, shortcomings in the materials, construction elements, installations and buildings;

- identify the causes and extent of the damage, malfunctions and shortfalls, assess the vulnerability and level of exposure of the asset to attack by environmental factors and the associated risks;
- assess the compatibility between the function and current uses, the character of the available spaces and the primary necessity of the conservation;
- handle various types of data sets - complex, heterogeneous, and developing -. through the construction and interrogation of relational databases and, in general, of digital and data management systems;
- define criteria and guidelines for shaping the design of the conservation operations, restoration and redevelopment of buildings and spaces of cultural interest.

During the second year, while developing the restoration plan on the building which was the object of the activities in the first year, the following areas are further explored and experimented: structural consolidation (diagnoses, calculations, seismic improvement); interventions on the construction and technological components (masonry, woods, metals…); interventions of technological adaptation, engineering, regulatory and improvement of the thermal-energy behaviour, also using dynamic modelling software; practical restoration trials (sampling, in situ analysis, tests and experimental applications of the various conservation techniques); reconversion operations aimed at enhancing and improving the use of the asset, with a focus on sustainability and accessibility.

At the end of the second year of activity, the postgraduate should have acquired the following knowledge and developed the corresponding skills:

- to use knowledgeably and critically the analytical and diagnostic results deduced from the study phases during the first year and to be able to integrate them where necessary;

- to identify the overall objectives to pursue in the plan and the strategies for achieving them through a gradual focus (from the programmatic to the technical report of the plan);
- to give reasons for the design choices with reference to the methodological, disciplinary and contemporary cultural debate and to significant examples of interventions carried out;
- to bring the design into line with the existing legislation (anti seismic, fire protection, on the architectural barriers, for reducing energy consumption...), identifying solutions which are consistent with the conservation objectives, in accordance with the specific nature of the protected asset;
- choose the types of installation (heating, cooling, lighting, air treatment) necessary and most suitable for the conditions of use, the needs of conservation and of enhancement of the asset and in accordance with regulatory standards and modern comforts;

Fig. 9 - Topographical relief with Total Station. Former Library of the Jesuit College

- choose the most appropriate products to use and the most effective intervention techniques to employ in the construction phase, based on the specific needs of the asset which is being worked on, the environmental conditions and their technical and commercial nature, in a cost-benefit awareness budget.

Relations with Universities, Institutions, Research Centres and Cultural Associations

The active participation of the postgraduates in the restoration sites is very important and the School supports it as much as possible with many working relationships established through a specific agreement entered into with the *Soprintendenza Archeologia Belle Arti e Paesaggio della Liguria* (Superintendency for the archaeology, fine arts and landscape of Liguria), as well as under research contracts with other local, regional and religious bodies. A specific agreement is also in place with the *Archivio di Stato di Genova* (State Archive), to enable the graduates to acquire and refine the correct techniques

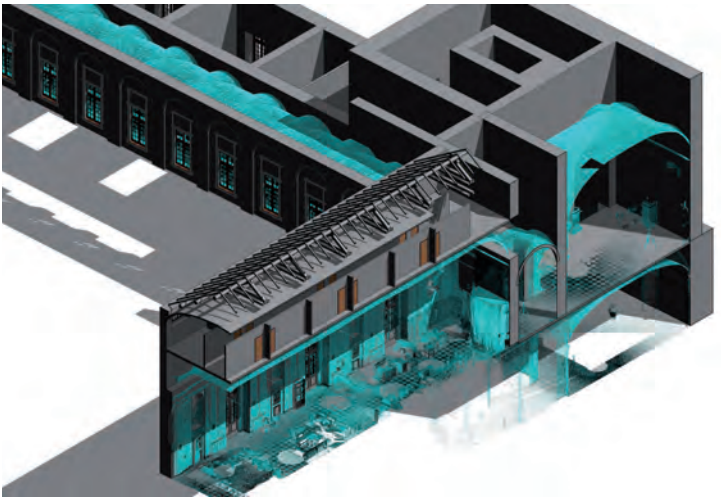


Fig. 10 - View of the BIM model of a section of the building and of the point cloud obtained by laser scanner survey. Albergo dei Poveri, Genoa

of documentary analysis, by accessing the extensive archives of this institute. There is also an active agreement between the School and the Regional Secretariat of MiBACT for Liguria which provides for collaboration between the two Institutions, both in the field of teaching and research. During the course of each academic year, depending on need and possibility, the School also establishes relations with other Bodies and Institutions and with experts in various fields, organising seminars of a cultural-methodological and technical-informative nature.

The School also establishes relations with professionals, experts and with public and private institutions, at home and abroad, to ensure that the cultural scope of its actions is not limited to the local, regional dimension and to allow them to be present in the broadest range of technological-scientific experiences and theoretical developments.

The postgraduates thus have the opportunity of integrating themselves into the national and international arena, through contacts and co-operation exchanges with specialists from other fields and provenance.

In this broad context are the many partnerships entered into over time by the School, with various authorities and bodies including: ISCR (Istituto Superiore per la Conservazione e il Restauro), Rome; OPD (Opificio delle Pietre Dure), Florence; CNR Centro di Studio sulle Cause di Deperimento e Metodi di Conservazione delle Opere d'Arte, Florence; ILC-CNR (Istituto di Linguistica Computazionale Consiglio Nazionale delle Ricerche), operating unit of Genoa; DO.CO.MO.MO. Italia (DOcumentation and COnservation of buildings, sites and neighbourhoods of the MOdern MOvement) for research, training and public law initiatives on the protection, conservation and restoration of the works of the Modern Movement; ICE (Istituto per il Commercio Estero Italiano): for the promotion of high level training activities; ICOMOS, ICCROM, UNESCO; EAAE (European Association for Architectural Education), with the co-ordination of the Thematic Network on Conservation; DG EAC (Education and Culture) of the European Commission, E.C.C.O. (European Confederation of Conservator-Restorers' Organisations), ARI (Associazione Restauratori d'Italia), Scuola del Patrimonio.

Laboratory of Analytical Methods for the Restoration and History of the Built Environment (MARSC)

The teaching of conservation and restoration in the Genoa School can count on the technical and operational support of the Laboratory of Analytical Methods for the Restoration and History of the Built Environment (MARSC highly qualified Laboratory of the University), founded in 1990 by Paolo Torsello. The Laboratory is divided into three sections: one dedicated to analytical methods for surveying, one to the archaeology of architecture and one to the characterisation of the materials of buildings of historic construction and cultural interest.

Among the research activities and applications on the ground carried out by the section dedicated to surveying, we can list:

- longimetry for the three-dimensional survey of the architecture and for three-dimensional and solid modelling;
- topography for architecture;
- digital, flat and three-dimensional analytical photogrammetry;
- simple mosaic straightening for the survey of flat surfaces by orthophoto planes, by point clouds obtained using laser scanners or with structure from motion techniques;
- advanced information systems for managing the restoration project (GIS, BIM, WEB-GIS);
- quantitative processing and analysis of digital images to identify materials and degradation;
- processing of digital images to simulate architectural conservation;
- construction of catalogues of restoration techniques.

The second part of the Laboratory, devoted to Archaeology of Architecture, is the development of the laboratory founded at the end of the 1980s by Tiziano Mannoni to take on the study of ancient and modern buildings, as direct "source material", both to reconstruct the individual events and to respond to more far reaching historical questions. Methodological research and applications on the ground

of the stratigraphy of the height and archaeological-archaeometric methods, to establish provenance and to date materials and architectural elements, have since been taken forward in close collaboration with the Institute of History of the Material Culture of Genoa (ISCUM), under whose ambit tools of major importance were conceived such as the mensiochronology of bricks or chrono typology of portals. Also important are the analyses of documentary sources relating to the building sector and analyses of degradation and instability conducted from a historic perspective, to provide the restoration designers with the broadest and most integrated understanding and evaluation.

The third section of the MARSC was set up more recently for the study and characterisation of building materials of historic and cultural interest. The fields of research are: the pre-industrial production of binding agents, with particular emphasis on Dolomite lime, to the formation of lumps in the lime mix, to the role and characteristics of hydraulic compounds in the mortars; the production and processing of iron in pre-industrial times, with a special emphasis on its structural use in tie-rods; the use of pigments in colouring frescoes and dry, with further studies on the plasters and on the binding materials used in wall painting; concrete and cement in the first part of the 1900s.

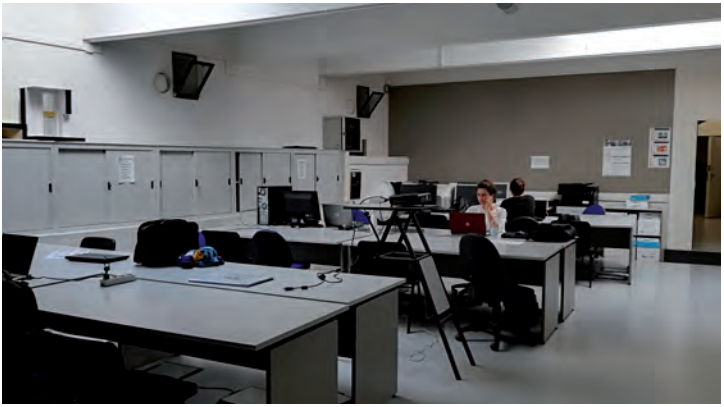


Fig. 11 - The rooms of the School of Specialisation

Intensive course in Archaeology of Architecture

Since the School's first year of operation (1994-1995), the teaching methodology, then assigned to Prof. Tiziano Mannoni, has been organised on a weekly basis, alternating lessons in the classroom, using methods and tools of an archaeological nature useful for studying the existing architecture objectively, with trials and surveys in the ancient centre of Genoa, to verify the practical applicability of the tools illustrated.

From the very first, the course has taken advantage of collaboration with the researchers of the Institute of History of the Material Culture (ISCUM), a Genoese cultural association founded by Tiziano Mannoni himself, who is responsible for the invention and the development of the archaeological and archaeometric dating tools illustrated in the lessons. Under an existing agreement between the then Institute of Building, which Mannoni was connected to, and the ISCUM, they were tasked with supporting the teaching in the scheduled activities, illustrating their most recent researches.

Fig. 12 - Plaster taken from vico Croce Bianca 10 containing sand from Sampierdarena, used between the XV and XIX centuries

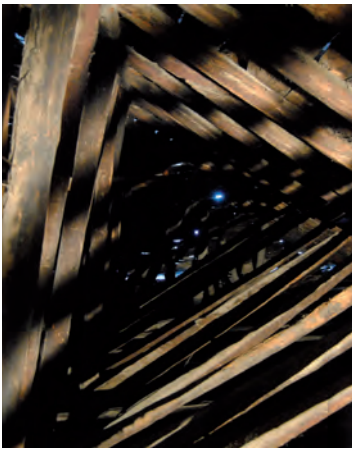


Fig. 13 - "Case studies: the wooden roofs of Albania" lesson by Federica Pompejano of 12.6.2019

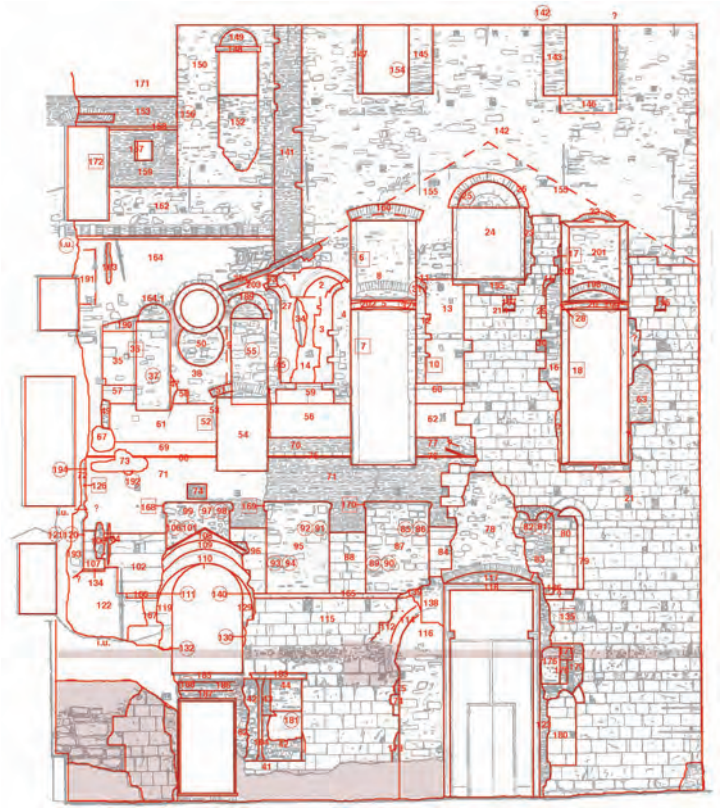


Fig. 14 - Former church of Santa Maria delle Grazie la Nuova, Genoa: map of the stratigraphical units

This was how the formula of the "Intensive course in Archaeology of Architecture" was conceived, intended both for students of the School of Specialisation of Genoa and for those of the related School operating in the Politecnico di Milano. Students at the latter have continued coming to Genoa ever since to follow the course, initially on an annual basis and, since 2012-2013, on a biennial basis.

As explained in the 1994-1995 programme, the first part, devoted to the presentation of the operating scheme used in Liguria since the 1970s in the researches of ISCUM and the sequence of operations

Fig. 15 - Stratification of the walls with the possibility of mensiochronological dating

necessary for a knowledge and understanding of the architectural object, was followed by an illustration of how to proceed to the stratigraphical analysis of a building and of how direct methods of absolute dating (chrono typology, mensiochronology, dendrochronology, etc.) are built and function. Given that it is not possible to interpret something correctly without knowing its nature, a space was dedicated to the projection of footage, relating to the processing of some materials and architectural elements (for example, the squaring of an ashlar, the painting of a fresco panel), specially developed by Mannoni for educational purposes.

The wide coverage found in the historic centre of Genoa, with its richly layered houses dating back to the early Middle Ages, was later used to illustrate the different conditions in which it was possible to conduct the research, depending on the state of the building ("conserved, unplastered, restored, plastered"), demonstrating the consequent problems of reading and interpretation.

The involvement of the SMAA - *Settore di Mineralogia Applicata all'Archaeologia* and the Laboratory of Archaeology of Architecture (later merged into the MARSC Laboratory), with its samples of historic materials, enabled further practical trials to be conducted.

Over the years, the intensive course has maintained an analogous programme, updating the content where necessary and alternating teaching and the external collaborators involved.

Some of them, such as the architects Anna Boato, Daniela Pittaluga, Rita Vecchiattini and Anna Decri, have participated on a continuous basis in the successful running of the course. Others have participated only once or for limited periods of time.

Among the researchers from the ISCUM involved, we should mention Professor Isabella Ferrando Cabona and architect Elisabetta Crus, authors of pioneering research on the chrono typology of portals in Lunigiana; Dr. Severino Fossati, founder of the Institute's Laboratory of Dendrochronology; Dr. Aurora Cagnana, expert in masonry techniques; the archaeologist, Enrico Giannichedda, author of numerous books, including one (with Tiziano Mannoni) dedicated to production archaeology; the geologist Roberto Ricci and the architect Gianluca Pesce, who managed and developed archaeological and archaeometric tools for dating plasters.

Fig. 16 - Sample of a carrot from a beam and study of wooden carrots for dendrochronological analysis

Teaching staff and subjects 2019-2020

YEAR 1

Alfonso Assini, formerly Genoa State Archive, *Archival and documentary analysis*

Annalisa Barla, University of Genoa, *Information Technology for Cultural Heritage*

Carlo Battini, University of Genoa, *Advanced Survey for Restoration*

Paolo Bensi, University of Genoa, *History of Artistic Techniques*

Anna Boato, University of Genoa, *Archaeology of Architecture/ Building materials, Techniques, Degradation and Diagnostics*

Roberto Bobbio, University of Genoa, *Urban Planning and Cultural Heritage*

Gerardo Brancucci, University of Genoa, *Elements of Geology and Climatology*

Gabriella Garello, University of Genoa, *Advanced Survey for Restoration*

Sergio Lagomarsino, University of Genoa, *Seismic Analysis and Modelling of Monumental Buildings*

Francesca Mazzino, University of Genoa, *Landscape Protection and Restoration*

Stefano Francesco Musso, University of Genoa, *Advanced Survey for Restoration*

Elisabetta Piccioni, formerly MiBACT, *The Protection System in Italy (series of seminars)*

Manuela Salvitti, MiBACT, *Legal Protection of Landscape and Cultural Heritage*

Rita Vecchiattini, University of Genoa, *Building Materials, Techniques, Degradation and Diagnostics*

Silvia Vicini, University of Genoa, *Chemicals for Restoration I*

YEAR 2

Marco Cartesegna, PhD Engineer, *Thermal Installations for Artistic and Monumental Places*

Claudio Chesi, Politecnico di Milano, *Seismic Verification, Consolidation and Improvement*

Giovanna Franco, University of Genoa, *Building Renovation Technology*

Maurizio Galletti, formerly MiBACT, *Emergency and e Post-Emergency Planning in the Case of Extreme Events (series of seminars)*

Sergio Lagomarsino, University of Genoa, *Seismic Verification, Consolidation and Improvement*

Roberto Leone, MiBACT, *Worksites for Architectural Restoration*

Anna Magrini, University of Pavia, *Energy Sustainability of Historic Buildings*

Angelita Mairani, MiBACT, *Chemicals for Restoration II*

Ludovica Marenco, PhD Engineer, *Energy Sustainability of Historic Buildings*

Giorgio Mor, University of Genoa, *Detailed Design for Restoration*

Stefano Francesco Musso, University of Genoa, *Restoration of Monuments*

Lucina Napoleone, University of Genoa, *Theory and Criticism of Restoration for the Project*

Daniela Pittaluga, University of Genoa, *Restoration Techniques*

Stefano Podestà, University of Genoa, *Seismic Verification, Consolidation and Improvement*

Paolo Rosasco, University of Genoa, *Economic Assessment of Restoration Work*

Manuela Salvitti, MiBACT, *Legal Protection of Landscape and Cultural Heritage*

Yearly work in the School 2011-2020

Alongside traditional teaching activities, the School reserves adequate space for practical experimentation, offering students the opportunity to work on the restoration and reuse of assets and sites of cultural interest, on the basis of actual need, under the supervision of the teaching staff. During these activities, the postgraduates benefit from the scientific equipment and support of the MARSC Laboratory and of the laboratories of the other departments of the lecturers involved. The topic of project experimentation consists of a Genoese or Ligurian historical building or complex of special cultural interest, which requires conservation, consolidation, restoration and enhancement work. In agreement with the public or private clients, the postgraduates are accompanied during the analytical and diagnostic phases (first year) and in the preparation of design theories for the conservation restoration, redevelopment and reuse and enhancement of the particular building during the second year. The majority of the lessons which offer specialist knowledge find that this approach has an immediate effect on the planning activity. To reinforce the School's training objectives, in the programming of the second year, postgraduates are also offered opportunities in addition to the general teaching activities, to explore essential subjects which are sometimes neglected in university courses, such as: engineering equipment, safety and accessibility requirements, lighting solutions, energy saving and comfort. Projects are taken through to the final level and to operational details and are accompanied by the necessary technical and assessment documentation. The following section shows the most recent works of the year in inverse chronological order.

Fig. 17 - Detail of the library of the Terza Sala. Former Genoa's University Library

Palazzo Ducale in Genoa: prisons and Torre Grimaldina

2019-2020 (in progress)

General agreement with the Palazzo Ducale Foundation

The *Palazzo Ducale*, which is currently at the heart of the city's cultural life, is so called because it was the seat of the first Doge of Genoa, Simon Boccanegra. The Palazzo, which encompasses a range of buildings, was built during a glorious period of the Republic of Genoa, after the victories against the Pisans (1284) and the Venetians (1298). The tower, known as *Grimaldina*, belongs to the medieval period, being constructed in the first half of the XVI century. Between the XIV and XV centuries, the Palazzo was enlarged, finally reaching a closed configuration along the four sides of the piazza (what is now Piazza Matteotti). The succession of porticoed courtyards and the covered atrium, the foundation of the new layout, belongs to the sixteenth century phase and is the work of Andrea Ceresola, known as Vannone; the wide staircase leading to the main floor is also his work. In 1777, the Palazzo was partially destroyed in a severe fire: it was to Simone Cantoni who, like Vannone, also came from Ticino, that the task fell of reconstructing the rooms of the *Sala del Maggiore e del Minor Consiglio* (Council Halls) and the roof structure, for which he adopted a design of parabolic arches in a brick wall structure, without recourse to wooden beams (parabolic arches still survive over the *Sala del Minor Consiglio*).
The *Torre Grimaldina*, together with the *Lanterna*, is the tallest building in the historic city, a symbol of political power before the Comune, followed by the Republic. The interior spaces of the Tower, together with other lower rooms above the Doge's Apartment, were turned into prisons which held illustrious figures such as Niccolò Paganini, Jacopo Ruffini. The objective of making the Tower rooms

Fig. 18 - View of the Torre Grimaldina of Palazzo Ducale in Genoa

accessible and of placing a small museum in the Prisons (displaying items placed into safe keeping during the ongoing restoration works of the 1990s) requires the postgraduates to plot a carefully thought out route through the vestiges of history.

Fig. 19 - View of one of the balconies of Palazzo Ducale

Fig. 20 - View of the barrel vaults of one of the Tower rooms

Fig. 21 - View of one of the prison cells of the Tower

Fig. 22 - View of the structural ribbed vault in the roof masonry above the Sala del Minor Consiglio

Ex Chiesa dei SS. Gerolamo e Francesco Saverio, once the seat of Genoa's University Library

2018-2019, 2019-2020 (in progress)

The Church of the Jesuit College in Genoa, currently the office of the university rectorate, was built in the middle of the XVII century at the behest of Francesco Maria Balbi on the ruins of an older church, adjoining the convent of the hermit nuns of Sant'Agostino. The church, with a single nave and four side chapels, has a chancel with frescoes painted by Domenico Piola. With the removal of the Compagnia di Gesù in 1773, the Republic of Genoa turned the College and church into the headquarters of higher educational institutions; at the beginning of the 20th century, the former church was changed into the Natural History Museum of the adjoining university.
In 1915, the *Casa del Soldato* (House of the Soldier) was housed in the *Palazzo dell'Università* (University Palace), taking advantage of the space of the former church, which underwent further transformation including the installation of side galleries.
In 1926, Carlo Fuselli put forward the first plan to locate the university library within the former church; the plan envisaged the division on high of the nave by installing a loft in reinforced concrete so that the book collections could be placed below and the reading room above the new loft space. When Fuselli died, and in the absence of approval by the competent authorities, in 1934 the Superintendence entrusted the work of designing the library to the architects Mario Labò and Giuseppe Crosa di Vergagni, to sort out the work which had already been carried out.
The Library was inaugurated in 1935 and, in 1947, was transferred into state ownership. In 1966, it was recognised as a building of special interest, under law 1089/39 «because it conserves the original 17th century facade and, inside, in the area of the apse, valuable

Fig. 23 - Detail of the frescoes on the right-hand wall of the reading room: orthophoto

frescoes by Domenico Piola». Following the transfer of the university library to another location (the former Hotel Columbia, via Balbi 40), the former church was closed to the public from 2014 and awaits its new fate.

Fig. 24 - View of the former Chiesa dei SS. Gerolamo e Francesco Saverio adjacent to the current Palazzo dell'Università di Genova

Fig. 25 - Three-dimensional model of the barrel vault of the reading room obtained using Structure From Motion

Fig. 26 - Three-dimensional model of one of the side chapels obtained using Structure From Motion

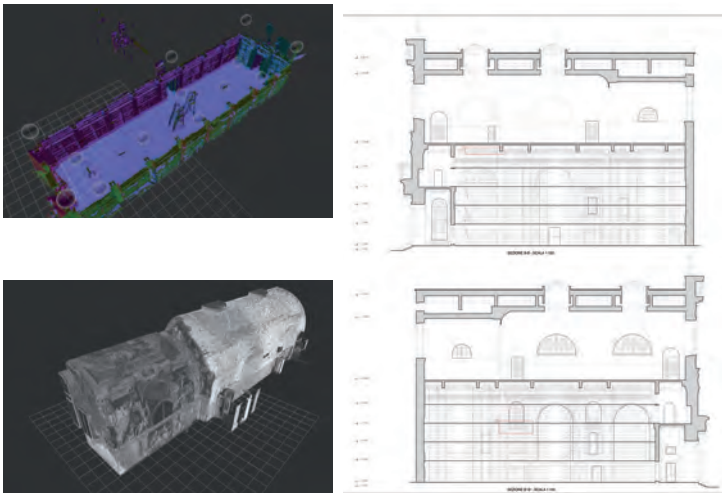


Fig. 27 - Digital and longimetric relief: reworking in CAD of the point cloud and longitudinal sections

Villa del Principe Doria in Fassolo, Genoa
Eastern wing

From 2016-2017 to 2018-2019

Research contract with Doria Pamphilij Trust

The *Villa del Principe Andrea Doria* in Fassolo, the construction of which began in the 1520s, is the largest noble residence in the city and the seat of an important Renaissance court which hosted Carlo V when he visited Genoa in 1533.
The Villa is famous for an important decorative series by Perin del Vaga, a pupil of Raphael. The monumental complex, which extended from its current position, through an Italian garden, to the sea (where it had a jetty) and to the mountains, as far as the slopes of the hills, was enlarged by Giovanni Andrea I, the heir of Andrea.
Today, the Palazzo is home to the lineage of the Doria Pamphilij family, and it has been turned into a museum full of works of art. The eastern wing of the Villa, part of which is today unused in its rooms on the lower floors, contains areas of special interest, some of which precede the construction of the Villa, encompassing earlier buildings for agricultural purposes.
Extensive research conducted by the postgraduates in the public and private archives (Genoa State Archives, Historic Archive of the Port of Genoa, Historic Archive SABAP Liguria, Historic Archive Region of Liguria Civil Engineering Fund, private Historic Archive of the Palazzo del Principe) iconographic sources and direct material sources has enabled a story largely unknown to the city to be rewritten, in a key area for rail and maritime infrastructure which, in the first half of the 20th century, underwent profound transformation.
The plans for reuse put forward by the postgraduates take into account the proximity of the Villa, and especially its eastern part, to the maritime and railway station and to the Silos known as "Hennebique" (these are also marked out for recovery and reuse in the future).

Fig. 28 - View of the loggia at garden level


ARCHIVIO STORICO DELLA PUBBLICITÀ

Fig. 29 - View of the Villa del Principe Doria in Fassolo

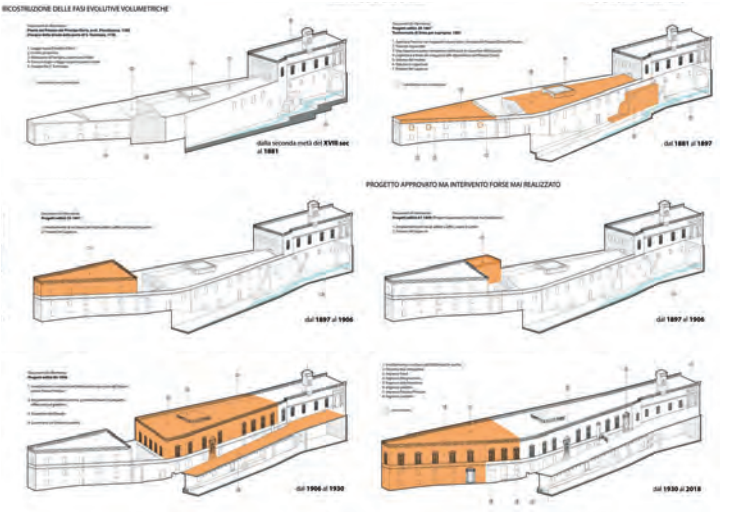


Fig. 30 - Reconstruction of the evolutionary volumetric phases of the eastern part

Fig. 31 - View of part of the loggia of the Villa del Principe Doria in Fassolo

Fig. 32 - Digital relief of the ribbed vaults on the lower floors of the Villa del Principe Doria: views of the point cloud and of the rooms on the lower floors

Palazzo Belimbau, Genoa

From 2014-2015 to 2017-2018

General agreement with the Area Sviluppo Edilizio Unige
(Unige Building Development Area)

The *Palazzo Belimbau*, situated in the heart of the historic city and at the junction between *Piazza della Nunziata* and *Via Balbi*, belongs to the premier league of *Palazzi dei Rolli*, which were designated to receive the most illustrious guests of the Republic of Genoa. It belonged to noble families until the end of the 20th century and was bequeathed, in the will of the last heir, to the University of Genoa which is engaged in its complete restoration and reuse. The Palazzo was built at the behest of Francesco De Ferrari at the end of the 16th century, encompassing earlier buildings, including the old aqueduct above the walls, which is still visible in the body of the facade. Dating to this phase are the pictorial decorations of Lazzaro Tavarone (pupil of Luca Cambiaso) in the atrium, the stairwell and in the salon on the main floor (one of the first representations of native Americans and of Christopher Columbus standing before the Queen of Spain). Between the end of the 1700s and the early years of the 1800s, the Palazzo underwent significant renovation work on the monumental staircase and on its facade. Over the centuries, the Palazzo was subdivided into apartments and underwent alterations making it difficult to understand its configuration at the height of its splendour. In consultation with the Manager of the Building Development Area, the School of Specialisation postgraduates, supervised by the teaching staff, have carried out analytical and diagnostic activities aimed at gaining a better understanding of the evolution of the Palazzo and of its current state of conservation. The material produced during the teaching activities and the knowledge acquired have enabled inter-ministerial funding to be obtained for restoration work on the monumental landmark, for future public use.

Fig. 33 - A frescoed wall of the Salon on the main floor

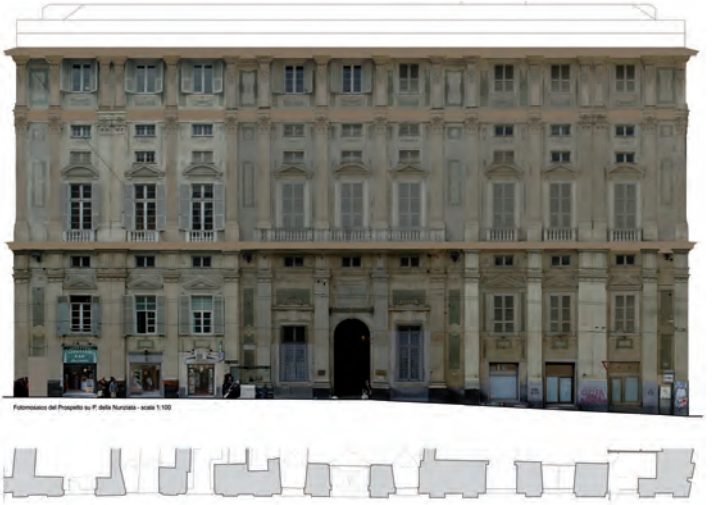


Fig. 34 - Digital relief: photographic straightening of the principal facade

Fig. 35 - Digital survey of the rooms on the main floor: digital processing of the 3D point cloud, with insertion of photo planes on the walls and vaults

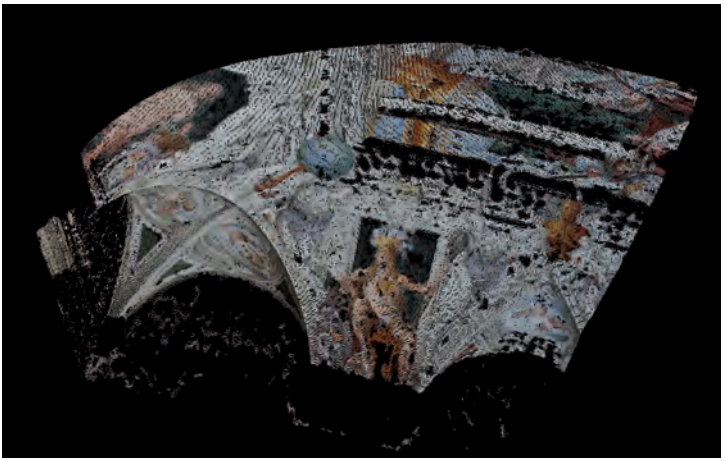


Fig. 36 - Detail of the vault of the Salon on the main floor: 3D point cloud

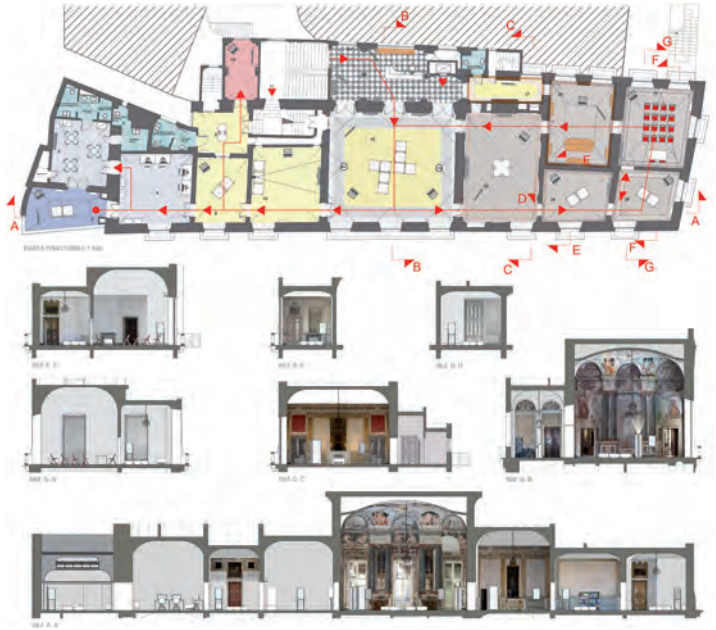


Fig. 37 - Design ideas to refurbish the rooms on the main floor: plan and sections

Albergo dei Poveri, Genoa

From 2011-2012 to 2014-2015

General agreement with the Area Sviluppo Edilizio Unige (Unige Building Development Area), PRIN project

The *Albergo dei Poveri di Genova* is a vast hospital complex of 17th century origins, which was built outside the city walls, radically altering a natural valley. It was built for philanthropic purposes (on the wishes of Emanuele Brignole) but also as a sort of "prison". The complex was incorporated into the expansion of the modern city and has long since lost its welfare role which lasted for more than three centuries. The complex was given in use as a free loan to the university which has taken on its management and has already recovered around 30% of the area, locating part of its Humanities Faculty there. There was however no exact knowledge of the physical state of the spaces and structures not yet reused; the School of Specialisation has therefore concentrated the teaching activities of some courses on the study of this large building. The complex was also chosen as a case study in the *Programma di Ricerca di Rilevante Interesse Nazionale* PRIN 2010-2011 (Programme of Research of Significant National Interest), which has investigated the possibility that parametric IT tools, such as GIS and BIM (Building Information Modelling), that facilitate the handling of information, design and management data, can be adapted to the needs (theoretical, cultural, technical and operational) of a complex reality such as an urban architectural monument of ancient formation and stratified substance. Within the teaching activities, the following have been conducted: rigorous architectural surveys - topographical, longimetric, digital plain photogrammetric, Z-scan, laser scanner, Structure From Motion; BIM modelling; construction of a GIS IT system for gathering and archiving numerous data collections; building characteristics and

Fig. 38 - View from the nave of the church dedicated to the Immaculate Conception

macro-conditions of conservation; identification and localisation of the most significant risk factors, identification of emergency exits; distributional layout for the entire complex, design hypotheses of reuse on individual parts.

Fig. 39 - Reinstatement of the photogrammetric survey of the south facade of the Albergo dei Poveri: partial view of the orto-photo of the main front

Fig. 40 - Reinstatement of the photogrammetric survey: east-west transversal section of the entire complex of the Albergo dei Poveri with insertion of orto-photos

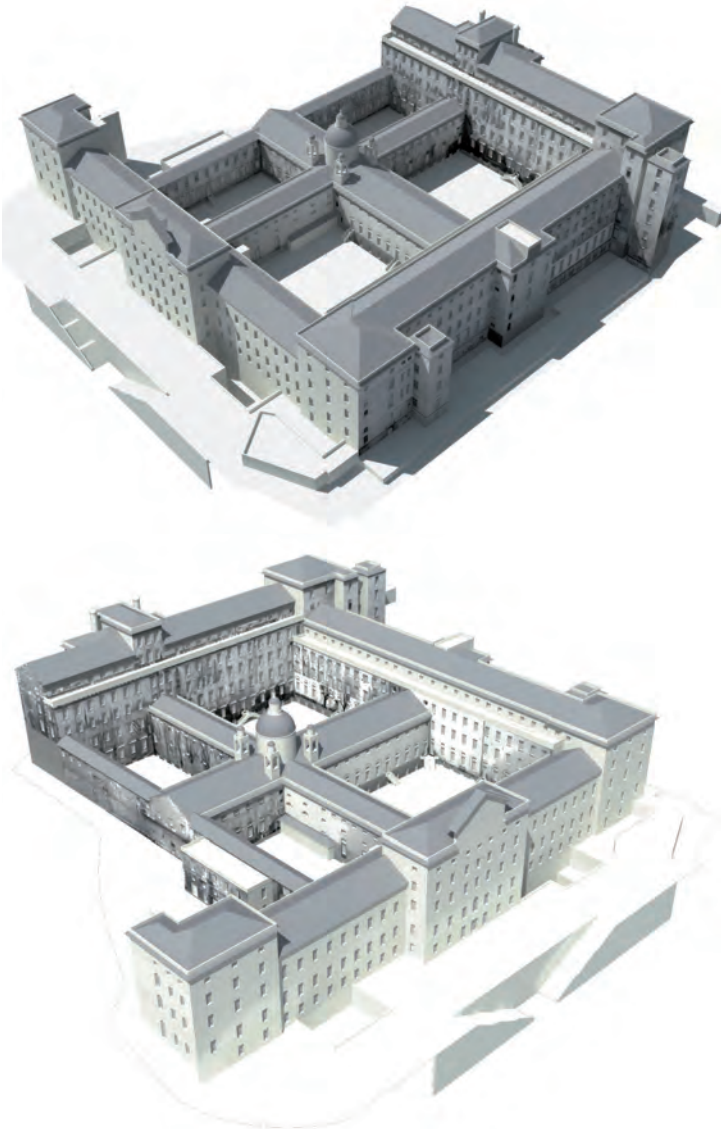


Fig. 41 - Three-dimensional model of the architectural complex with insertion of orto-photos of the facades: south-eastern and south-western views

Themed workshops, seminars and visits

The conservation project follows methods reinforced in schools and in good practice, using themed maps for building materials and techniques, state of conservation and related conservation work, based on a gradual cognitive approach. The idea of organising, within the teaching activities, spaces for themed in-depth study with the possibility of "touching" and trying out intervention techniques, until the outcome can be seen, is designed to stimulate, through manual skill, the ability to observe and reprocess information acquired during the training course. In the experiences described below, it is not just a case of "picking up a tool" to practise one or more simple operations (to learn "how"), it also means knowing how to decide what to conserve, reflecting on "why" it is being done.

Of particular importance is the active involvement of civic institutions which work in the field of protection, with which the School has always worked: the Superintendence of Archaeology Fine Arts and Landscape, the Municipality of Genoa, the Municipality of Sanremo, to name the most recent. Among the workshops organised during the first years of activity of the School we recall: in 2001, the workshop with Michel Hebrard, the restorer who was at that time working at the école d'Avignon. He allowed the postgraduates to try out the main techniques of restoration of plaster and wall decoration. Then, in 2003, there was the workshop with the maestro Mario Fogliata from Venice, on the techniques for working with marmorino and stucco.

Practical activities are always preceded by and interspersed with in-depth seminars of a methodological nature and a presentation of innovations in the area of protection. These events are also often open to those studying in other departments of the University of Genoa and to architects listed in the Register, within the context of their obligatory continuous training.

Fig. 42 - Sculpture in marble in the restoration workshop at the Monumental Cemetery of Staglieno

Sacro Monte di Varallo (VC)

June 2020 (previewed)

The Sacred Mountain of Varallo was founded by Father Bernardino Caimi who, upon his return from the Holy Land, wished to recreate the Palestinian sites and the episodes from the life of Christ. The site, which is a UNESCO World Heritage Site, includes around fifty chapels which illustrate scenes from the life of Jesus and Mary, with frescoes and groups of wooden statues. The workshop was organised by the Superintendent for the Archaeology, Fine Arts and Landscape of Liguria, Manuela Salvitti, who used to be Superintendent for the provinces of Biella Novara Verbano-Cusio-Ossola and Vercelli and in partnership with the Authority for Managing the Sacred Mountains of the Piedmont region, to commemorate the restoration works of the XXVIII Chapel which displays "Christ on trial before Herod". More specialist seminars will be organised for the postgraduates, held by a range of different players in the process on inter sectoral themes: the cultural landscape of the Sacred Mountains recognised as UNESCO sites, the relationship between pilgrimage and architecture, local building techniques, the relationship between the Sacred Mountains, art and spirituality. There will also be studies on the challenges of conservation, on the diagnostics conducted on the XXVIII chapel and on specific problems linked to the reconversion of pigments in lead. The phases and content will be illustrated of the restoration project, conducted by the Minister of Heritage, Cultural Activities and Tourism, the regional Secretariat for Piedmont, the Superintendence for Archaeology, Fine Arts and Landscape for the provinces of Biella Novara Verbano-Cusio-Ossola and Vercelli under a ministerial funding programme for the restoration and enhancement of the Sacred Mountains - UNESCO site. The postgraduates will be able to attend the restoration work of the paintings on the right and left walls and of the drapes of Herod's throne.

Fig. 43 - View of the complex of the Sacred Mountain of Varallo

Fig. 44 - Interior of one of the chapels

Marmor, memoriae, cura. The University of Genoa for the Monumental Cemetery of Staglieno: knowledge, protection, restoration and enhancement

8 - 12 April 2019

The teaching workshop was devised in an agreement between the Director of Civic Services of the Municipality of Genoa, Fernanda Gollo, the School of Specialisation and the Superintendence for Archaeology, Fine Arts and Landscape, Vincenzo Tinè, as a theoretical and practical training activity inside the Monumental Cemetery of Staglieno, where the Municipality has acquired a small restoration laboratory, and also to create awareness amongst the citizens of the value of the site.

During the week of the workshop, the postgraduates had the opportunity of gaining a deeper knowledge of the monumental complex from a historical, architectural, artistic and landscape perspective, with the participation of experts in the various fields; they tested diagnostic techniques and, under the guidance of the restorer, Axel Nielsen, they practised cleaning operations and consolidation of marble artefacts.

Fig. 45 - Cleaning using cellulose pulp

Fig. 46 - The restorer, Dr. Axel Nielsen, and postgraduates taking part in the workshop

Fig. 47 - Cleaning with the application of adsorbent clay

Fig. 48 - Mechanical cleaning of a stone artefact

Wooden elements from Palazzo Grillo. Degradation, diagnostics and restoration techniques

19 May 2018

The workshop focused on activities of diagnosis with portable instruments (digital optical microscopy and spectrophotometry) and of conservation (cleaning and consolidation) of some decorated wooden relics, conserved at the Architecture and Design Department. These consist of beams and tables taken from a noble Genoese palazzo following the restoration and reuse work conducted by the *Azienda Regionale Territoriale per l'Edilizia* (ARTE).

The practical activities, under the guidance of the restorers Stefano Vassallo (Superintendence of Archaeology, Fine Arts and Landscape), Marialuisa Carlini (Co-Art) and Franco Aguzzi, saw the active involvement of the postgraduates in operations to clean and strengthen the pictorial film.

The workshop was preceded by a seminar focusing on the decorated wooden Genoese ceilings and on the problems of understanding, dating and working on these artefacts. Those taking part included the proprietor Company, the Superintendence, the Institute of History of the Material Culture of Genoa, the *Museo Archeologico del Finale*, the teaching staff of the School and the restorers.

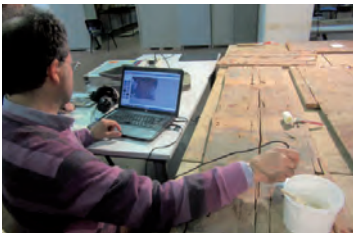


Fig. 49 - Investigations with optic microscope 60X and 200X.

Fig. 50 - Brush consolidating application

Fig. 51 - Local consolidating application using a syringe

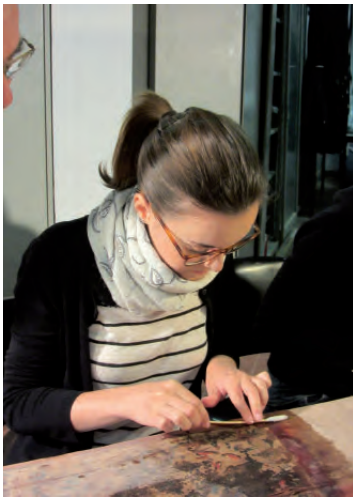


Fig. 52 - Cleaning with a swab

Fig. 53 - Removal of excess consolidation with a sponge

Conserve the surface finishes in the "Pigna" historic centre of Sanremo

19 - 21 April 2018

The historic centre of Pigna, which has been gradually abandoned by residents, conserves a large quantity of ancient plaster which represents an extraordinary palimpsest to be conserved, protected and enhanced. The idea of organising a workshop was conceived as part of the project ART LAB NET - Resource centres for the innovation of Art professions, Interreg Programme ITA-FR Maritime 2014-20, which saw the involvement of a range of bodies including the Architecture and Design Department of the University of Genoa and the *Pigna Mon Amour* Association. The primary objective was that of safeguarding the architectural and cultural heritage of the historic centre of the Municiplity of Sanremo and raising awareness among the local community about the importance of its conservation. A partnership was established between the restorers, Antonio Rava, Carlo Terzi and Lara Siriotti, teaching staff and postgraduates, who have taken on the task of cleaning, pre-consolidating, integrating old plasters and glazing of the ancient plaster of some of the buildings in the historic heart.

Fig. 54 - Postgraduates trying out restoration techniques on the plaster: cleaning the graffiti

Fig. 55 - Re-adhesion of a detached lens by injecting compatible mortar

Fig. 56 - The restorer and architect, Antonio Rava, hands out the "tools of the trade" to postgraduates

Fig. 57 - Treating the edges of an area without plaster

Fig. 58 - Plastering with compatible mortar

Fig. 59 - Removing lime using a scalpel and re-adhesion with injections

Restoration and conservation of stone artefacts

2010-2017

For several years in a row, the School has organised a workshop with the restorer, Axel Nielsen, devoted to the conservation of stone artefacts. The activities have taken place within the San Agostino Museum of Ligurian Architecture and Sculpture. The Museum (1963-1979), which was designed by Franco Albini and Franca Helg on the ruins of the Augustinian convent complex of medieval origin (XIII century), houses sculptures, sections of fresco and stone relics dating to the period between the 10th and 13th centuries. During the workshop, there were analyses carried out of lithotypes, demonstrations of techniques and equipment used in the restoration of stone works of art (with a visit to the Museum's restoration laboratory) and identification of recurrent problems and deterioration of works exposed to atmospheric agents. In this way, the postgraduates acquired practical knowledge of restoration techniques, taking part in simple operations of mechanical and chemical-physical cleaning (with scalpels, brushes, sprays, wraps of paper pulp and glues).

Fig. 60 - Postgraduates at the work table in the Museo di Sant'Agostino storage

Fig. 61 - Marble fragment with a section of surviving colour

Fig. 62 - Cleaning tests on a fragment of sculpted marble with scalpels and swabs

Fig. 63 - Preparing the piece for the re-adhesion of detached fragments

Fig. 64 - Cleaning a fragment of marble stone

The *Cappella della Sacra Sindone* in Turin. Restoration using method and science

Luca Rinaldi

22.3.2019

A light tour in the museums

Eugenio Labate

22.3.2019

The School of Heritage

Carla Di Francesco

23.1.2019

Urban construction and transformation. *La Strada dei Signori Balbi* in Genoa, 1618-2018

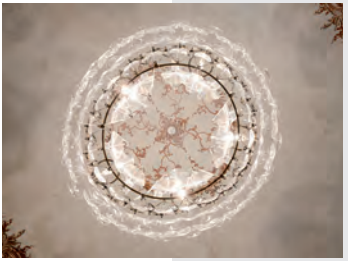
Carolina Di Biase

22.1.2019

Decorated wooden ceiling: the remains of Palazzo Grillo and the Ligurian context. Knowledge and intervention

organized by Anna Boato

18.5.2018



Lighting techniques for monumental buildings

Eugenio Labate

16.5.2018

Conservation of the Modern. Conception and evolution using theory and case studies. Le Corbusier, *Couvent de La Tourrette*. From design to restoration

Roberta Grignolo

15.5.2018

Knowledge and restoration of plasters and external wall surfaces in Venice

Francesco Doglioni, Luca Scappin, Angela Squassina, Francesco Trovò

17.4.2018

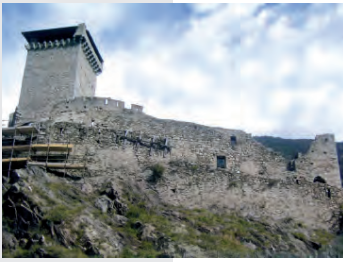
Painting on stone
Mario Casaburo
16.1.2018

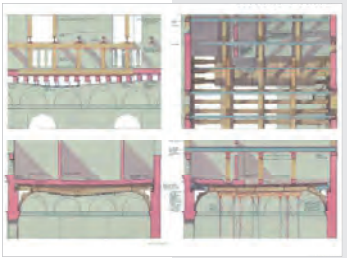
Protection measures of archaeological areas
Bruno Massabò
19.5.2017

Studying the *Villa Savoye*: unexpected strands and traces of thinking
Carlo Olmo, Susanna Caccia
17.5.2017

The worksite as a place of strategic research

Successes and frustrations in the stratigraphical interpretation of a building undergoing restoration
Francesco Doglioni
16.5.2017





Restoration in Venice: interventions on wooden frames

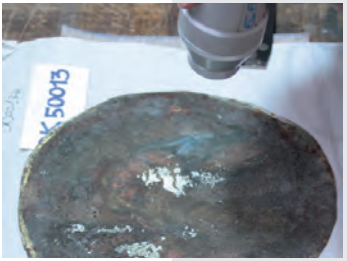
Mario Piana

11.4.2017

The roof of the *Villa Grimaldi "La Fortezza"*

Giorgio Mor

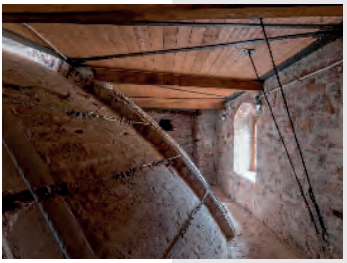
13.2.2017



Polychrome tiles on metal sheets in Chiusanico: a recovery made possible by the different competences working together

Roberta Moggia

26.1.2017



Structural consolidation of the historic building: methodologies and applications

Lorenzo Jurina

24.1.2017

The *Palazzo dei due Principi*: patrons of Andrea and Giovanni Andrea Doria for the *Palazzo del Principe* in Fassolo

Laura Stagno

16.12.2016

Diagnostics of historic buildings: methodologies, techniques and examples of application

Monitoring buildings, indoor environment and well being

Camilla Colla

13.12.2016

Biographical research using data banks

Nuccia Gianelli

24.1.2017

Virtual restoration

Luciano Ricciardi, Paolo Bensi

11.7.2016

The catalogue of Cultural Heritage: new points of focus and future prospects

Laura Moro

17.6.2016

Lighting techniques for monumental buildings

Eugenio Labate

20.5.2016

Restoration and seismic improvement: an interlinked plan

To rebuild or not?

Francesco Doglioni

17.5.2016

Energy efficiency in the historic heritage: opportunities and limits

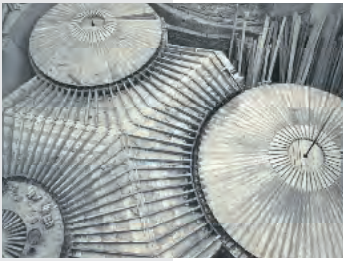
Conference

21.4.2016

International legislation on cultural assets

Luisa De Marco

20.4.2016



Conserving the Modern: Franco Albini and the *Museo del Tesoro di San Lorenzo*

Carmen Andriani, Piero Boccardo, Marco Dezzi Bardeschi, Fulvio Irace, Luca Rinaldi

17.3.2016

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Antonio Rava 24.1.2002

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Umberto Baldini 22.1.2002

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The reinforcement of masonry structures with reference to the work of Sisto Mastrodicasa and other restoration interventions in the Basilica in Assisi
Giuseppe Pistone 7.3.1998

Interventions on the plastered and stone surfaces of the Civic Tower in Rapallo
Roberto Balzerotti 20.2.1998

Ancient masonry construction techniques and methods of sizing architectural structures
Vittorio Nascè 18.2.1998

Techniques for cleaning stone materials with lasers
Giancarlo Calcagno 21.1.1998

Causes of degradation and methods of conservation of works of art
Carlo Manganelli Dal Fa 17.12.1997

Forms of biological degradation and methods of intervention to remedy overgrown vegetation
G. Montanari 17.12.1997

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Massimo Brida 5.2.1997

Pre-consolidation, cleaning, consolidation and protection of plastered surfaces
Renata Codello 22.1.1997

Cleaning techniques of stone materials
Dino Beltrame 27.11.1996

The restoration works on the *Basilica di San Marco* in Venice
Ottorino Nonfarmale 27.11.1996

Fig. 65 - Visit to the restoration worksite of the paintings of Gino Grimaldi in the church of S. Maria Addolorata in the former Ospedale Psichiatrico of Cogoleto

Fig. 66 - Consolidation of surfaces in humid areas and an overview of the works of static consolidation and of restoration carried out at the Fornace Bianchi in Cogoleto; lesson of Mauro Matteini, Angelita Mairani, Fabio Fratini and Axel Nielsen



Fig. 67 - Villa Centurione del Monastero, Genoa - Marble caves of Carrara



Fig. 68 - Villa Zanelli in Savona - Rocca di Sissa Trecasali (PR)



Fig. 69 - Miniera di Gambatesa (GE) - Restoration worksite of the dome of the Cattedrale di San Lorenzo, Genoa



Fig. 70 - Chiesa di N. S. della Consolazione, Genoa - Villa Grimaldi, Genoa



Fig. 71 - Abbazia di San Fruttuoso (GE) - Cappella della Sacra Sindone, Turin



Fig. 72 - Basilica di Carignano, Genoa - Santuario di Vicoforte (CN)



Fig. 73 - Museo del Tesoro della Cattedrale di San Lorenzo, Genoa - Forte di Santa Tecla and Chiesa Russa of Sanremo (IM)



Fig. 74 - Opificio delle Pietre Dure (FI) - Workshop "The restoration of stuccoes" (maestro Mario Fogliata)

Specialisation theses

Thesis work is done by the individual postgraduate, or in small groups, and concerns a building or a site of cultural interest of their choice, often one which is also subject to an agreement between the School and proprietor stakeholders in its restoration This enables students to take advantage of the equipment and assistance of specialist skills within the university. The work consists of a definitive restoration project, prepared based on surveys and analytical and diagnostic phases which reflect the activities of the first year of the course and, above all, the current legislation. The project must be accompanied by a technical report which first of all makes clear the methodological and cultural premises and objectives. It should also include all the necessary graphical drawings, up to the building detail, with a precise and analytical description of the expected intervention techniques and the conservation work as well as new work possibly anticipated. The project should also include specific technical specifications and elements of economic assessment.

The postgraduates' theses have often given rise to the search for the required sources of funding for the implementation of the assumed interventions and, in the happiest cases, the new specialists have also been able to follow personally the detailed design and execution phases.

The following section presents a significant number of the theses discussed since 1997 and they are reported in inverse chronological order, including those generally subject to agreements or research contracts stipulated with the proprietary bodies of the assets concerned. There follows a second section listing all the theses with the relative authors.

Fig. 75 - View of the Aula Edoardo Benvenuto: Department of Architecture and Design, the University of Genoa, used for graduation sessions

The military fortifications of the Island of Palmaria. Restoration and conservation of the complex of Cala Fornace

Specialists: Joanna Adrakta, Francesca Stanchi

2019

The subject of the specialisation thesis is the military batteries on the island of Palmaria at Portovenere (SP).
These are a range of artefacts dating in large part to the 19th century, found in an area which, along with Portovenere and the Cinque Terre, was entered in the 1996 World Heritage List. It is also subject under Ministerial Decree 13/12/1941 to landscape restrictions which have become archaeological restrictions because of the so called *Grotta dei Colombi* (Cave of the Doves).
The study was conducted, emphasising the site's weaknesses and the potential, and devising effective intervention strategies to enhance it. The island presents two mutually complementary macro areas, consisting of the natural system (paths, viewing points, plant heritage) and the man made one (caves, military garrisons, agricultural activity). The project impacts on both of them, ensuring that the environmental system is maintained and that tourism on the island is developed in a sustainable way. The objective is to offer a wide range of more structured services to residents and tourists to try to curb the depopulation of the island. The project includes improvement of the accessibility to places, both in summer and in winter, restoration, the re-functionalism of Palmaria Fort, networking of the existing excellent historical-cultural facilities on the island, the adaptation of the existing infrastructural system and the implementation of eco-sustainable forms of transport. The defensive artefacts will be restored and assigned to museums and to institutions whilst, in order to increase the accommodation, a plan for building hotels throughout the island was adopted.

Fig. 76 - View of one of the paths on the island of Palmaria (SP)

Fig. 77 - View of the interior of the central Battery of Cala Fornace

Fig. 78 - View of the Chestnut Battery

Fig. 79 - View of Scola Tower

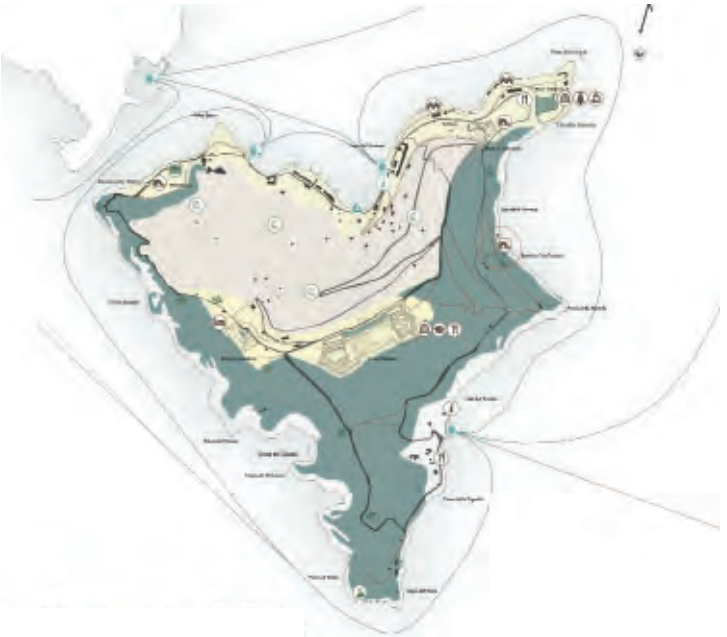

Fig. 80 - Project for the cultural and functional regeneration of the Island of Palmaria: masterplan

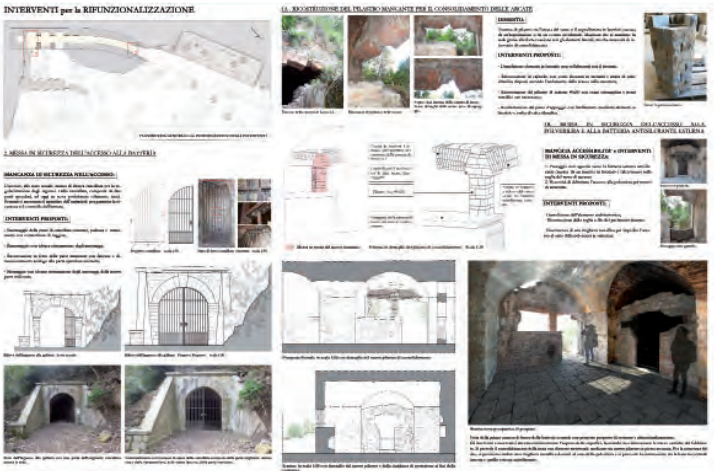

Fig. 81 - Reconversion of the central Battery of Cala Fornace

The Oratory of the Confraternita Mortis et Orationis of Monterosso al Mare (SP)

Specialist: Giuseppe Arena

2019

Research contract with the Confraternita Mortis et Orationis of Monterosso al Mare (SP)

The ancient Oratory of *Santa Maria della Vergine Assunta* of the *Confraternita Mortis et Orationis* of Monterosso al Mare (SP), which stands opposite the parish church of ***San Giovanni Battista*** has, since the 17th century, been an important reference point and a place for religious and social gathering for the population of the small village. This small, late Baroque gem presents serious challenges for conservation because of the substantial and widespread presence of humidity. The thesis work proceeded in parallel with the activities provided for by the research contract stipulated between the Architecture and Design Department of the University of Genoa and the *Confraternita Mortis et Orationis*. Its aim was to conduct a survey using a laser scanner, with topographical support, and an archaeological analysis with interpretation of the stratigraphical traces present on the brickwork of the cavity positioned behind the apse. The thesis had a dual objective: to achieve an understanding of the place and its state of conservation, which is necessary for the restoration project, respecting the traces left by time, and to reconstruct the history which, up until now, has been somewhat patchy. The phases of the methodological path so far have been: learning about the region, from a historical and geological perspective; survey, interpretation and comprehension of the physical properties, the geometry and formal and decorative characters of the building; historical knowledge, obtained by a mixture of archive research, bibliographical activity and interpretation of the stratigraphy and building structures; interpretation of the materials through

Fig. 82 - View of the interior of the Oratory

sampling and analysis; analysis of the degradation and its causes. Following the fact-finding investigations, the restoration operations were identified, aimed at eliminating or attenuating the causes of degradation and at the conservation of the internal surfaces.

Fig. 83 - Map of the materials: longitudinal section a-a'

Fig. 84 - Three-dimensional model: possible local mechanisms of collapse

Fig. 85 - Simulation of restoration work on frescoed panels

Fig. 86 - Simulation of restoration work on dyes laid out to dry

Restoration of a modern building in the marble region of the countryside. The former Figaia sawmill in Carrara

Specialist: Pierpaolo Frediani

2019

The subject of the specialisation thesis is the former Figaia sawmill in the San Martino district, at the entrance to the city of Carrara. Within the area, the buildings are laid out in a manner which is disordered and casual but, at the same time, functional and, for the most part, are devoted to the processing and marketing of marble. Some buildings are in an abandoned state and in precarious structural conditions, partly lacking roofs and in need of recovery and restoration. The two buildings on which the thesis concentrates stand parallel to the sides of a long, wide piazzale where there still remain the platforms of the old carriages which were part of the infrastructure of the marble railway, enabling the movement of blocks of marble. The two abandoned buildings, despite their similar architectural features, are not the same age. The one to the west, which dates to the 1920s, is partially without a roof and in a bad state of repair but, structurally, it is still stable. The second building, which contains building debris and is in a bad state of repair, was constructed in 1960.

The recovery and restoration project concerns this second works building whose measurements are 56.60 x 17.81 m and consists of reinforced concrete frames with openings of 17.5 m and section pillars 30x30 cm placed at intervals of 5.00 m. The covering structure is in brick-cement with depressed arch profile and driven onto piers. The construction system (SAP) is formed of prefabricated curved beams 3-4 m in length, prepared off site.

Having surveyed the building and evaluated its state of conservation, the conservation restoration measures necessary to eliminate or

Fig. 87 - View of one of the buildings in an advanced state of degradation. Former Figaia sawmill in Carrara

attenuate the degradation were identified; a proposal to recover it was put forward, envisaging its transformation into a showroom, making the area part of the urban fabric, via a huge stairway and a steel footbridge supported by pillars made of mini-ashlars in pre tensioned stone.

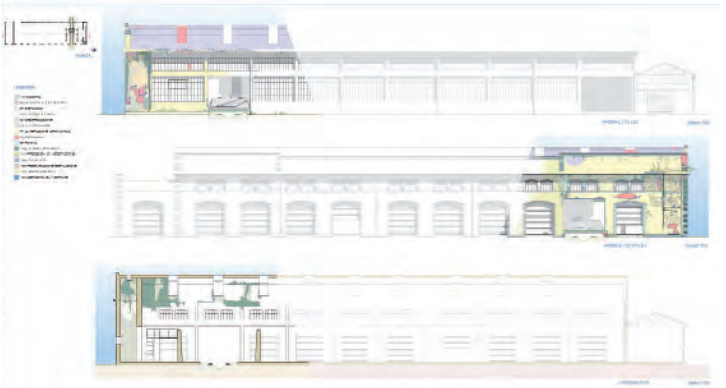

Fig. 88 - Chart of degradation phenomena: longitudinal sections of the body of the fabric

Fig. 89 - View of the advanced state of degradation of the interior

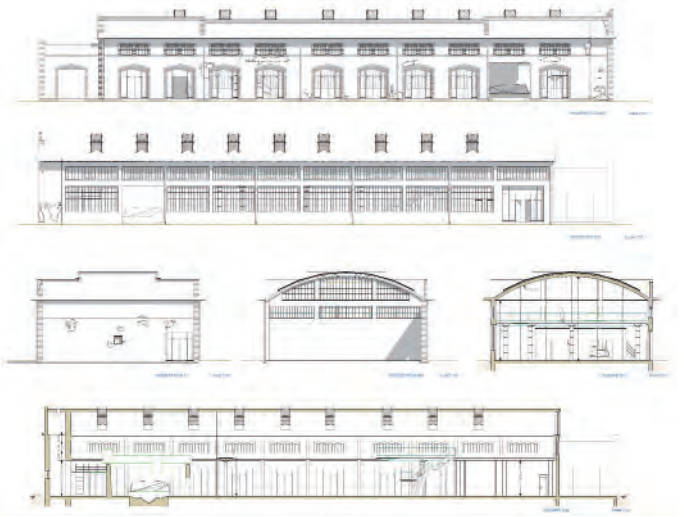

Fig. 90 - Project for the reuse of the former Figaia sawmill: external facades and sections both longitudinal and cross section

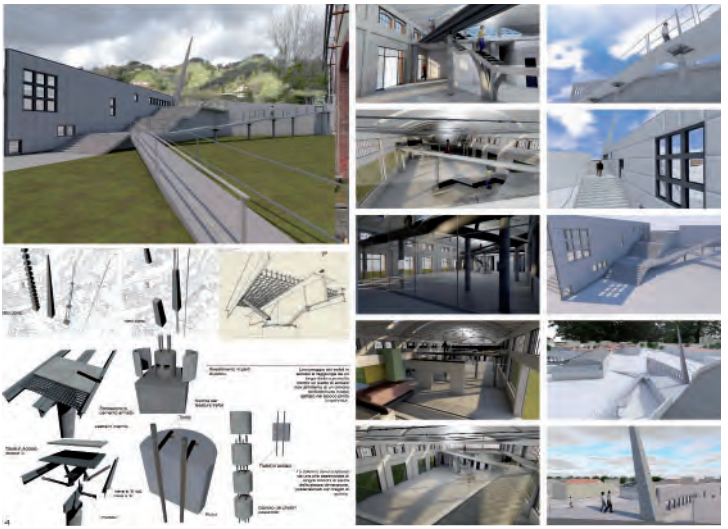

Fig. 91 - Reuse project: details of the new access footbridge and render of the project

The Benedictine monastery of the SS. Severino e Sossio in Naples. The Conservation Action Plan as an intervention strategy

Specialist: Vittoria Iazzetti

2019

The thesis conducted in collaboration with the University of Naples Federico II, tackles the topic, common to many Italian historic centres, of the restoration and enhancement of the vast number of religious heritage sites fallen into disuse. The case study consists of the monastic complexes in the historic centre of Naples, which is known as "the city of the five hundred domes". The work focuses in particular on the former Benedictine Monastery of the *Saints Severino e Sossio* which occupies an entire island in the urban fabric of the ancient centre and conserves archaeological, art historical and documentary testimony from the foundation of the Greco-Roman city up to the present day. It therefore tells of the evolution of a city in which the sacred performed a fundamental role that, today, struggles to find a clear position and definition in the contemporary reality.

The tool used to address the design process is the conservation plan, still little known and used in Italy, whose value as a strategic approach to the resolution of complex cases is at an experimental stage. Addressing the subject in a holistic way, the thesis identifies a methodology which, keeping together general and detailed questions, can place itself as a valid alternative to the "case by case" interventions, which are localised and dictated by contingent needs, often failing to liaise with each other and to agree on enhancement objectives. In this way, drafting a conservation plan based on a precise analysis of the context and on the present state, allows the material features of the asset to be examined, extrapolating those which are immaterial. It also enables an assessment of the weaknesses and potential and outlines a general picture of the work to be carried out to adopt choices which are strategic, established and shared.

Fig. 92 - View of the Sacresty of the church of the monastery of SS. Severino and Sossio

Fig. 93 - View of the complex of the monastery of Saints Severino and Sossio in the urban environment of Naples

Fig. 94 - Layout of the monastery complex at garden level: mapping of the tree species in the garden

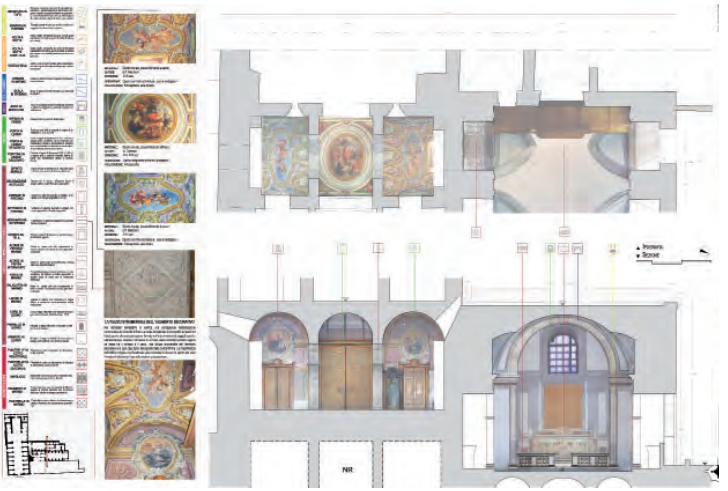

Fig. 95 - Materials map: chart of the details and longitudinal section

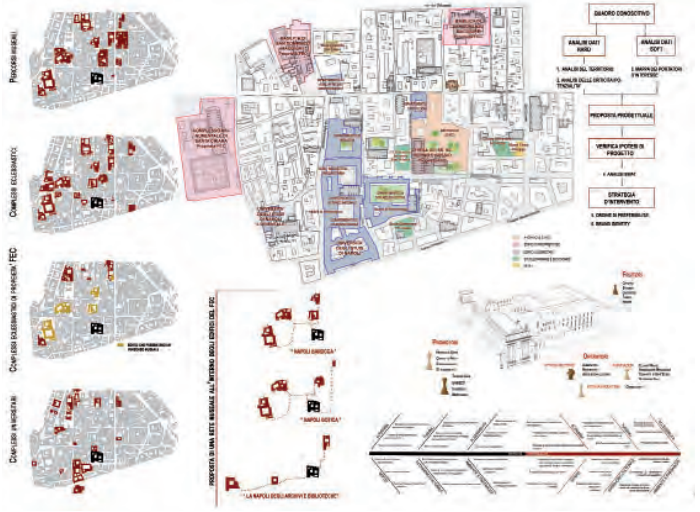

Fig. 96 - Conservation Plan: Overview of the action strategy for enhancing the monastery complex of Saints Severino and Sossio in Naples

The conservation of the central temple of the Longju Monastery in Sichuan (China)

Specialist: Yue Xia

2019

The subject of the thesis is the Central Temple of the Monastery of Longju in Guanghan (Sichuan, China) and it puts forward a restoration and conservation plan.

The central temple was constructed in 1447 and the interior walls are decorated with wall paintings relating to themes from the Buddhist religion (spiritual illumination of the 12 Bodhisattva). This is the oldest part of the monastery which, over time, has suffered various losses including the demolition of the garden, transformations brought about by the cultural revolution and the 2008 earthquake, as well as the reconstruction works which continue to this day.

On-site inspections have been carried out and existing documentation gathered, and the information necessary for an initial understanding of the monastery's historic development has been successfully obtained.

A survey was conducted using laser scanner techniques, with the collaboration of Professor Li Lu of the Southwest Jiaotong University of China and of Dr Wa Yiming of the IIT. The final result is a 3D model of the studied complex as well as a comprehensive information system linked to it.

For an understanding of the wide difference between the oriental and occidental building cultures, the thesis represents an important step in learning about traditional Chinese building techniques which themselves are the subject of separate section, and are analysed in various historical journals (using significant examples). Only by starting with a knowledge of the construction methods can the work begin of analysing the structure of the temple which is the object of

Fig. 97 - Picture of Vimalakirti, Mogao Grotto no.103

study. The analytical work was completed with the identification of the phenomena and processes of degradation and the assessment of the current state of conservation of the complex.
The wall paintings in the central temple were of particular interest and required a specific study. A proposal for their restoration was formulated, even though the thesis is based mainly on a methodological approach and identification of the analytical studies which are still necessary to reach a full conservation plan.

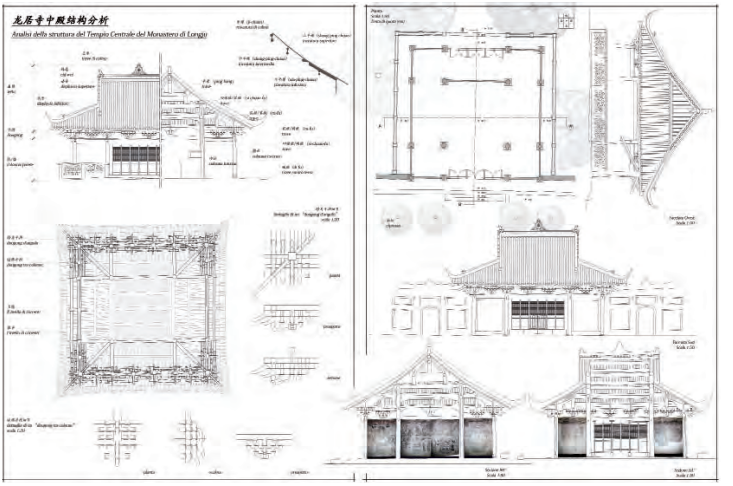

Fig. 98 - Survey and technological analysis of the temple building

Fig. 99 - Geometric survey: maps of the eaves and the roof

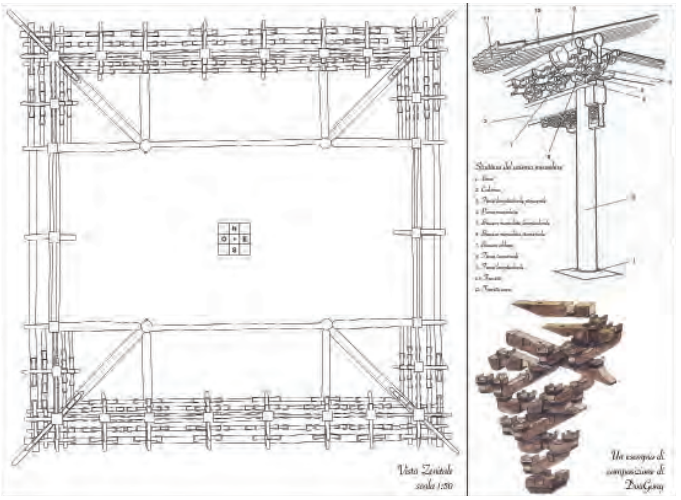

Fig. 100 - Technological analysis of the temple building: example of the Dougong structural composition

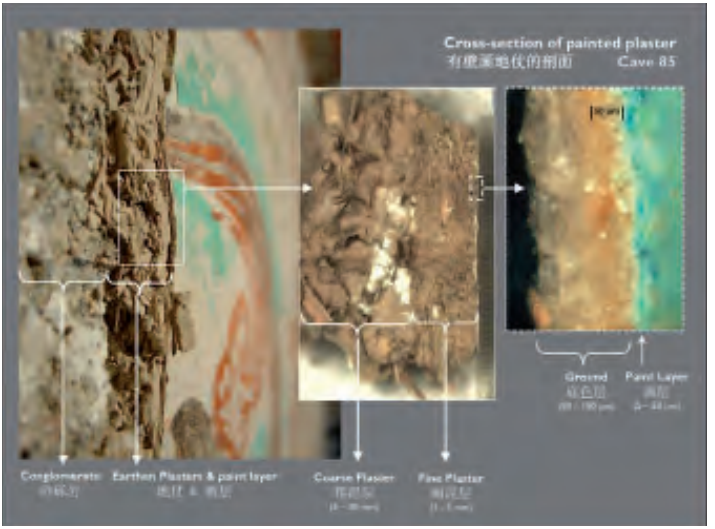

Fig. 101 - Analysis of the materials of the layers of Mogao Grotto no. 85 (Getty Conservation Institute)

The restoration of the Staircase of Honour at the University of Pavia

Specialists: Valentina Cinieri, Emanuele Zamperini

2017

The subject of the thesis is the Staircase of Honour in the Palazzo where the Rectorate of the University of Pavia is located. The staircase was constructed as part of an overall plan to expand and reconstruct the Palazzo (1819-23) by the architect Giuseppe Marchesi, a professor at the university. The enlargement of the Palazzo had required the design of a new monumental stairway, suitable for the magnificence of the building. Marchesi designed the architecture, which featured the simplicity of a mature neoclassicism while the lavish interior decoration was assigned to the Ticinese master plasterer, Diego Marieloni. The huge barrel vault above the stairway is decorated with large stucco flowers in high relief and the walls are adorned with various cornices and deep niches, with roses in stucco.

Around twenty years ago, following water infiltrating the roof, some of the stucco on the vault was badly damaged and, to protect those using it from falling material, a net was positioned under the vault, in which, over the years, numerous fragments of stucco have been deposited. Although the leaks were eliminated about five years ago, the degradation has not been arrested. The need to replace the protection net stimulated action to install scaffolding (October 2016-March 2017), enabling in situ study and the survey of samples for laboratory analysis, which was necessary for the restoration work. Careful observation of both the intact and damaged rosettes also enabled an understanding of the construction techniques. Mineralogical and chemical analyses (X ray diffractometry on dust, optical microscopy, FTIR) were conducted on fallen fragments and on small samples taken from the rosettes on site, helping to bring

Fig. 102 - View of the Staircase of Honour at the University of Pavia

about an understanding of the distinctive composition of the stucco and to speculate on the mechanisms of its degradation.
Alongside the investigations on direct sources, analyses were carried out on indirect sources (archive and bibliographical sources), as well as stratigraphical investigations on the dyes and dendrochronological and structural analyses of the wooden covering structure.
Lastly, the thesis put forward a plan to strengthen and restore the buildings and interior decoration.

Fig. 103 - Map of the materials: longitudinal section

Fig. 104 - Map of the materials: cross section

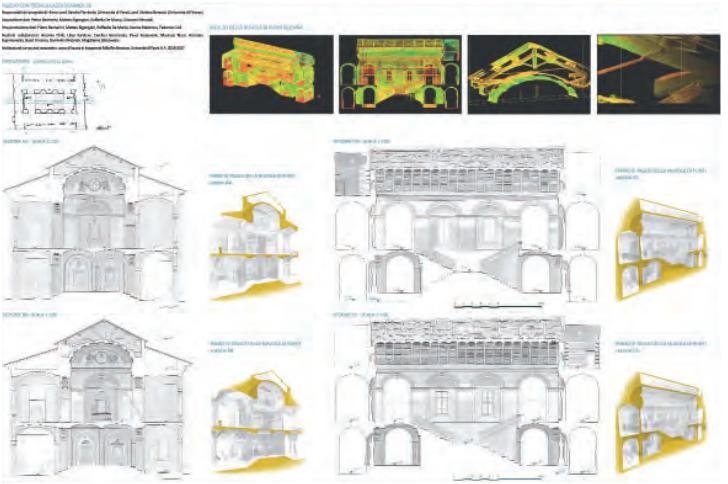

Fig. 105 - Digital geometric survey using 3D laser scanner technique

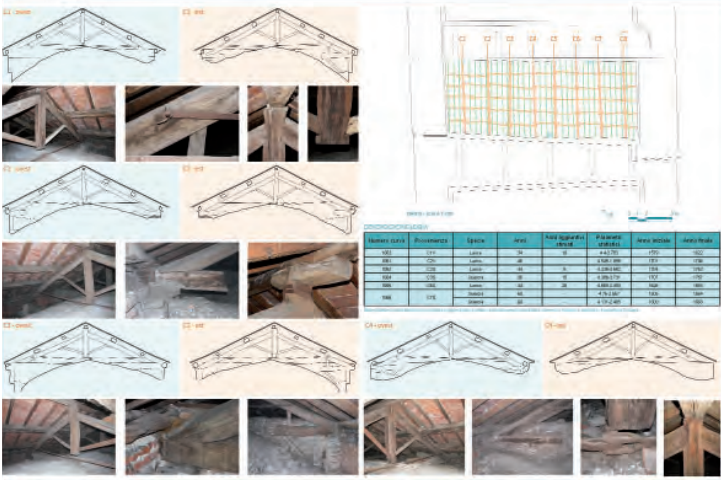

Fig. 106 - Survey of the covering structures and dendrochronological analysis of the wooden elements

Church and former Augustinian Convent at Melpignano (LE). From diagnostics to restoration project

Specialist: Marta Fersini

2017

General agreement with the Municipality of Melpignano

The complex of the Church and former Augustinian Convent in Melpignano is one of the most important works of Lecce Baroque outside the region of the province's capital. It is the work of the architect, Giuseppe Zimbalo, who was also responsible for the Basilica di Santa Croce in Lecce. Quite apart from its artistic and archaeological importance, the church and attached convent are an important ethnographic and cultural, as well as tourist, attraction. For the last twenty years it has provided the backdrop to the final concert of the *Notte della Taranta* (Night of Tarantula) festival, a world-renowned event.

Apart from the phases of analysis and learning about the complex, the work carried out for the thesis envisages an assessment of the state of conservation, identifying the processes and agents of degradation and, finally, identification of a series of measures to be taken which could bring the monument back into use once more. The main problem to be revealed was the humidity which, inside, consists of extensive biological coating and rising damp and, outside, widespread colonisation of lichen. A work schedule was proposed that, in the first place, would act on the causes of degradation, preventing the water coming in, both from the roofs and from the foot of the walls. The next step was to proceed with conservation work on the surfaces and interior decoration. Then the redevelopment of the complex continued with the creation of a musical centre offering a forum for the *Fondazione Notte della Taranta* and a stimulus for other musical and artistic events linked to the tradition of the Salentine region.

Fig. 107 - View of the Church and former Augustinian Convent at Melpignano (LE)

Fig. 108 - View of the high altar of the church

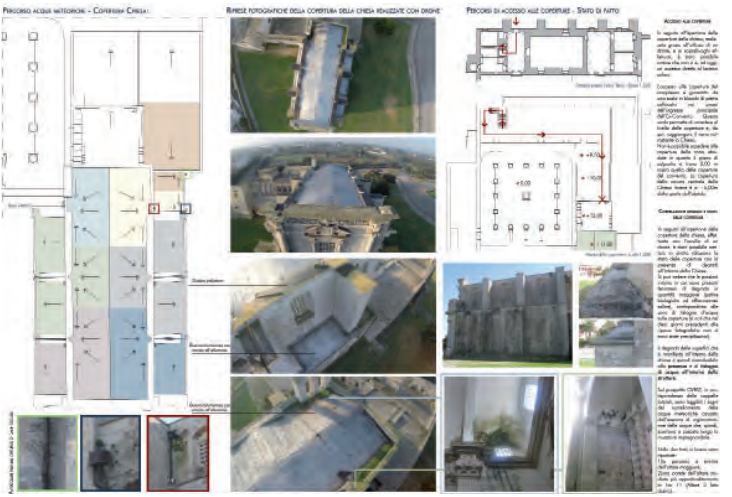

Fig. 109 - Analysis of the actual state of the roofs

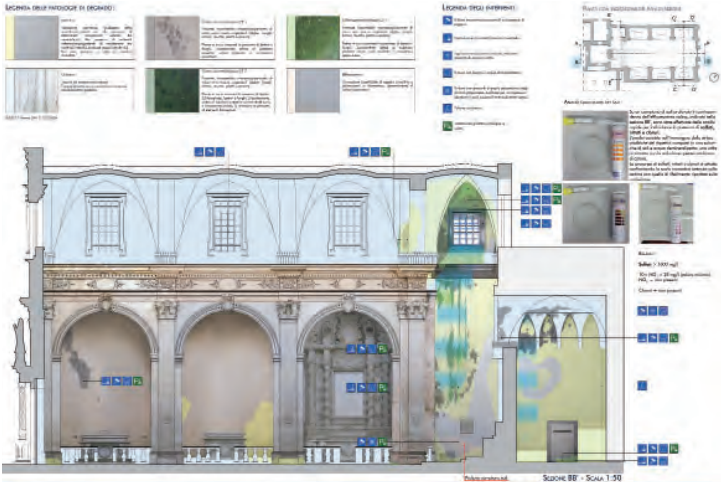

Fig. 110 - Mapping of the degradation phenomena: section b-b'

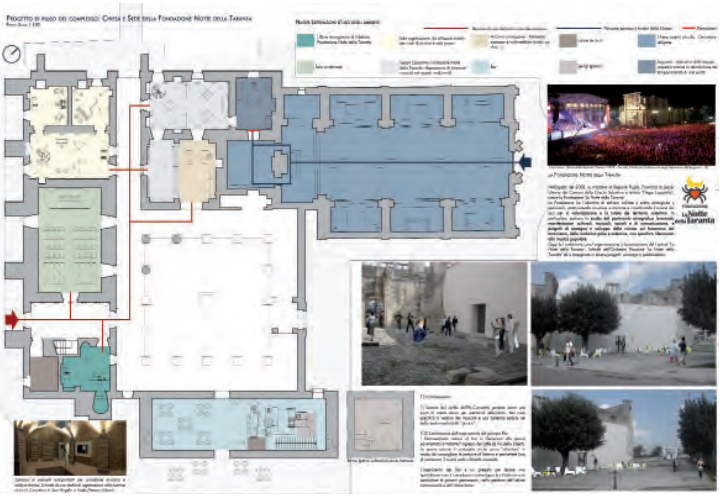

Fig. 111 - Plan for the reuse of the architectural complex: map of the intended uses

Restoration of the bell tower of the church of Santa Maria delle Vigne in Genoa

Specialists: Matteo D'Andrea, Eva Serpe

2016

The subject of the thesis is the bell tower of *Santa Maria delle Vigne* in Genoa, which dates to the 12th century. The investigations were conducted in different phases and they outlined a framework of knowledge of the site, to prepare the plan for its conservation, restoration, and enhancement and to maximise its visiting potential. This "framework of knowledge" was the fruit of multidisciplinary contributions. The logic with which the task was approached was that of first acquiring a general knowledge ("macro" level) about the bell tower and then arriving at a knowledge of the detail ("micro" level) always keeping close and coherent relations between the different levels of study. The survey was conducted combining topography and laser scanner technology. The building techniques were then identified of the interior floors and of the vertical structures.

A "census" was performed of the damage to the inside of the bell tower and non-invasive structural investigations were carried out. There then followed the planning phase, aimed at the material conservation and enhancement of the distinctive aspects of the monument on the different urban and architectural levels. The choices arose from the need to make the bell tower suitable for visiting. That led to studies relating to the safety of the visitor and the installation of collective safeguards such as railings and handrails which conform with the legislation, and the study of an adequate lighting system.

The concept of "visitability" also implies the need to stimulate curiosity, as a source of knowledge. It was therefore sought to respond to all these aspects through the installation of a continuous

Fig. 112 - View of the bell tower of Santa Maria delle Vigne in Genoa

single element, a sort of strip, going up the bell tower to the belfry which, "being deployed" in different ways, could accompany the visitor, such as a railing and supporting material and information.

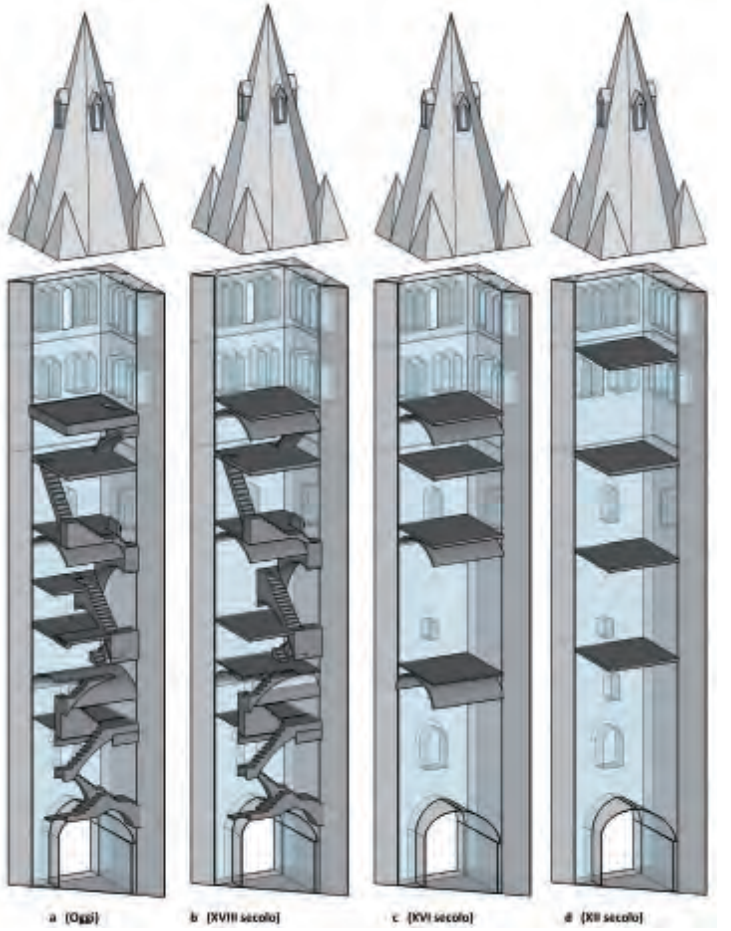

Fig. 113 - Study of the construction features: three-dimensional representation of the internal configuration of the bell tower rooms over the centuries

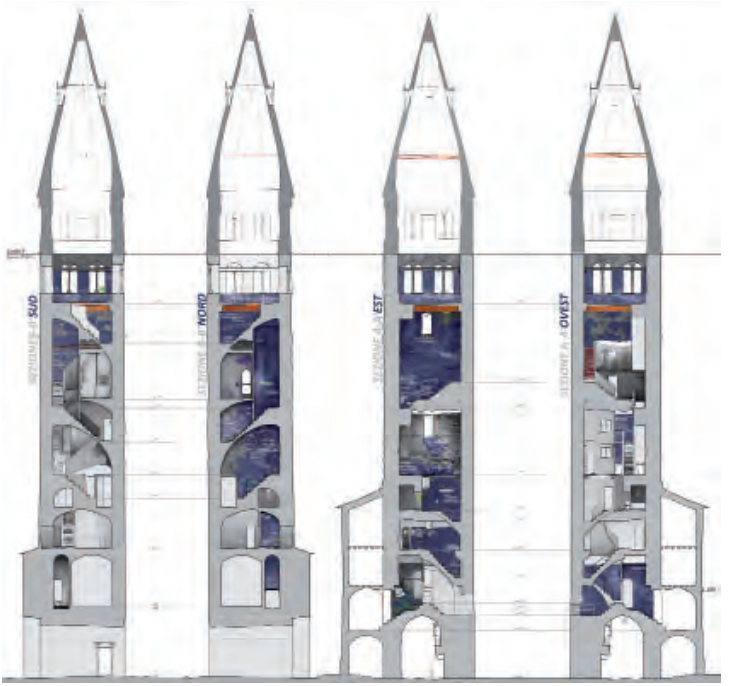

Fig. 114 - Map of the degradation phenomena on the internal surfaces of the bell tower

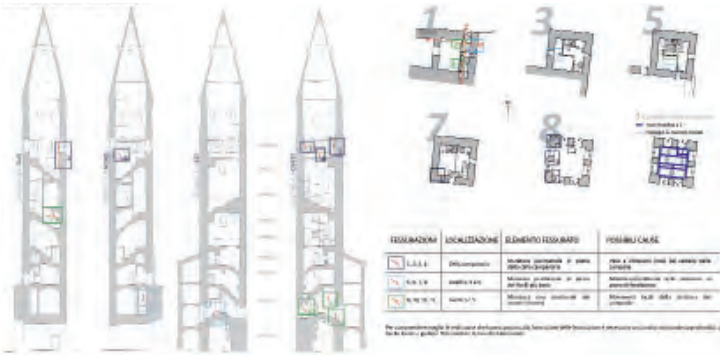

Fig. 115 - Survey of the cracks: sections and maps

The signs, the interventions, the project. Project to restore and set up as a museum the "Sala delle Monofore" in Santa Maria della Scala, Siena

Specialists: Marta Biasio, Margherita Pedroni

2015

The subject of this study is a section located in the north west area of the ancient hospital of *Santa Maria della Scala* in Siena. In the thesis it is referred to as the *Sala delle Monofore* because of the presence, on both the larger sides of the building, of buffered single-lancet windows. The complex of *Santa Maria della Scala* was partly refurbished for museum purposes in the 1990s but there are still large sections of it in disuse which, although "liberated" from the superfluous additions dating to the hospital phase (which came to an end between the end of the 1970s and the early 1980s) still remain to be recovered and converted for public use, with new functions of a cultural nature. The public administration has been working on the project for thirty years and, despite the economic management difficulties and the time taken, the plan is still to "reopen" the complex for the city.

The analysis and interpretation has led to a proposal which seeks to reconcile differing needs, mediating between conserving the material and transmitting the message, between the permanence of the signs and the need for a new function, between the structural needs of a fabric which has been recast several times and the desire not to adulterate its structures and building techniques. Accepting the idea that the VI level of *Santa Maria della Scala* is to be the new home for the National Art Gallery, it was suggested that the room would house part of the collection of the *Fondi oro* (gold leaf background) of 14th century Siena (works of Duccio di Buoninsegna, Simone Martini, the Lorenzetti brothers and their ateliers).

The most complex part was defining the operations which involved

Fig. 116 - View of the architectural complex of Santa Maria della Scala

the readability of the historic material traces, linked necessarily to cultural choices as to whether or not to liberate certain elements, in particular of the buffered single-lancet windows.
The final decision was made to conserve all the stratifications, working on the basis of suitable apertures and precise cuts which allow the existing historic layers to be seen.

Fig. 117 - Overview of the architectural complex in the urban setting and panoramic view

Fig. 118 - Survey and interpretation of the characteristic elements and the stratigraphic evidence

Fig. 119 - Simulations of the work on the surfaces and render of the architectural project

Conservation plan of the walls of Dodong-Seowon in South Korea

Specialist: Kym Kyuyeon

2015

This thesis proposes to apply the restoration and conservation criteria - such as distinctiveness, reversibility, minimum intervention and chemical-physical compatibility - to the project to recover the walls of the courtyard of the Jungjeongdang lecture hall of Dodong-Seowon in South Korea. In order to achieve the objective, a procedure has been followed which includes the analysis of the materials, diagnostic investigation for the assessment of the degradation phenomena and a programme of intervention.

The case study is Seowon, where the doctrines of Neo-Confucianism and the Confucianism of the Joseon Dynasty (1392-1897) are taught. The structure and its walls are a National Treasure designated as a Historic Site. The walls of Dodong-Seowon are constructed using natural materials such as raw earth, sand, stone and vegetable fibre that, despite numerous repairs carried out in the past, some recently, show some signs of degradation which require conservation work and, most important of all, continuous maintenance.

The thesis is concentrated on a general study of the site and, in particular, on the walls of the main facade in the area of the Jungjeondang lecture hall. The walls, which measure 35 metres, are positioned in front of the Jungjeondang lecture hall and are subdivided into two parts: the east part and the west one in respect of the entrance. The project is based on the criterion of minimum intervention, in order to conserve the distinctive aspect of these artefacts, namely its "authenticity", which is at one and the same time its weak point - as there is the risk of further deterioration - and its strength as, once the causes of degradation have been eliminated and the effects alleviated, the historic signs will remain perceptible.

Fig. 120 - View of the entrance stairway to the Courtyard of the Jungjeondang Lecture Hall


喚主門

From "Fish Market" to mosque: restoration and reuse of a rationalist Genoese building

Specialists: Danilo Cafferata, Cecilia Moggia, Francesca Segantin

2013

The thesis concerns the project to restore and reuse the building that, since its construction in the 1930s, has housed Genoa's Fish Market. The building is located in the heart of the city, in an area lying between the ancient centre and the stretch of coastline, next to Molo Vecchio. The municipal authorities decided some time ago to move the fish market, for health-hygiene reasons. However, the fate of the building, the first example of rationalist public architecture promoted by the Municipality, seems unclear.

After numerous operations to change its use, the former market is today affected by a range of problems linked to a lack of maintenance and it suffers from a precarious urban situation, aspects which make giving it a new use problematic, notwithstanding its prime location close to the Old Harbour.

These considerations gave rise to the subject of the thesis, which has been conducted in a number of different phases. First of all, a study of historic archives, to find preliminary documentation on the history, original architectural features and the alterations it underwent following onerous urban planning operations. The building is now next to a major road (the *Sopraelevata*), built in the 1960s, which has also made it less visible. The second phase of work consisted in mapping the state of conservation, focusing mainly on the external parts. The planning phase concentrated on the choice of intended use (an Islamic cultural centre), on verifying the compatibility with the architectural space and on the restoration project on the outside walls, which feature stone and ceramics cladding and by opening wide iron windows.

Fig. 121 - Former Fish Market in Genoa: main entrance (2013)

Fig. 122 - The main sales area

Fig. 123 - Decorative mosaic in the main sales area

Fig. 124 - Detail of the mosaic covering the main sales area

Fig. 125 - Comparison between the original design of 1933 and the market today. Evidence showing the changes made in the 1970s (building in red, demolitions in yellow)

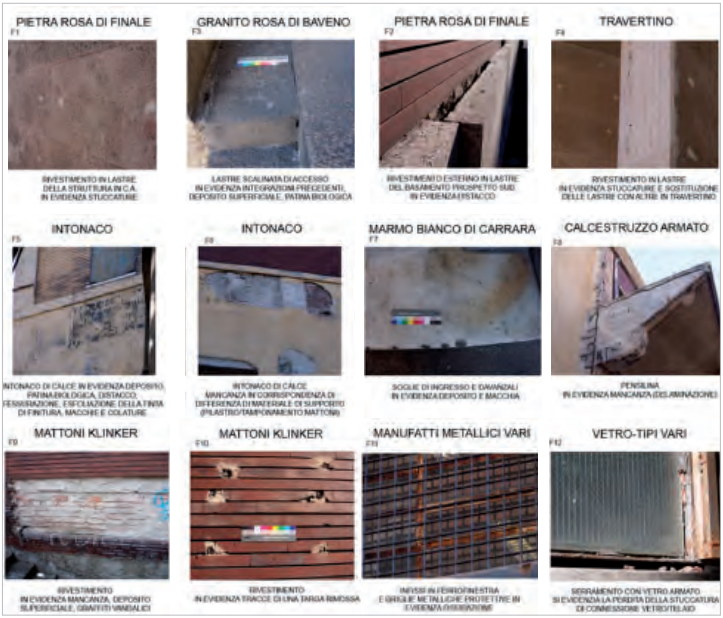

Fig. 126 - Abacus of the materials and relative examples of degradation

Should we save the graffiti of Oroszlány?

Specialist: Boglarka Szentirmai

2013

The subject of the thesis is a series of nine graffiti, displayed along the main street of the city of Oroszlány in Hungary in 1959, in the "socialist realism" style". The artists responsible for them were talented young students at the Academy who had won a study grant and, for three years, contributed towards the execution of works of art on behalf of the State.

The works of art were restored for the first time at the end of the 1980s but, in 2012, the Municipal Council passed a resolution to proceed with the refurbishment of the buildings. The work envisaged their thermal insulation and, at least on paper, it was decided to "save" the graffiti. Of the first four graffiti, three had by now been lost and a total renovation was taken forward. The original design, taken from old black and white photographs, and the traditional technique, were revived but the original range of colours was reduced. In substance, the new graffiti turned out to be clumsy copies and the local people regarded them as fakes.

The thesis reconstructs the sequence of events of the lost and reproduced graffiti, analyses the five still existing and reflects on the questions raised by this sequence of events: is it right to reproduce something which has already been lost? And, in the case of the surviving works, is their conservation feasible, as we are dealing with accomplishments which are not universally welcomed amongst the employees? It is this uncertainty, which does not yet allow a unanimous recognition of value, that prompts the identification of solutions which, as a precautionary measure, conserve the works over time, entrusting the judgement to later generations. It is therefore proposed that the originals are protected with panels on which new

Fig. 127 - View of the city of Oroszlány in Bulgaria

graffiti can be executed, as was already done with the first four, and that one of the originals be detached as a testimony and a reminder of the period in which it was executed.

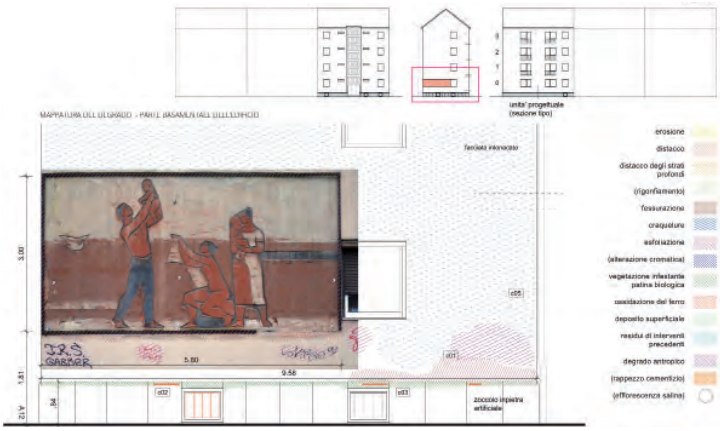

Fig. 128 - Map of the degradation in the basement part of the building

Fig. 129 - Map of the degradation on the graffiti of Janos Blaski 'Family of the miner'

Fig. 130 - Details of the degradation phenomena of the graffiti of Janos Blaski

Fig. 131 - Detail of the degradation of the graffiti of Janos Blaski: interruptions in the continuity of the graffiti owing to cracks

Studies and research on the Albergo dei Poveri. Preliminary analysis for the establishment of a museum of the Albergo

Specialists: Simonetta Acacia, Marta Casanova

2012

General agreement with the Area Sviluppo Edilizio, Unige

The thesis is part of a wider work on the building of the *Albergo dei Poveri* in Genoa, which has engaged the School of Specialisation in Architectural Heritage and Landscape of the University of Genoa since the 2010-2011 academic year. The project also forms part of the plan to reconvert the *Albergo dei Poveri* into a university campus. The main objective of the thesis is the enhancement of the entire complex, by creating a museum in the hall of the former infirmary, displaying collections from the *Albergo*'s artistic heritage and, at the same time, narrating its history, both from a construction point of view and as an institution.

It was considered that the story could not be told solely through the exhibition of documents, objects and settings in just any room. What was required was a very particular sort of architectural space.

The work began with a preliminary phase to find the most impressive and suitable setting for the museum within the building which, from the outset, already responded to the minimum requirements of accessibility and safety, fundamental aspects for a public place.

The choice fell on the setting of the ex-infirmary, right in the centre of the *Albergo* which had a historic connection with the church.

Being a museum of itself, it is even more important than usual to maintain all the signs testifying to the transformations the building has undergone in its three hundred and fifty years and more of life.

The key points of the project are: to ensure that the restoration work on the surface walls is recognisable; to restore unity to the complex's central nave, making it part of a single visiting itinerary; ensure the reversibility and compatibility of the buildings and installations

Fig. 132 - The main façade of the Albergo dei Poveri di Genova

added; maintain the possibility of a further alteration of its use; be very careful of the flooring and plasters when shifting the pipework; ensure the fullest accessibility for the visiting itinerary.

Fig. 133 - Orto-photo of the main facade of the Albergo dei Poveri

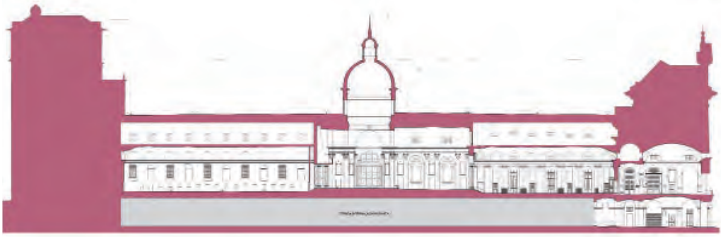

Fig. 134 - Longitudinal section of the architectural complex

Fig. 135 - Project option of the establishment of a museum in the former infirmary hall: longitudinal section

Fig. 136 - Simulation of the museum layout: former infirmary of the Albergo dei Poveri

Fig. 137 - Simulation of the museum layout: former infirmary of the Albergo dei Poveri

The Thermal Baths of Corallo in Livorno

Specialists: Giovanna Bracone, Benedetta Colombo

2012

The Thermal Baths of Corallo in Livorno, a charming Liberty style complex built in 1904 and used in a variety of ways until the 1960s, has now been in a state of total abandonment for fifty years.
The area and buildings which make up the complex are currently uninhabitable and the state of degradation has been aggravated by a rail flyover on the *Viale degli Acquedotti* which has cut it off completely from the city centre of Livorno.
There is serious damage to the complex's roof structure and a complete lack of doors and windows. As a result, the decorative elements and all the finishes display serious signs of degradation because of attack by atmospheric agents.
The thesis puts forward a plan to secure, conserve, restore and enhance the complex, aimed at combating its current state of abandonment and degradation and to restore it to full use.
Studies and analyses have highlighted the main risk conditions to which all the elements are subject.
It was considered advisable to proceed firstly with a process of studying and cataloguing, followed by an outline of the work to be carried out, acting on two different, but closely connected, levels: one more general, concerning the urgent work and safety measures required to ensure the usability of the site; then a detailed one relating to the windows, decorative elements and surfaces, comprising all the necessary interventions to halt the losses of material from the most characteristic parts of the site.

Fig. 138 - View of the access stairway to the central pavilion of the Thermal Baths of Corallo

The windows of remembrance. Project of architectural restoration and reuse of a section of the "piano nobile" of Palazzo Tassoni-Estense in Ferrara

Specialist: Elena Macchioni

2012

The subject of the thesis is a section of the *piano nobile* of *Palazzo Tassoni-Estense in Ferrara*, seat of the Faculty of Architecture.
The building, whose original core dates back to the beginning of the 15th century, remained the property of the Tassoni-Estense family until the middle of the 19th century, maintaining a residential function for the majority of its history. In 1855, the whole building was sold to the Province of Ferrara which turned it into a local Asylum, completely transforming it and causing the loss of a considerable proportion of the internal wall paintings. In the 1980s, the whole complex was given partly to the U.S.L. and partly to the Municipality, which granted its use to the University. In 2002, the "Project of reuse and restoration of the complex of Palazzo Tassoni", prepared by the internal planning centre of the University of Ferrara, was approved by the competent authorities.
The rooms which are the subject of the thesis underwent a series of investigations in 2009 which brought to light layers of frescoes which had been painted over. The discovery of the rich interior decoration made it necessary to revise the provisions of the 2002 project, to evaluate the findings, to give a solution to some of the critical issues which had emerged and to balance the needs of conservation and use of the rooms as study areas in the new library. In the restoration proposal presented here, the "expectations" of the 2002 project (to satisfy the needs linked to the function of the reading room, to the safe use and to the perception of the artefact's features by users) have been balanced, to meet the "needs of the fabric", which had already undergone conservation restoration work.

Fig. 139 - View of one of the rooms in the section of the piano nobile of Palazzo Tassoni - Estense in Ferrara

The thesis is therefore concentrated on the search for design solutions which allow as far as possible the presence and visibility of the rediscovered pictorial layers to be maintained.

Fig. 140 - Longitudinal sections with the insertion of photo planes of the walls

Fig. 141 - Map of the materials: longitudinal sections

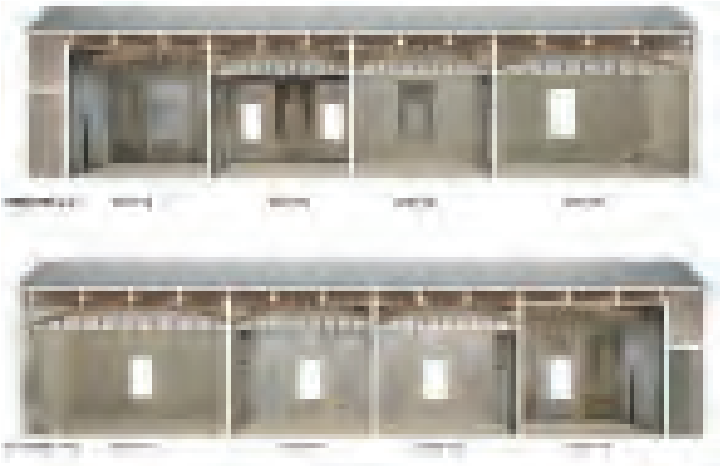

Fig. 142 - Simulation of restoration work: longitudinal sections

Fig. 143 - Simulation of restoration work: longitudinal sections and render of the rooms in a section of the piano nobile

A stone palimpsest. The castle and walls of Taggia (IM)

Specialists: Francesca Buccafurri, Angela C. De Hugo Silva, Mirko Pasquini

2011

Research contract with the Superintendence of Architectural Heritage and Landscape of Liguria, MiBAC and with the Municipality of Taggia (IM)

The thesis offers a contribution to the drafting of the definitive plan entitled "Castle and ramparts of Taggia: restoration and functionalism", entrusted by the Municipality of Taggia to the Superintendence of Architectural Heritage and Landscape of Liguria The castle, which stands on the right hand bank of the river Argentina, dates to the 16th century but preserves remains of artefacts dating to the 12th century. The study includes a plan to survey the ruins in order to be able to describe the geometry of the site. In parallel, an in-depth study of all the available indirect sources was conducted which has allowed a detailed historical overview to be defined and a chronological list to be constructed, expanded by stratigraphical analysis, of the masonry techniques, chrono-typology of the apertures, mineralogical-petrographical analysis of the plasters and mensiochronology of the bricks. The diagnostics have enabled the state of conservation of the materials and the structures to be determined and identification of the degradation phenomena. The conservation restoration work, shown in the plan, follows the criteria of "minimum intervention", the "reversibility of the interventions" and the "ability to distinguish any additions". The plan for reuse envisages the establishment of a multi-functional area on different levels, consisting of a large space for open air events and an exhibition and learning zone. The overall plan places a focus on accessibility, with a redesign of the links and communications with the historic centre of Taggia which, in the part immediately downstream from the Castle, is in poor condition and is very inaccessible to the public.

Fig. 144 - View of part of the walls of the ruins of the Castle of Taggia (IM)

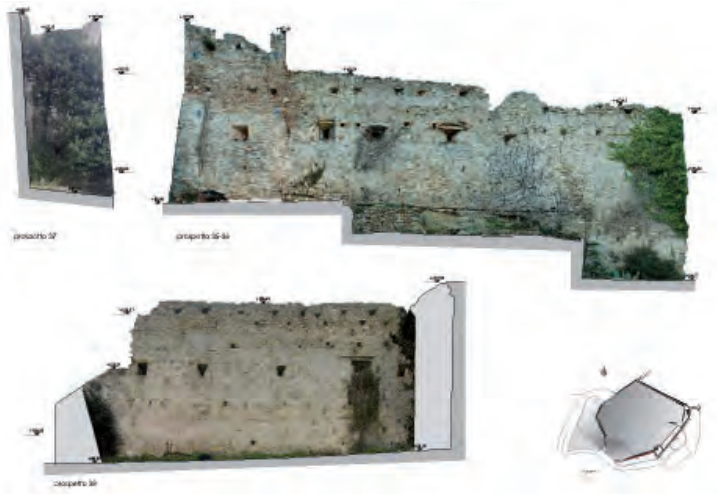

Fig. 145 - Reinstatement of the survey of the elevations of some stretches of the walls with the insertion of photo planes

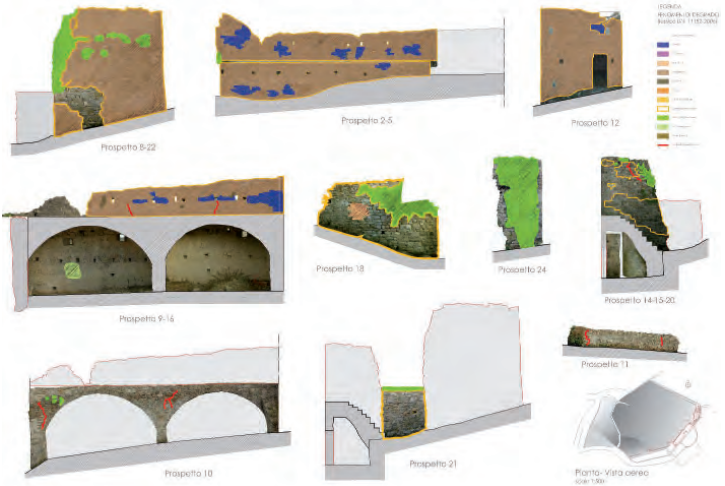

Fig. 146 - Map of the degradation phenomena of some stretches of wall

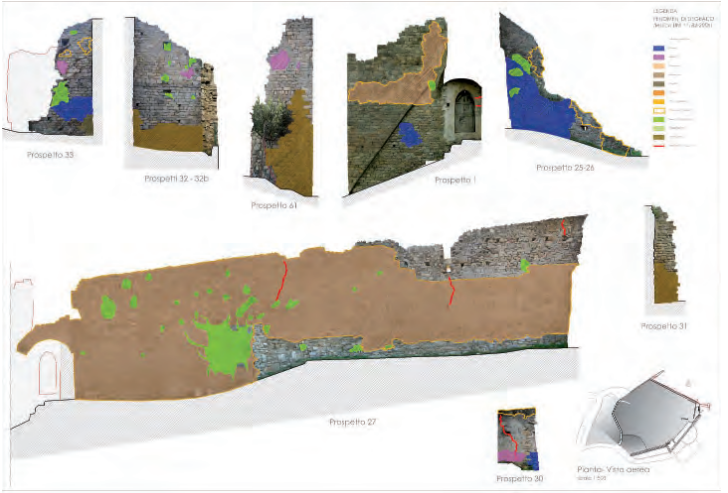

Fig. 147 - Map of the degradation phenomena of some stretches of wall

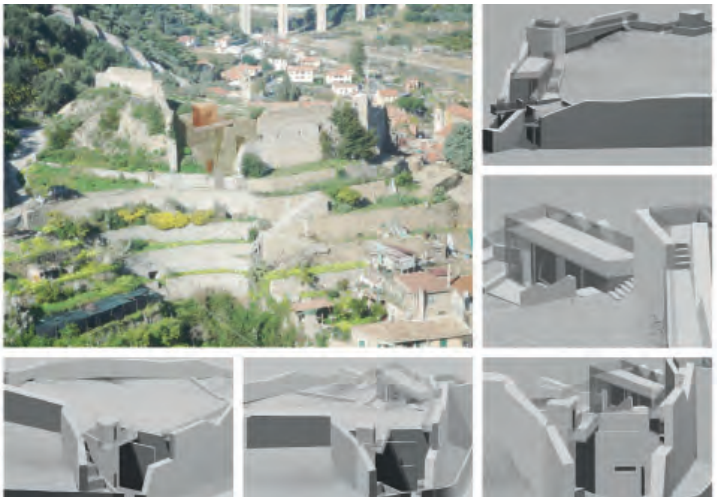

Fig. 148 - Photo insertion and three-dimensional modelling of the new architectural construction

Application of the Geographic Information System to restoration work. A case study: Palazzo Doria-Spinola, Genoa

Specialists: Barbara Peri, Alessandra Pili

2011

The thesis applied GIS technology to the project to restore the Palazzo of the Prefecture of Genoa, *Palazzo Doria Spinola*. The Palazzo, which has been part of the system of the *Palazzi dei Rolli* since 1588 is the ideal subject for this trial as it has undergone numerous changes of use over the years and at least three renovations.
There is actually a great deal of information from numerous sources but it is at risk of not being used because it is difficult to track down. The task consists in gathering all the existing material on the building and utilising the information with an ad hoc research on the events of recent decades. To organise and systematise the information, a survey was carried out to develop a cartographic database to which the data could be linked using the software Archis 2.2 of SISCAM.
The material collected and entered into the GIS is bibliographic, documentary-archival, cartographic, graphic and photographic. To this material was added the information obtained from the analysis of the building: mapping of the materials and construction elements, finishes, decorations and installations.
A further step was to enter the data on the state of conservation and on past restoration work, in particular the renovation of the facade in 1938, under the direction of Superintendent Ugo Nebbia; the conservation restoration in 1981, curated by Pinin Brambilla Barcilon and directed by Superintendent Giovanna Rotondi Terminiello; and, lastly, the work carried out in 2001 by Superintendent Liliana Pittarello and designed by Gianni Bozzo.
The objective of the work is not the creation of a system as an end in itself but instead to put together a planned conservation programme,

Fig. 149 - Detail of the entrance portal of the Palazzo Doria-Spinola


PALAZZO DEL GOVERNO

transforming the system from a simple container of data into a useful tool for developing a procedural insight into the world of architectural heritage conservation.

Fig. 150 - View of the main facade of Palazzo Doria-Spinola

Fig. 151 - Map of the expected restoration work in the 2001 project

Fig. 152 - Map of the state of conservation of the plasters and pictures before the 1938 restoration

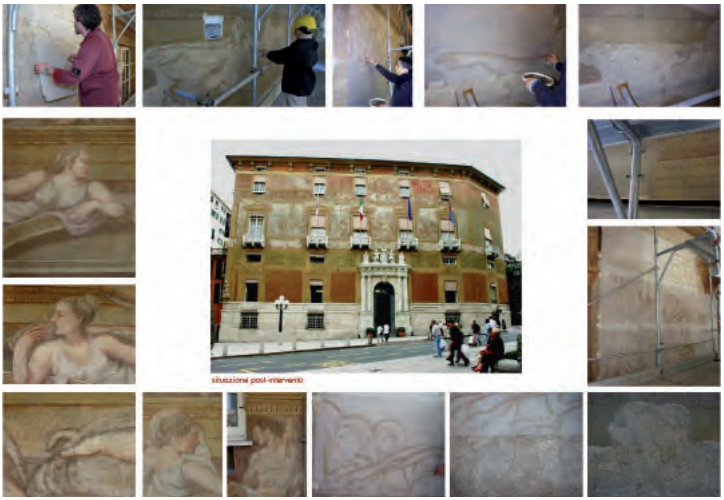

Fig. 153 - The implementation stages of the 2001 restoration. In the centre, the facade of Palazzo Doria-Spinola at the conclusion of the restoration work

Protecting and restoring the Vittoriano Viganò Faculty of Architecture

Specialist: Valeria Megna

2010

The building of Viganò forms part of the vast property heritage of the *Politecnico di Milano*, consisting of bequests by illustrious masters of modern architecture. The first stone of the *Città Studi*, where the Politecnico is situated, was laid in 1915. It is a peripheral area of the city which, at that time, had a strong rural character.
The Viganò building, designed by Gio Ponti and Giordano Forti, was an extension of the Faculty of Architecture, carried out between 1955 and 1961, partly in relation to the project. It was immediately insufficient to satisfy the increase in the student population which occurred from the middle of the 1950s onwards.
The predominant presence of steel in the construction makes this one of the most emblematic buildings in terms of the use of this technology. Over the course of the first twenty years, the building underwent numerous alterations owed, in part, to adaptation to the new technical legislation and in part to maintenance work. These were always of a somewhat *ad hoc* nature, almost of "emergency", which prevented an overall vision and a general, organic approach. Instead, alterations were made, one on top of the other and were mostly conceived and executed without an overall vision of the relationship between the elements.
The building's state of conservation did not require restoration. On the contrary, problems existed which necessitated putting in place a plan which avoided proceeding with emergency action conducted from the viewpoint of the maintenance of the ordinary building.
The objective of the thesis is to study the building's fabric and its state of conservation in order to develop a "Plan of programmed

Fig. 154 - Detail of the main facade of the Politecnico di Milano's Faculty of Architecture on via Ampère

conservation". In particular, the work has explored the problems relating to the glass facade on the western side and the set of skylights located in the roof space. To illustrate the proposed conservation process, SIRCoP (*Sistema informativo della Regione Lombardia per la conservazione programmata*) software was used.

Fig. 155 - View of the north eastern part of the covered patio

Fig. 156 - Detail of the steps taken on the top of the steel load bearing structure

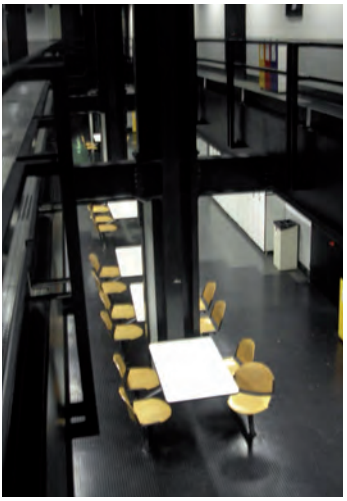

Fig. 157 - View of the space distribution at double height

Fig. 158 - View of the internal stairway to the first floor

Fig. 159 - View of the balconies on the second floor of the building

Fig. 160 - Detail of the interlocking elements on the edges of the outer framework

The Villa Durazzo-Pallavicini Park in Genoa

Specialists: Elena Gentilini, Mara Lucchetti, Valeria Mangini, Luca Pedrazzi, Giorgia Teso

2009

The historic park of *Villa Durazzo-Pallavicini* is a work of art of considerable artistic historic value, in terms of environment, landscape and architecture. However, it is difficult to interpret and understand, both in its specific detail and, to a greater degree, in its collective meaning. The cultural value of the site is even more important when considered as part of the whole Pallavicini di Pegli complex which, as well as the garden and its pavilions, comprises the Villa and botanic garden. The historic garden, which was inaugurated in 1846, is characterised by the successful symbiosis between the landscape and architectural elements, skilfully handled by the architect, Michele Canzio. The site, artificially transformed to simulate a natural environment, the architectural artefacts and the individual living plants have made the park a complex cultural testimony which, over time, has undergone continuous alterations. It is this feature of an interlinked whole which has prompted the work of the thesis to be based on a methodology favouring a systemic vision of the development of the conservation processes. In this sense, the vegetation which makes the park a constantly changing work of art, because of the natural transformations regulated by the life cycle of the plants, represented a real design challenge based on an in-depth cognitive study through survey and analysis of the existing. The problems of conservation, protection and management, used as a base for constructing the restoration and redevelopment project proposals, have been identified. This was necessary not just to check the spontaneous transformations, but also to remedy the altered state of the upper part of the park, already abandoned for decades. The

Fig. 161 - View of the central area on the ground floor of the Castello del Parco in the Villa Durazzo-Pallavicini

specific fields of study have been discussed with the Municipality administration (Cultural Department - Museums Sector) which has taken an interest in the upper part of the park. This area has already been closed to the public since the first decades of the 20th century and has fallen into an overall state of decay, causing an alteration in the environmental and architectural system. In this area of the park, the study is focused on the *Castello del Capitano*, one of the most iconic buildings of the entire complex.

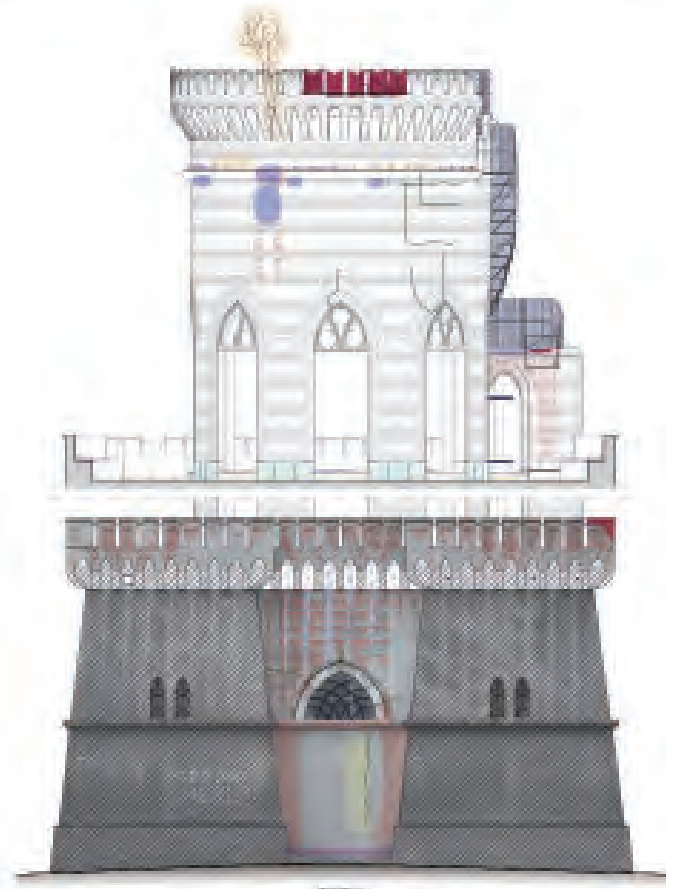

Fig. 162 - Map of the degradation phenomena: east side of the Castle

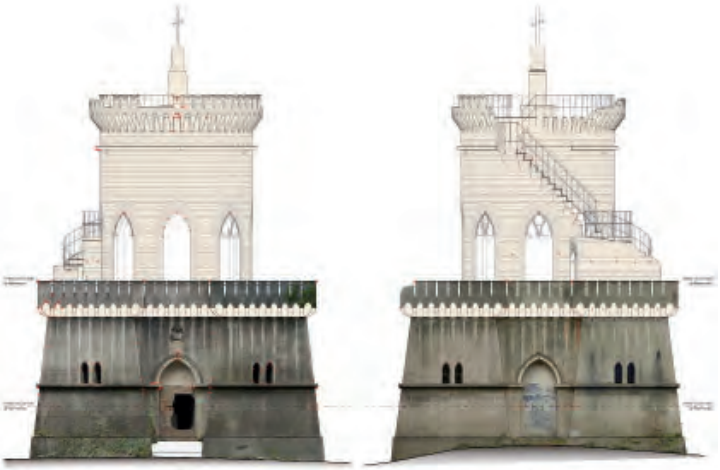

Fig. 163 - Reinstatement of the survey of the northern and southern elevations of the castle with the insertion of photo planes

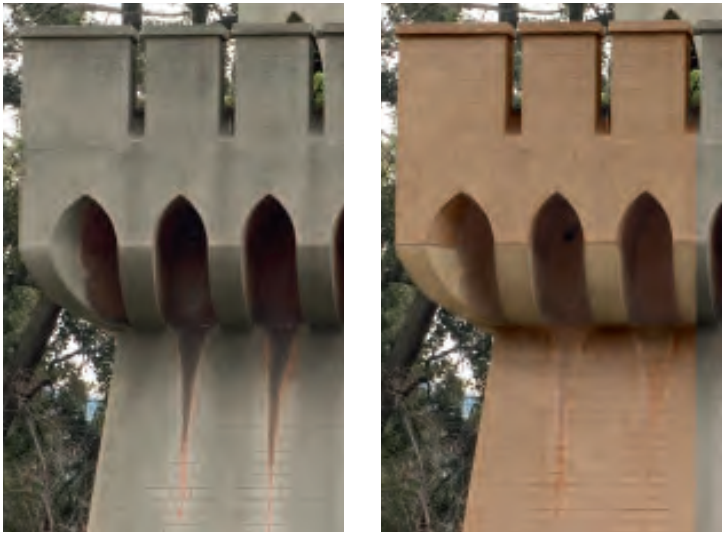

Fig. 164 - Detail of the current state of the external plastered walls and simulation of the state following their restoration

The former Supreme Court of Singapore and its artificial stones

Specialist: Ho Weng Hin

2008

The ex-Supreme Court is the most famous of the buildings which constitute the colonial architectural heritage of Singapore. It was built by the British government in 1939, in a neo-classical style. Its symmetry, proportions and imposing dimensions conveyed the strength of power of the colonial government to the citizens of Singapore.

Behind the facades clad in artificial stone, the building consists of pillars and beams made from steel produced in Scotland, imported and assembled on site. They were encompassed in concrete and then clad in local bricks on which the plaster was laid and, lastly, the finish in artificial stone. The interior displays a wide variety of sophisticated technical work on the ceilings, cornicing, plinths, moulding and other decorative elements. Other modern finishes were added to these materials, such as the rubber flooring, done by a historic company in Singapore and a rare example of a technique which was once very widely used in Singapore and Malaysia, and cladding in agglomerated cork, another rare experimental building material from the 1930s.

In Singapore, notwithstanding the quantitative success of the conservation in the historic district in the centre of the city (more than 6,500 buildings have been conserved, mostly through re-use projects), there is still a lack of regulation imposing strict analytical study of the architectural asset before the design phase. A specific qualification is not contemplated for design projects on historic buildings. These are often used as a "pretext" for invasive interventions, adapting them to uses demanded by aggressive economic development which destroy precious signs and evidence of the landscape and, consequently, the

Fig. 165 - Detail of one of the columns in the Ionic style: principal facade of the ex-Supreme Court

cultural identity of Singapore. In this sense, the aim of the work of the thesis on the ex-Supreme Court is to be a pilot study for Singapore. It is divided into phases of documentation, analysis, diagnosis and drafting of guidelines for the conservation of the monument, which will be transformed into a National Art Gallery

Fig. 166 - Anonymous drawing depicting the Supreme Court of Singapore (JIAM Archive)

Fig. 167 - Entrance passageway to the main Hall of the ex-Supreme Court

Fig. 168 - Access gallery to the main Hall of the Court Room

Fig. 169 - Entrance to the main Hall of the Court and link with the main corridors

Fig. 170 - View of the Supreme Court of Singapore

The Sacro Monte della Beata Vergine of Ossuccio (CO)

Specialists: Gloria Brocchi, Mariachiara Faliva

2007

The *Sacro Monte di Ossuccio* is the only one among the Sacred Mountains in Lombardy and Piedmont whose land has been heavily urbanised and poorly protected. This situation is the result of political and historical events which saw the expropriation of the areas surrounding the complex. They were awarded to private individuals who, since the end of the 19th century, have built over the land. For this reason, the study of the complex of the *Sacro Monte di Ossuccio* has, among its objectives, the understanding of the multiple, complex connections and relationship with the surrounding environment and the recognition of the value, not of the individual asset, but rather the context in which it is located. In this sense, the conservation is not intended as an impediment to the transformations, but rather as a tool to recognise the co-evolutionary potential of the asset and the field of reference and of the dynamic potential (historic, social and cultural) in how it arrived at this situation. vIt began with an in-depth analysis of the historical, cultural and environmental context of the Sacred Route, the buildings, the statues and the surrounding land. In this phase, analyses conducted in the archives, especially those of the Sanctuary, have been an enormous help. It has been shown that many of the problems that exist today are linked to past activity which has had a negative influence both on the conservation of the material of the monument and of its surroundings.
Following the analysis phase, carried out on the whole complex, the thesis focused on one single Chapel, the 12th of the Route, chosen for its very advanced state of degradation and for the lack of any recent restoration work. In collaboration with the Experimental Laboratory of the BEST Department and with the Institute for the

Fig. 171 - Details of the terracotta statues of the Sacro Monte di Ossuccio





Conservation and Enhancement of the Cultural Assets of Milan, analyses were performed on the state of conservation of the building and the polychrome terracotta statues. The causes of the degradation were identified and a protocol of actions was developed, which will be useful for the analyses and interventions that will have to be conducted in the future.

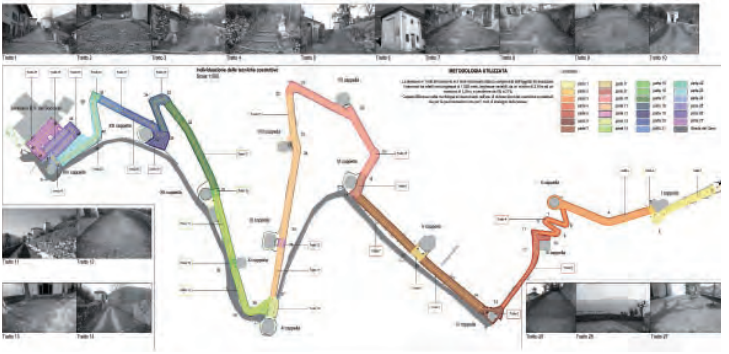

Fig. 172 - Map of stretches of the route to the Sacro Monte

Fig. 173 - Group of statues hanging on one of the walls of the 12th Chapel: The Assumption of Christ

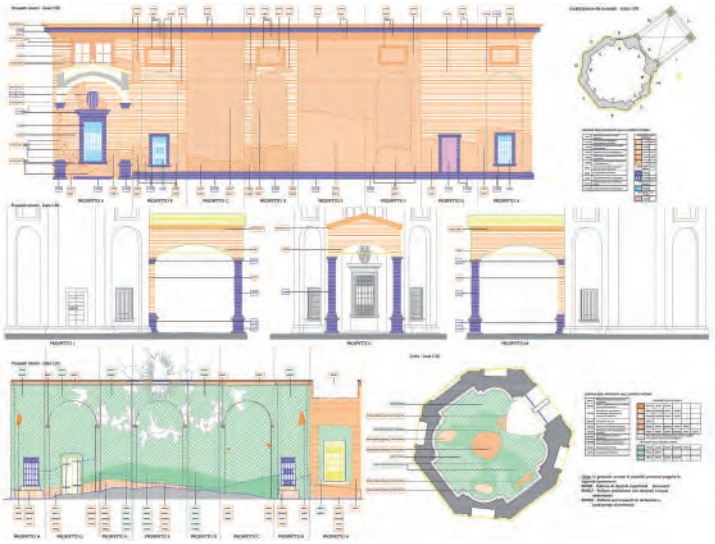

Fig. 174 - Map of the restoration interventions 12th Chapel

Fig. 175 - Group of statues on the floor in the 12th Chapel: The Assumption of Christ

Studies and research on the Su Pyo Bridge in Seoul, South Korea

Specialists: Beniamino Polimeni, An Jin Sung

2007

The Su Pyo bridge is a structure consisting entirely of blocks of pink granite which is situated in the Jangchungdan Park in Seoul, South Korea. The original name of the bridge, which was built in 1420, was MaJeonKyo because of its proximity to the horse market. It was only later that it assumed the name of Supyogyo from the tool used in 1441 to measure the depth of the water and which was typical of the Choseon period. In its formal structural features, the bridge belongs to the "HyungKyo" building typology, which is characterised by a trilithic structural scheme which is repeated three times over. Over time, the bridge has undergone replacements and additions, the most important of which date to the year 1768, when it was lengthened during the work to enlarge the riverbed. In 1958, it was removed from its original location on the river Cheong Gae, then covered and reassembled within the Park where it stands today. The objectives of the specialisation theses consist of: 1) Experimenting with tools and methods of Italian restoration, applying them to a historic Korean architecture. 2) Evaluating the possibility of using these tools within a different cultural and environmental context. 3) Presenting an alternative plan to that of the Korean Ministry of Cultural Heritage that had intended shifting the bridge from its original location again, thereby distorting its shape and structural features. The methodology consists in a careful analysis of the materials, building techniques and degradation phenomena and in the planning of measures which would allow the material evidence of the past to be conveyed to the future, maintaining the state reached by the construction, through the elimination of the intrinsic and

Fig. 176 - View of the Su Pyo Bridge in Seoul, South Korea

extrinsic causes of degradation, to move even further ahead in time the work's threshold of permanence and to ensure the visibility of the material evidence of the past. Action has also been taken to improve the accessibility of the structure and to ensure its full visibility.

Fig. 177 - Illustration 'JunCheonSSa YeolMoodDo': Anonymous c.a 1776 Civic Museum of the city of Busan

Fig. 178 - View of the stone pillars of the bridge

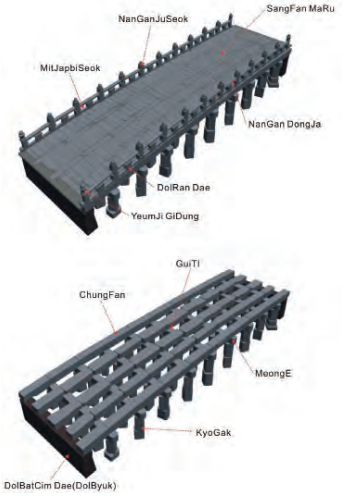

Fig. 179 - 3D Representation of the structural elements of the bridge

Fig. 180 - Detail of one of the stone pillars of the bridge

Fig. 181 - View of the Su Pyo Bridge in Seoul, South Korea

Conservation proposal for the east solarium of the former Regina Elena di Savoia sanatorium in Legnano (MI)

Specialists: Marta Angeli, Mara Blonda, Patrizia Della Vedova, Maria Luisa Laddago, Michela Poletti, Silvia Teruggi

2006

The *Regina Elena di Savoia* Sanatorium in Legnano (MI), constructed between 1922 and 1927, was designed by the engineers Brini and Roveda. It is formed of a central body, some service buildings and two solariums of dual display, winter and summer. With the illness eliminated, the complex was reconverted into a place for looking after minors, causing numerous alterations and adaptations. The subject of the thesis is one of the solariums, abandoned since the 1960s as the constraints of layout and of use (semi open, flexible spaces, adequate dimensions and aero illuminating ratios) prevented it from being converted to new uses.

The original structure with wood-framed walls is reminiscent of the timber-frame houses, as well as some elements of the Modern Movement, such as the punctiform structure and the prefabricated modular elements in reinforced concrete. Despite the existence of ample documentation relating to the project and to the worksite, some doubts remain regarding the systems of connection and interface between the different materials and construction elements, so the thesis has been useful for conducting a careful technological analysis that throws light on such relations.

The analysis of the state of preservation of the building, in particular of the wooden elements, has shown the poor state of repair of some of them.

The project has a strongly conservative profile which has influenced the choice of function: a multi-functional space, usable from time to time as an exhibition space, for theatrical or musical events, or simply to pause without imposing heavy transformations.

Fig. 182 - View of the corridor of the east solarium of the sanatorium

Fig. 183 - View of the complex of the former Regina Elena di Savoia sanatorium in an old postcard (1928)

Fig. 184 - View of the severe degradation into which one of the pavilions of the complex of the former Regina Elena di Savoia sanatorium has fallen

Fig. 185 - Map of the restoration interventions on the wood framed walls

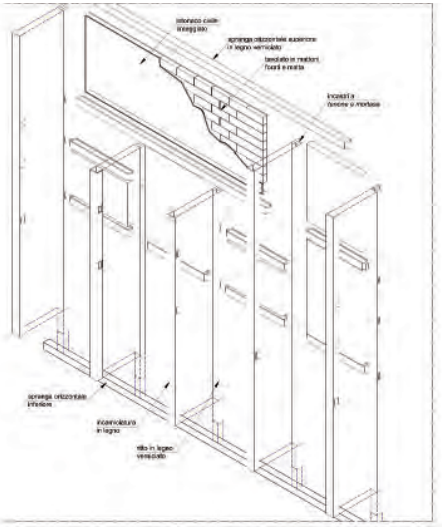

Fig. 186 - Technological analysis of the wood framed walls: three-dimensional model of a section

The convent complex of Sant'Antonio in Scicli (RG)

Specialists: Izabel A. Alcolea Cancado, Ilaria Cavirani, Benedetta Steri

2005

Research contract with the Municipality of Scicli (RG)

The Church and Convent of *Sant'Antonio* are among the only testimonies of Sicilian architectural Renaissance in the Val di Noto to have survived the catastrophic earthquake of 1693. The building was reduced to ruins, the convent church was left only with the perimeter walls, the roof and the vault of the main nave having fallen down. The vault of the bowl-shaped apse is conserved and the eight-point ribbed vault, on plumes decorated with stalactites, of the area situated at the back of the church. There are also numerous remains of valuable decorative furnishings in stucco.

The division of the work envisaged, first of all, a photogrammetric survey, which provided the graphic basis to enable construction of maps of materials and degradation phenomena.

A stratigraphic reading of the signs and historical traces left on the building was also conducted. Because of its ruined condition, the complex is able to show "anatomically" the variety of techniques and construction elements. Its ruined state is certainly a weakness.

However, it has been turned into a point of strength for the project, providing the role of "masonry technique museum", a development which should also make it place of interest for those studying construction.

The restoration measures envisage structural consolidation, selective elimination of biological patinas and plant infestations, careful work to grout the ridges of the walls, the joints between the stone elements and the decorative furnishings.

Fig. 187 - View of the ruins of the nave of the convent church

Fig. 188 - Detail of a column in stone material

Fig. 189 - View of the apse area of the church

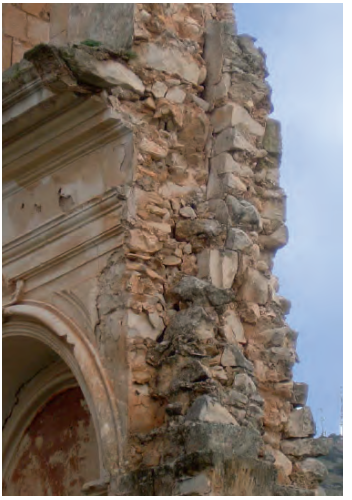

Fig. 190 - Detail of the cross section of the perimeter wall of the church

Fig. 191 - View of the interior of the cloister ruins

Fig. 192 - View of the convent complex of Sant'Antonio in a state of ruin

The facade, a palimpsest to rebalance

Specialists: Francesca Cacciola, Laura G. Capurro, Maria Cecero, Tiziana Ciresola, Anna Decri, Stefano Demi, Marta Franzini Tibaldeo, Carlos R. Gimenez, Francesco Laiolo, Laura Nanni

2004

Among the "crucial" topics of restoration, that of the facade probably displays the most pronounced ambiguity. The solution of the problem is generally entrusted to the "sensitivity" or long experience of the restorers, when it is not pre-ordained by building regulations, colour plans or pre-packaged methodological repositories. The problem is presented with a variety and complexity of situations of the kind that dismiss any attempt, be it technical or simply guided by taste. The question appears to be of a different nature: does there exist a form of checking design procedures in the restoration of painted or decorated facades? The thesis indeed moves from this question to attempt to outline a methodological route whose individual moments are subjected to three forms of inspection. 1. The acceptance of the stratigraphic furnishings as evidence to be protected in its totality. 2. Reading the phenomena of the alterations made to the painted or decorated facades. 3. An assessment of the techniques, tools, materials and procedures applicable to the treatment of the surfaces. A collateral aspect, although not secondary, is the apparently irremediable conflict between the requirements of "common sense" (which demands innovation and decoration) and those of a restoration rooted in the rigour of the whole in accordance with all documentary records. The objectives of the thesis have stimulated an orderly series of reflections and experiments which have had, as their theatre and field of work, the prevalently Genoese historical building heritage, according to the following methodological approach: acquisition of data; development of a system of reference - the "thresholds" of intervention; examination of a case study: the facade of *Piazza Campetto 5*.

Fig. 193 - Image processing techniques for the study of the levels of integration of the gaps in decorated plasterwork. From above: actual state, treatment of the smallest gap, restoration of the visibility/continuity of the only geometric pattern

The Torre Delfinale in Oulx (TO)

Specialists: Chiara Mondino, Benedetta Murzio, Mariana Teixeira

2004

Research contract with the Municipality of Oulx (TO)

The tower is situated in Oulx (1.121m ASL), in *Val di Susa* (TO). It is an isolated building, standing on a hill overlooking the lower village and the modern part of the town, as well as the plain of Oulx. It is reached on foot, following an ancient mule path (known as "*Vicolo della Torre*") which crosses the higher part of the village and continues along the fields. The monument is in a state of ruins (the roof and internal ceilings have collapsed) which must have happened more than a century ago, judging from the archive documentation of the end of the 19th century and from old photographs. It is, nevertheless, a ruin in a good state of conservation which is in large part due to the skill and care with which it was constructed: the masonry is massive and of good medieval craftsmanship, with angle irons in square ashlars and regular patterns using quality mortar. There are signs of collapse from the top battlements and the chimney is damaged and in a dangerous state, so the thesis is directed first of all on plans to make it safe. The building is a square structure, on a north-south axis, and it is accessed via an opening with an arched doorway, situated on the ground floor close to the north-east corner. The tower is ringed with simple battlements, on which a pavilion roof must have been supported. The building has been the subject of investigative inquiries including a topographical and a photogrammetric survey, structural analyses of the materials and degradation phenomena and an archaeological-historical study. The project envisages the conservation of the ruin's fabric and all the elements that characterise it and proposes its refurbishment using the study of an "eco museum" extending to the whole region of the

Fig. 194 - View of the Torre Delfinale in Oulx (TO)

Susa Valley, in which the tower would be valued both as evidence (monumental-documentary), being part of the regional museum exhibition, and as a "virtual remembrance museum", conceived as a laboratory for a teaching experiment and as a tourist attraction.

Fig. 195 - View of the top part of the tower

Fig. 196 - View of one of the window openings of the tower

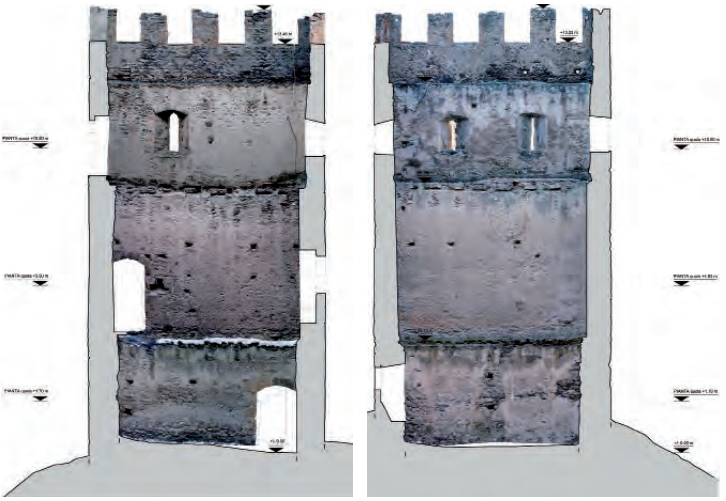

Fig. 197 - Sections a-a' and d-d' with the insertion of photo planes of the north and south internal walls

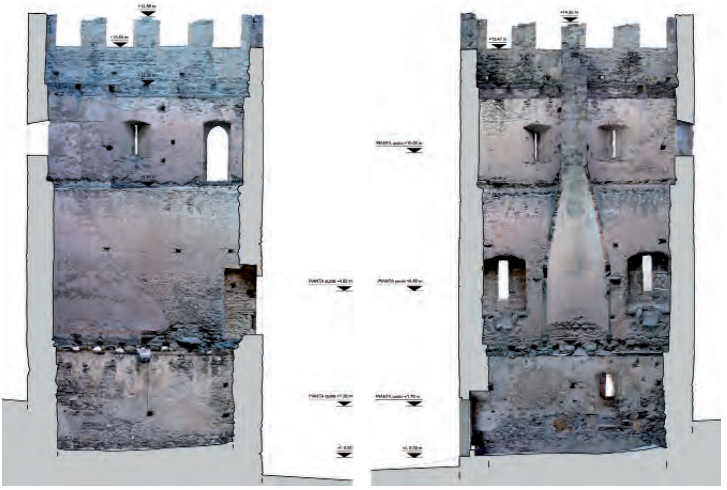

Fig. 198 - Sections e-e' and c-c' with the insertion of photo planes of the east and west internal walls

Facades of Palazzo Brignole or "Palazzo della Dogana" in Novi Ligure (AL)

Specialists: Stefania Bertano, Franco Biondi, Samanta Braga, Micaela Goldoni, Emma Ibba, Alessandra Lenti, Barbara Pani, Chiara Sotgia, Chiara Tettamanti, Marcela A. Traina

2003

Research contract with the Municipality of Novi Ligure (AL)

Situated in the historic centre of Novi Ligure (AL), *Palazzo Brignole*, which is known as *Palazzo della Dogana* (Palazzo of the Customs), has architectural and decorative features which are typical of 18th century noble building in the Novese area, inspired by the constructive and figurative repertoire of contemporary Genoese models. The building was not granted protection which has perhaps been why no appropriate conservation measures have been implemented, resulting in the current state of general decay. The Municipal Authorities have contacted the School and asked for the preparation of a suitable design plan to deal properly with the urgent conservation demands of the frescoes on the facades, a specific subject of the research task, promoting, at the same time, a co-ordinated set of investigations on the building to support the appropriate initiation, by the Superintendence for Architectural Heritage and Landscape of Piedmont, of the necessary inquiry to fix the restriction (until then) ex Legislative Decree 490/ 99.

The series of geometric surveys, analyses on the materials and building techniques, historical and archival investigations and the mapping of the alterations and pathologies which afflict the front of the building have given rise to a planning proposal aimed at ensuring the monument's conservation, stemming the progress of the decay and protecting the formal, stratigraphical, technical and documentary "evidence" still visible on the complex, as well as its "examination".

The search for solutions which, while ensuring the technical effectiveness of the measures, does not limit the ability to decipher the painted surfaces, has therefore been developed by exercising a

Fig. 199 - Detail of the facade of Palazzo Brignole - "della Dogana" on via Roma

constant check on the expected "formal outcomes", also using digital simulation techniques, especially for the treatment of the gaps in the different layers of painted plaster. The actual concept of "gap" has in fact been subjected to a sort of "methodological revision" which has suggested implementing different design solutions, distinguishing between the cases in which the edge could refer to the effective lack of entire sections of 18th century painted plaster (the deepest and oldest), or else to the presence on it of fragments of more recent plaster which were partly obliterating the ancient traces of decoration and, therefore, without which there was no certainty about their existence and their definitive loss.

Fig. 200 - Details of the facade on via Roma. To the left, detail of a missing layer of more recent plaster. To the right, detail of the decoration of the facade visible through the missing parts

Fig. 201 - Photo plane of the facade on via Roma with its pre-intervention and post-intervention state of restoration

Fig. 202 - View of the facade of Palazzo Brignole on via Roma

Restoration of the church of San Filippo Neri in via Lomellini, Genoa

Specialists: Giulia Elia, Ivonne M. Moreno Moga, Giuliano Peirano, Sara Rizzo, Giulio Vatteroni

2003

Research contract with the Superintendent of Architectural Heritage and Landscape of Liguria, MiBAC

The complex of *San Filippo Neri in via Lomellini*, one of the oldest parts of the historic centre of Genoa, consists of the church, oratory and convent annex and represents one of the most important examples of Baroque architecture in Genoa, with rich stucco, frescoes, examples of cabinet making and marble inlay. Despite this, the complex has never been thoroughly investigated, which may also be because of the loss of the archives of the religious community, which occurred during the Second World War. This has led to the assignment of the task to the School by the Superintendence for Architectural Heritage and Landscape of Liguria in view of the new restoration work.

According to known documentary and literary sources, the construction of the church dates to 1660 but, in 1673, the same sources testify to its early, complete destruction, which was only remedied in the eighteenth century, when it was reconstructed together with the oratory. The interior of the church consists of a covered hall with a tall, wide ribbed vault (19.60 m), marked to the side by two lunettes and ending in a semi-circular apse. On the sides of the hall are two chapels, rectangular in shape, defined by a large arch, flanked by two smaller arches.

The interior features impressive decorative elements consisting of vast frescoes which cover the entire surface of the walls, with architectural finishes, recesses in perspective and figurative scenes of a religious nature, lavish polychrome marbles which enliven a remarkable variety of inlays and sacred furnishings, added to which is a great profusion of decorated stucco.

Fig. 203 - View of the facade of San Filippo Neri, Genoa

The thesis has above all addressed the problem of a survey which gave an account of a space of tricky "definition" and complex geometry, mainly in relation to the illusionist nature of many of the frescoed parts, where the colour and shapes go beyond and invade the space, "cancelling" or hiding the lines of the architecture. Added to that is the analysis of the phenomena of degradation affecting the building and the study of their causes, to construct a project of intervention which provides the operators of the pictorial restoration with rigorous technical and scientific bases, above all for that concerning the treatment of the gaps, distinguishing between the frescoed parts, painted dry or decorated in various ways, on plaster or wooden elements.

Fig. 204 - Detail of the painting of the large ribbed vault of the central nave by Marcantonio Franceschini (1648 - 1729)

Fig. 205 - Longimetric survey of the longitudinal section with the insertion of photo planes

Fig. 206 - Suggested restoration of the painted surfaces: simulations of striped pictorial addition

Fig. 207 - Suggested restoration of the painted surfaces: simulations of glazed pictorial addition

The Parish Church of San Vito in Morsasco (AL)

Specialists: Antonella Caldini, Tiziana De Iaco, Matteo Ferrari, Grazia Finocchiaro, Francesca Giambanco, Maria Previti, Maria Cristina Ruggieri

2002

Research contract with the Diocese of Acqui Terme (AL)

The thesis proposes an overall programme to restore the Romanesque church of *San Vito* in Morsasco (AL), frequently the object of attention by the Superintendence of the Architectural and Landscape Heritage and the Superintendence for the Artistic, Historic and Demo-ethno-anthropological Heritage of Piedmont, mainly for the worrying state of degradation of the internal frescoes and the rare roof of the apse which is constructed from Luserna stone.

Following the earthquake which struck Alessandrino on the 21st August 2000, the apsidal section of the ancient building also suffered new structural damage and the church was therefore entered into a "Plan for urgent measures on damaged historical-monumental and artistic buildings".

The work of the thesis gave rise first of all to the development of a plan of structural consolidation and improvement of the anti-seismic resistance, which was given the immediate go ahead.

The more general conservation plan, based on the information acquired during the development of the thesis, is yet to be put into practice. The information includes geometric survey, executed with topographical, rigorous longimetric and simplified photogrammetric techniques; the analysis of the materials and construction techniques; stratigraphic reading of the height; diagnosis of the current phenomena of degradation and experimental trials with non-destructive diagnostic techniques such as video-endoscopy, dynamic tests on the metallic chains, ultrasonic trials on the masonry and thermo-hygrometric surveys, both to the exterior and the interior.

Fig. 208 - View of the apse of San Vito in Morsasco

The set of data gathered and processed has highlighted the indications relating to the technical interventions aimed at the physical maintenance of the building and its stratifications, not to forget the requirements linked to its use. Technical instructions have been provided for the restoration of the surviving frescoes and of every other building and structural material component of the church, organised into design charts and into technical specifications.
If it is sufficiently circulated, the study of the Church of *San Vito* could provide useful elements of comparison for studies and projects on analogous architectural monuments, the conservation of which is sometimes crucial for the protection of the heritage of many local communities.

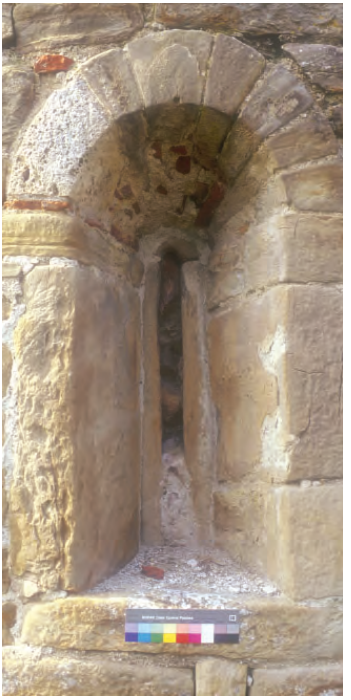

Fig. 209 - Lancet window: central part of the apse

Fig. 210 - Fresco portraying the Virgin and Child: apse area

Fig. 211 - View of the central fresco of the apse depicting the Crucifixion

Fig. 212 - View of the Church of San Vito in Morsasco

Former church of Santa Maria del Canneto in Taggia (IM)

Specialists: Andrea Canziani, Lorenza Comino, Francesca Fabiani, Laura Maggiolo, Daniela Zambelli

2002

Research contract with the Superintendence of Architectural Heritage and Landscape of Liguria, MiBAC

The church of *Santa Maria del Canneto*, one of the most important buildings in Taggia, is of pre-Romanesque and Romanesque origins (12th and 13th centuries) and houses a series of frescoes by Luca Cambiaso, dated 1547. The building had already undergone radical transformation in 1768 and is the result of numerous other interventions, including the recent structural consolidation of the masonry. The School of Specialisation was asked to give its contribution to the study of the degradation phenomena and the conservation of the frescoes. There was a strong focus on computer processing of all the analytical and diagnostic data acquired during the survey phase, to design a layering system making it possible to enter different sorts of information in a single file which can be updated by different operators, thus creating a readily searchable "system".

Linking with an external database has also enabled real time updating of metric calculations, to amend design charts (especially the maps of the interventions). In parallel, an automated experimental programme has been developed relating to the photogrammetric and instrumental surveys, to integrate three-dimensional geometric models with digital images of complex and irregular surfaces. By way of example, it can be shown how, in the survey of the vaults, different methods of DEM (Digital Elevation Model) generation have been compared, built on the basis of stereoscopic models (stringent analytical photogrammetry) to highlight the deformed profiles of the structures. On the apsidal surfaces, on the other hand, experimentation was carried out of the Leica TCRM1102 motorised

Fig. 213 - View of the facade of the former church of Santa Maria del Canneto

total station, for the automatic survey of masonry profiles, using the instrument's capabilities in scanning continuous surfaces. The software regulating this function, which was created to monitor the mine extraction sites, is not in fact able to take into account levels of non-parallel scanning at the zenith axis, nor is it able to read two-dimensional profiles.
The experimentation has therefore led to the development of a scanning system able to generate, to the instrument itself, profiles featuring groups of very fixed points, of which are known the point of departure and arrival and a significant frequency of intermediate readings, with much reduced processing times. To all of this, the thesis has attached the simulation of the conservation restoration measures, carried out with image processing techniques and has added to it the design element, up to the special conditions of contract.

Fig. 214 - View of the apse and of the bell tower of the former church

Fig. 215 - View of the internal vault in an advanced state of disrepair, mainly due to water infiltration

Fig. 216 - Longimetric survey, longitudinal section

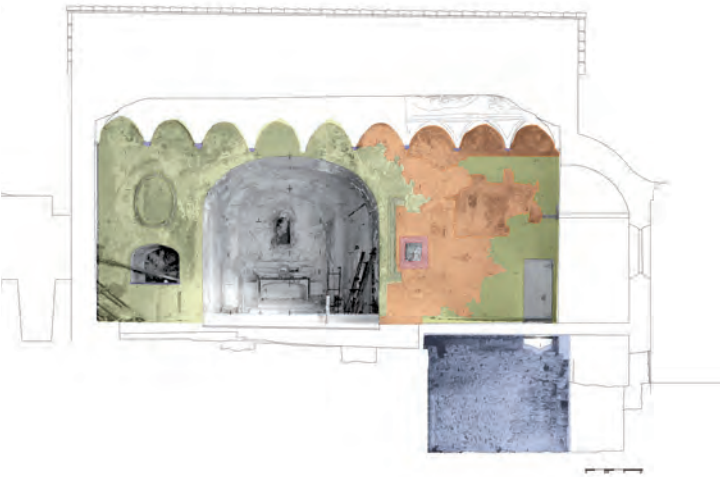

Fig. 217 - Map of the materials: longitudinal section

Renovation of Piazza Marconi in Castelnuovo della Berardenga (SI)

Specialists: Maria A. Fiorucci, Cristina Gandolfo, Gioia Molinari, Roberto Nessi, Elisa Pafumi, Giusi Pagliarello, Gino Repetto Montalvan, Maria Grazia Scarzella, Massimo Sigillò Massara Francesca Tassara, Claudia Zanlungo

2002

Research contract with the Municipality of Castelnuovo della Berardenga (SI)

The redesign of *Piazza Marconi* represents a fundamental crossroads in the programme of overall reorganisation of Castelnuovo della Berardenga, a town in the province of Siena, which is considered to be the capital of the Chianti region. By its size, morphology of the land and position, the piazza, which used to be the location for the market outside the walls called "Exhibition Meadow", is the ideal frontier between the old town and the surrounding land, with the dual function of community centre and entry point.
The place, of which there is a record at least since the 17th century, was progressively configured as a real piazza over the course of the 19th century: having erected houses on the northern side which gradually closed the open space of the "campo", although not always coherently, it was transformed into a community centre. At the time of the thesis, the urban space was being used as a park. The facades do not have any important architectural features, apart from some specific elements. They have heterogeneous features but the materials used are traditional: stone and plastered bricks. The project is driven by certain objectives which can be summarised thus: to improve the quality of the urban environment by working on the elements of public space and trying to set in motion a series of measures which would allow the place to be given a clearer identity; to physically make the open space of the piazza emerge by restoring its primary and historic function of "place of communication", developing the theme with a technological platform (with plant networks, underground services and lighting) which is configured as a true piazza within the piazza.

Fig. 218 - View of the fountain in Piazza Marconi

Fig. 219 - View of the town of Castelnuovo della Berardenga

Fig. 220 - View of Piazza Marconi in Castelnuovo della Berardenga (SI)

Fig. 221 - View of the fountain in Piazza Marconi

Fig. 222 - View of the main façade of the Oratorio della Misericordia in Piazza Marconi, Castelnuovo della Berardenga

The Railway Bridge of Prarolo in Ronco Scrivia (GE)

Specialists: Sergio Balbi, Francesca Ballocca, Andrea Gaggero, Sara Gallini, Piera Manavella, Simona Martini

2001

Between Piedmont and Liguria, in the stretch of the *Valle Scrivia* between Ronco Scrivia and Arquata, between the end of the 1940s and the early 1950s, during the construction of the first "Giovi" railway line, bridges were constructed of considerable historical-typological interest, examples of the spread of modern construction techniques of bridges in cut stone of French tradition and of construction models in bricks, widespread through Great Britain. However, the bridge is an anomaly because its geometry is somewhat different than other works of a similar period: its piers or "tower" shoulders owe their truncated cone shape to the need to resolve the geometric problem created by crossing the bridge on an oblique axis in respect of the direction of the current, without erecting intermediate pylons, therefore reaching considerable dimensions (40m of ground clearance, 20m of strut and 22m height of piers). The structure is massive and statically co-operative, but is hollow in the parts which are not directly supported: a mighty vault in solid brick in variable directions and with low arches, which continue to the inside of the piers, generating a double curved connecting surface which supports the iron rail.

The most widespread degradation phenomena are attributable to the action of rainwater added to which are factors such as: the particular rigidity of the climate, frequent rainfalls, also snow, the high rate of humidity relative to the surrounding environment (averaging above 80%) and the significant presence of atmospheric particles which are potentially very damaging. The already inefficient regulation of the rainwater, caused by the blocking of drains and drainage channels

Fig. 223 - View of the inter dorsal ridge of the double curved vault which links the two circular towers

as well as the degradation of the canopy which was protecting the underlying parts of the bridge, is provoking the continuous leaching of the water to the inside of the structure. Amongst other things, the water dissolves the calcium carbonate in the protective covering and in the mortar in the vault, funnelling it and depositing it on the external surfaces, where it forms widespread concretions. The widespread biological patinas and overgrown vegetation which are undermining the brickwork of the structure, can be ascribed to the same causes.

The thesis, after a close discussion with State Railway technicians, has tried to give effective technical answers to the problem of protecting ancient structures, without having to interrupt the traffic and without altering definitively the original design concept of the bridge. It is helping to avoid its probable replacement with a new bridge, as happens all too often with similar transport engineering works which make an important contribution to our country and its history.

Fig. 224 - View of the Prarolo bridge at Ronco Scrivia

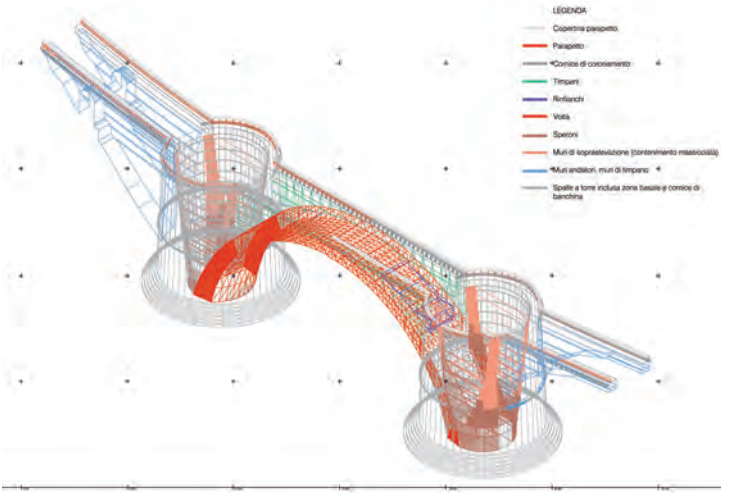

Fig. 225 - Three-dimensional analysis of the geometry: wire frame view of the 3D model

Fig. 226 - Examples of alterations and degradation: overgrown vegetation and carbonate deposits

Fig. 227 - Aerial view of the Prarolo bridge

The monastery of San Gregorio in Conca in Morciano di Romagna (RN)

Specialists: Virginia Cicciarella, Anna Ciurlo, Valentina Marconi, Emanuela Maura, Raffaella Miazza, Marco Musmeci, Efstratios Pavlidis, Maria Pia Placentino, Claudia Remisceg, Paola Rosolia, Paola Ruggeri, Barbara Scarsi, Alessandra Siniscalchi, Antonio Zunno

2001

Research contract with the Municipality of Morciano di Romagna (RN)

Established on the river Conca, between 1060 and 1061 by San Pier Damiani, the monastery of *San Gregorio* di Morciano, near Rimini, has played a central role in the economy of the region for centuries. However, by the 14th century, it had begun to deteriorate significantly and continued to do so until the Napoleonic period, when the monastery was dismantled and its buildings transformed into dwellings and agricultural buildings. The work undertaken by the municipal authority is a response to the centuries old abandonment of the complex and is aimed at documenting, first of all, the state of conservation of the complex and at basing its restoration project on the strictest respect for the marks left by history and use in the stratifications of its shape and material, without prior selections or attributions of value.

The thesis therefore proposes a project which consolidates, reclaims and protects the construction material, making the buildings safe and usable again, without conferring on them a "new vision". Nevertheless, every choice made makes an alteration to the actual state which still has a formal or "aesthetic" repercussion which attempts not to undergo but to control, through the use of simulation techniques or virtual restoration.

Fig. 228 - Detail of the building materials of a portion of the masonry

Fig. 229 - Overview of the monastery of San Gregorio

Fig. 230 - Detail of the façade of the tower building

Fig. 231 - Detail of an opening with an ogival arch

Fig. 232 - View of the altar of the chapel

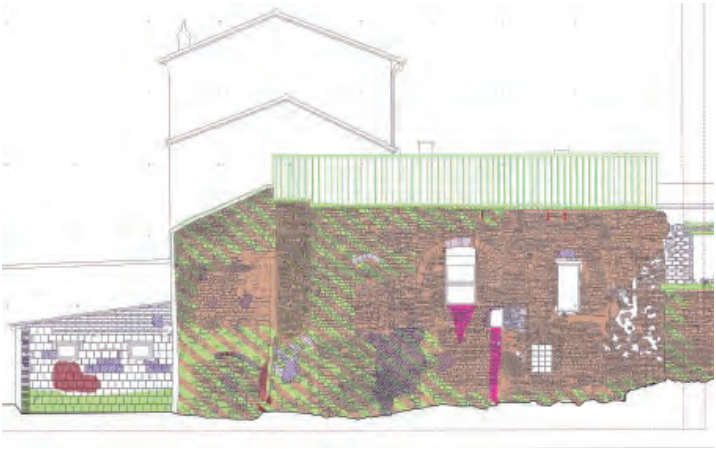

Fig. 233 - Map of the degradation phenomena: facade

The Torre Medicea del Salto alla Cervia in Pietrasanta (LU)

Specialists: Claudia Godino, Monica Nicoliello, Antonio Silvestri, Marzia Villella

2001

Research contract with the Municipality of Pietrasanta (LU)

The tower of Pietrasanta is part of a vast system of fortifications and artefacts, constructed around 1560, as a defence of the Tuscan coastline of Lucca, on the initiative of the Grand Duke of Tuscany, Cosimo I. The environmental context is now completely transformed, with new buildings shouldering the monument which have interrupted its relationship with the site and with the landscape. However, the tower maintains intact the rich and evocative stratification of marks and material traces which, despite the very severely degraded state of repair, tell much about its history, some of which is still unknown. This work arose from the sensitivity of the Municipal authority towards the conservation of its cultural heritage, of the landowner, willing to give the monument as a public asset and, not least, from the commitment of our country. Analytical and diagnostic studies, beginning with a geometric survey, have thus constituted the base on which to anchor a preliminary, definitive restoration project aimed, first of all, at arresting the progress of the degradation and instability, scrupulously preserving the complex's material and stratigraphic marks and traces, including the recent ones on the monument. The tower is a massive construction in solid brick, almost square in shape, with few openings. The transformations it has undergone over the course of the last century have weakened the external walls and, in some cases, the partial destruction caused by military hardware has caused the loss of part of the internal core of the masonry. The internal spaces are covered by brick vaults and enclosed by plastered vertical partitions in mixed brickwork. There are particular problems concerning the covering and the need to ensure the protection of the monument without changing its historically reached layout.

Fig. 234 - View of the Medici Tower of Salto alla Cervia (LU)

Fig. 235 - Orto-photo of the southern façade. Actual state and development of the image for the simulation of the first phases of the restoration work

Fig. 236 - Detail of an opening: southern facade

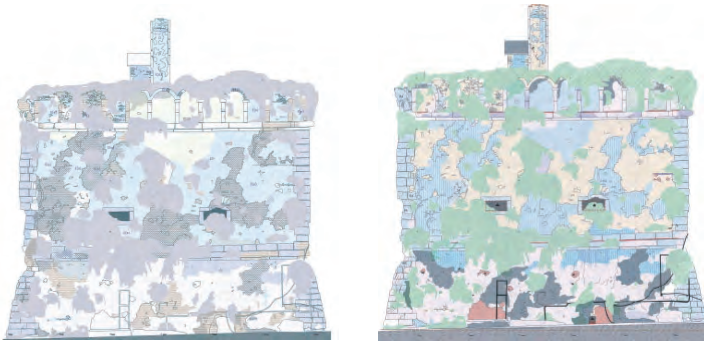

Fig. 237 - Map of the degradation phenomena and restoration work: southern facade

Fig. 238 - View of the Medici Tower in a historical document of the 17th century (Historic Archive of Lucca)

The Teatro Sociale di Camogli (GE)

Specialists: Gianluca Astore, Francesca Chierici, Raffaella Grilli, Mara Liuzzi, Valeria Masera, Peppino Peritore, Graziella Perticone, Valerie Piquerez, Laura Punzo, Angela Squassina

2000

Research Contract with the Palchettisti Association of the Teatro Sociale di Camogli

The theatre was built between 1874 and 1876, during a prosperous period for the seaside town of Camogli and at a time when the city's more important public and social works of art were carried out. By the end of the next century, however, the theatre had been transformed into a cinema, later being closed and reopened several times until it was completely abandoned.

The building is constructed in plastered load bearing brickwork and the principal facade is composed of neoclassical shapes, with pilasters and cornices underlining the three horizontal sections supporting the great central tympanum that encloses the structure on top.

In this case, the School of Specialisation, at the request of the Palchettisti Association, aims to propose to the Province, the building's owner, a coherent and organic set of surveys and studies, as a scientific contribution to the drafting of a suitable future plan to recover and restore the building to use.

For this reason, topographical, longimetric and photogrammetric surveys have been conducted of the spaces and the external surfaces of the building and of the most important internal parts, starting with the grand hall with its rows of overlapping theatre boxes, one of the side "longboats" on which they sit, the proscenium, the scenic spaces and the overhead roof structures.

On the graphic and geometric bases thus drafted, the results of the analyses performed have been registered, with laboratory and empirical methods, on materials, construction elements and on the phenomena of degradation and alteration of the building and

Fig. 239 - Detail of the main façade

an analogous and more in-depth study on a portion of the side overlooking the piazza. Integration of the different analytical and diagnostic tools has enabled a rigorous information database to be offered to the individuals responsible for the maintenance of the theatre, under tight time restraints and largely free of charge.

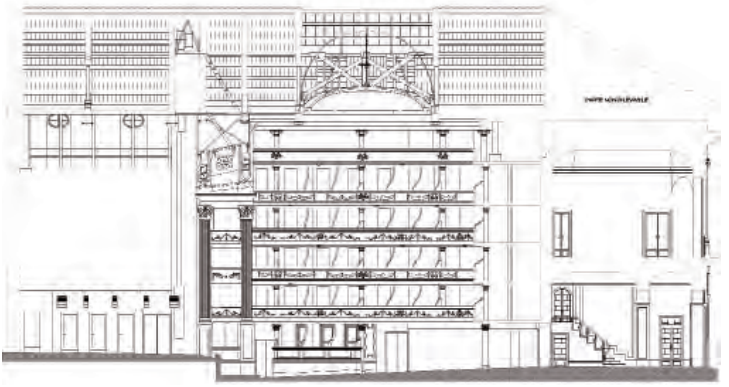

Fig. 240 - Longimetric survey, longitudinal section of the theatre

Fig. 241 - Detail of the iron structure supporting the roof skylight

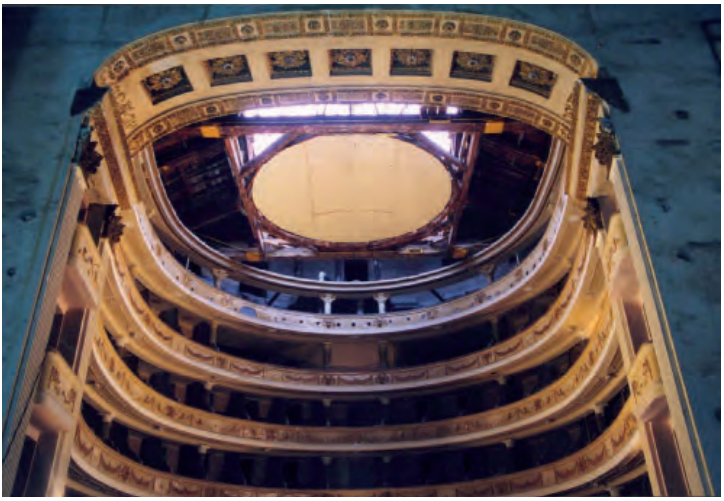

Fig. 242 - View of the stage

Fig. 243 - Longimetric survey of the main facade of the Teatro Sociale of Camogli

The Monastery of Santa Maria di Valle Christi in Rapallo (GE)

Specialists: Carla Arcolao, Cristina Bellingeri, Paola Brignardello, Elena Bronchi, Elisabetta Canevello, Luisa De Marco, Mogadashi Feraidoon, Vincenzo Passarello, Francesca Romeo, Barbara Volpato

1999

Research contract with the Municipality of Rapallo

The ruins of the monastery of *Santa Maria di Valle Christi*, the picturesque remains of a Cistercian monastery for women, stands on the outskirts of the town of Rapallo, surrounded by partly derelict land and by a golf course. Of the original complex, only two blocks have survived in a precarious state of conservation, arranged around a quadrangular space marked by a small wall of recent construction which recalls the position of the cloister. The perimeter walls of the church are still standing and the vaults of the presbytery and the transept, dominated by the imposing pointed bell tower, but only the layout of the single nave is visible. Although they are in a very poor state of repair, the ruins still have considerable historical, archaeological, architectural and landscape importance. For this reason, the studies and research conducted have entailed the involvement of several areas of competence - historical, archaeological, geological, mineralogical, petrographic and chemical - designed collectively to investigate the monument and its relationship with the site. To the survey of the geometry of the building and the archaeological remains was added that of the ground, using topographical, longimetric and photogrammetric techniques; these last in particular, by building very precise stratigraphical maps, helped to identify the probable phases of construction and transformation of the monument. The analysis of the alterations and degradation has led to GeoRadar investigations of the ground on which the foundations stand, to try to understand the possible origins of the processes already under way and to complete the archaeological excavations. There have been numerous partnerships with other research bodies (CNR, the Departments once known as DIPTERIS, POLIS, DIPARC - now

Fig. 244 - View of the top of the bell tower

DAD - of the University of Genoa) to address the problems which have emerged. For example, there has been continuous monitoring of the environmental weakness factors (temperature and relative humidity); a botanical investigation to determine the hazardousness of the species of overgrown vegetation; experimental verification of some of the protective and/or consolidation products, using simulation trials performed in climatic chambers on the various lithotypes present in the complex and using application tests on a sample wall, designed to verify their effectiveness and to evaluate their alteration processes.

Fig. 245 - View of the monastery of Santa Maria: bell tower and ruins of the church

Fig. 246 - View of the monastery of Santa Maria in Valle Christi in Rapallo

Fig. 247 - Map of the degradation phenomena

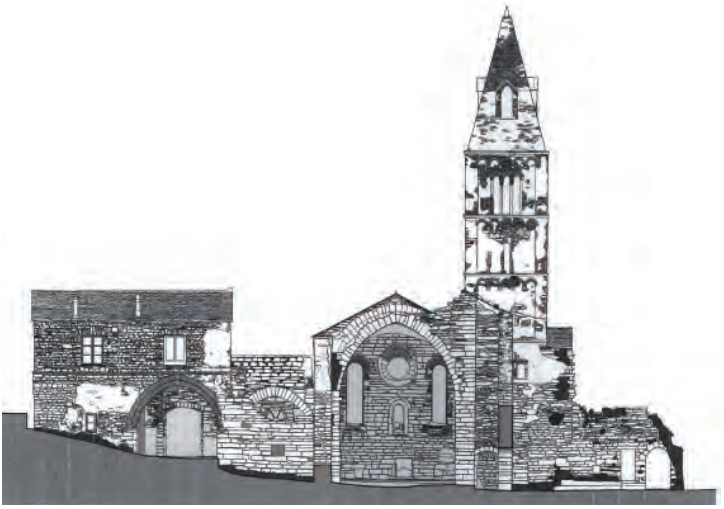

Fig. 248 - View of the monument complex of the monastery of Santa Maria in Valle Christi in Rapallo

Fig. 249 - View of the monument complex of the monastery of Santa Maria in Valle Christi in Rapallo

The Hospital Convent of SS. Trinità dei Frati Ospedalieri di San Giovanni di Dio in Filetto (MS)

Specialists: Angela Baila, Alessandra Carlesi, Stefania Dassi, Alessandra Gallo Orsi, Cristina Lacchini, Maristella Pafundi

1999

Research contract with the Municipality of Villafranca Lunigiana (MS)

The thesis stems from an agreement between the School of Specialisation and the Municipality of Villafranca Lunigiana (MS), concerning topographical and longimetric surveys, stratigraphical and archaeological analyses, an analysis of structural instability, characterisation of the materials and the degradation phenomena which afflict the architectural complex, once the seat of the ancient convent, later transformed into a hospital. In addition, there is the conservation project, with the drafting of the relative specific clauses in the contract and estimated metric calculations. The Hospital Convent of *SS. Trinità di Filetto* is the fruit of numerous successive layers of building over the centuries which have, from time to time, altered its aspect, granting us a monument "document" rich in stratigraphic signs which allow light to be shone on the different construction phases. There is also rich, albeit limited, archive documentation. The thesis has focused especially on "reading" these signs, through the use of archaeological techniques such as: mensiochronology, chrono-typology of masonry techniques and of the openings and petrographical-mineralogical analysis of the mortar, plaster and stone materials. These analyses, cross referenced with the archive investigations, have enabled the identification of three different construction phases, between the 17th and 20th centuries, which took place on pre-existing medieval sites. The state of disrepair into which the building had fallen was attributable to two principal causes: structural instability linked above all to past seismic events and the lack, or poor function, of measures to keep out rainwater.

Fig. 250 - Detail of one of the painted ceilings

The conservation project has had to take into account the position of the town of Filetto, in an averagely seismic area. Consequently, the operations envisaged have aimed, first of all, at addressing the risk of destabilising the walls and corners of the building, by putting in place horizontal tie-rods and achieving greater continuity between the damaged brick elements though localised injections of binding agents.

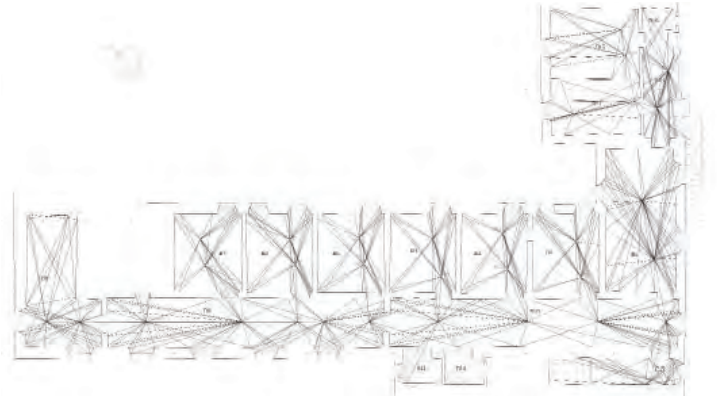

Fig. 251 - Longimetric and topographical survey, first-floor plan

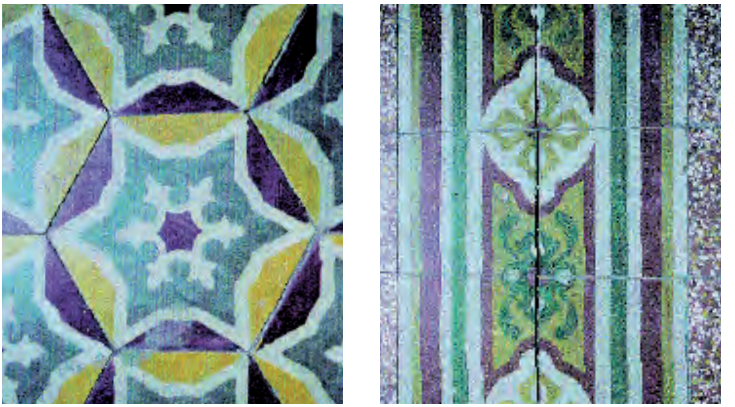

Fig. 252 - Details of two floors inside the convent

Fig. 253 - Map of the restoration work: longitudinal sections

Fig. 254 - View of the Piazza del Borgo in Filetto

Fig. 255 - Aerial view of the town of Filetto

The Civic Tower of Rapallo (GE)

Specialists: Nicola Gallo, Debora Pizzorno, Laura Romanò

1998

Research contract with the Municipality of Rapallo

The Civic Tower of Rapallo, in the province of Genoa, was built at the end of the 15th century as a symbol of the community but was abandoned some time ago. Before its restoration, it displayed a worryingly advanced state of degradation of the material and structural instability. This is testified by the presence over the last decade of scaffolding to protect the site from falling fragments.

Erected close to the coast, the tower suffered from aggressive action by atmospheric agents, especially winds, often carrying humidity and salt and by heavy driving rain.

Added to this are the wide daily and seasonal temperature variations which cause devastating and disruptive action on all the exposed surfaces to the south while, to the north, the attack has come mainly from the overgrown vegetation and bio-degradation encouraged by the micro climatic conditions and by the leaching of rainwater.

Structurally, the tower was very uneven vertically, suffering from a gradual detachment from the body of the adjacent church, a marked axial rotation and significant damage in several points.

All this had made it unusable and the request was for the preparation of a design that, while totally respecting the current state, would allow recovery of its function, for the benefit of the community.

The work of cleaning, consolidation and then the protection of the walls, combined with static measures did not, therefore, aim to "renovate" the monument as its appearance was perceived by the community to be historic.

The fate of the clock was significant in this regard as it was put back into operation without replacing the dial, or restoring the camouflage of the shelves which support the top rim.

Fig. 256 - View of the Civic Tower of Rapallo

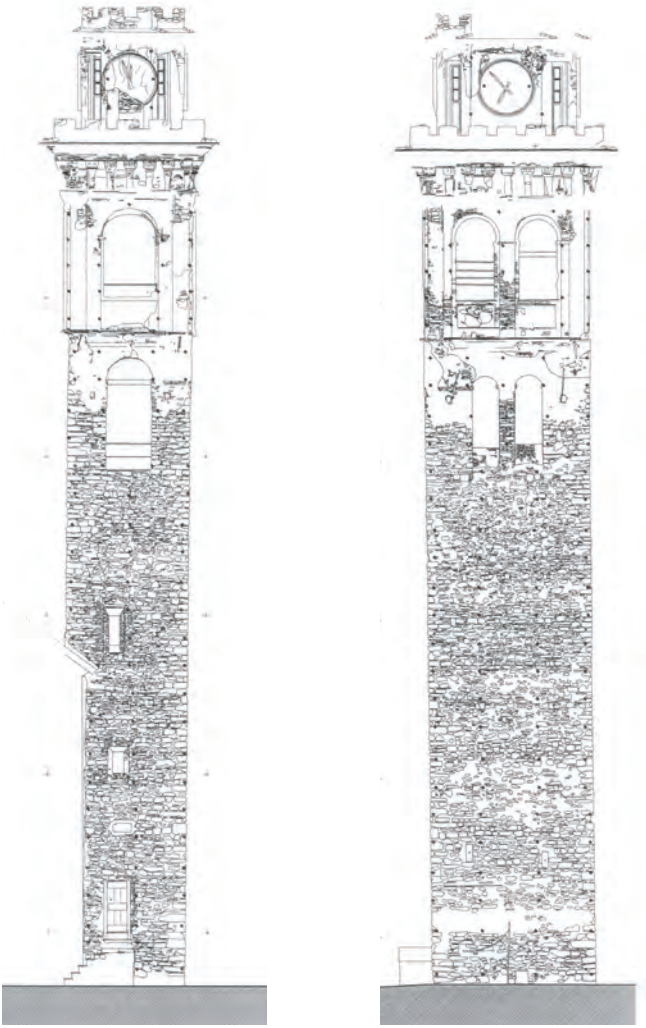

Fig. 257 - Photogrammetric survey of the east and north sides of the tower

Fig. 258 - Simulation of an operation to integrate the building material by inserting stone material and grouting the joints

Fig. 259 - View of the Civic Tower of Rapallo

The monumental complex of San Nicolò del Boschetto in Genoa

Specialists: Elisabetta Airaldi, Nicoletta Bevilacqua, Fabiana Fantoni

1997

The complex of *San Nicolò del Boschetto* in Genoa Bolzaneto, consists of the church which dates back to the 15th century and underwent several transformations in later centuries, two cloisters, a courtyard and the convent. The church has three naves divided by pillars supporting large longitudinal arches on which is set a barrel vault with lunettes, while the side aisles are covered by cross-shaped vaults.

An analysis of the body of the building, of the construction techniques and their state of conservation, revealed conditions of static risk that the project had to address: one of the internal pillars of the church was badly slanted thus lowering the ratio of support given to the overhead arches. The instability was (and probably is) linked to the presence of tombs in the areas surrounding the pillar. With regard to the cracks and deformity, an inspection was carried out using electronic sensors to check the reciprocal movements of the edges of the damage, connected to a remote unit to acquire and memorise the data (Remdac). This has indicated that the pillar is gradually rotating towards the interior of the church. Other damage, still in movement, is attributable to subsidence in the foundation of some not interlinked walls. The photogrammetric survey of the internal walls has highlighted considerable irregularity in the progress of the cornicing on the right-hand side of the central nave, which corresponds with a lowering of the choir balustrade in the counter facade, and of the line joining the impost of the arches in front.

The project is focused on implementing prompt consolidation measures that can be done with traditional techniques, inserting

Fig. 260 - Detail of a marble tombstone

new tie-rods into the brick structures and injecting consolidating mixtures into the ground at the foundations. To all of this was added an analysis of the state of conservation of the stone and marble elements and of all the monument's surfaces on which an overall programme of cleaning, consolidation and protection was carried out.

Fig. 261 - The pictures show two different techniques of executing the pictorial decorations of one of the church's chapels.

Fig. 262 - Signs of degradation on a marble tomb. The phenomenon can be defined as erosion, according to the Lexicon of Recommendations UNI 11182

Fig. 263 - View of the monumental complex of San Nicolò del Boschetto

Fig. 264 - Abbey church View of the nave

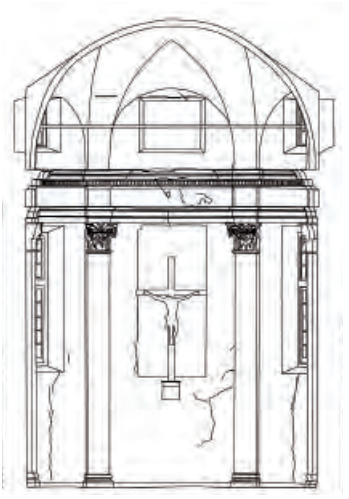

Fig. 265 - Abbey church Cross-section of the nave

The Castle of Rapallo (GE)

Specialists: Anna De Palma, Marta Gnone, Roberto Leone, Roberta Risso

1997

Research contract with the Municipality of Rapallo

The Castle of Rapallo is in a defensive position in the bay of the same name, built directly in the shallows of the Ligurian Sea, a few metres from the beach and erected following an attack by pirates in 1549 which, according to chronicles of the time, took a hundred prisoners from among the undefended populace.

The work carried out for the specialisation thesis was initially focused on a geometric survey of the rooms, conducted using topographical, photogrammetric and strict longimetric techniques and with cataloguing the construction elements using a database. The problems affecting the monument essentially concerned the state of conservation of the external walls. In fact, although it did not display problems of a structural type, the building, being in direct contact with the movement of the waves, suffered from widespread erosion, in particular to the mortar in the joints which, at some points, had actual gaps with the partial loss of the brickwork. The covering mantle of slate dormer was no longer effective because of its poor state of repair, while the surviving plaster, above all on the tower, displayed widespread disintegration and detachment.

The Castle, which is full of historical traces, has been the subject of archaeological interpretation, using methods of stratigraphy and archaeometry (mensiochronology, dating of the plasters and chrono-typology of the masonry techniques). The results of these analyses, cross-referenced with the information found in the archives, has enabled identification of the principal construction phases of the monument.

The conservation project was constructed starting from this work of identification and interpretation of the material remains.

Fig. 266 - View of the Castle of Rapallo

Its' primary object was the elimination of the causes of degradation, or their attenuation and, at the same time, safeguarding the possibility of gaining a further understanding of the history of the building through its conservation. During the methodological development and the illustration of the expected results, the project used image processing techniques to simulate integration and grouting techniques.

Fig. 267 - The castle before the restoration works

Fig. 268 - General simulation of the restoration

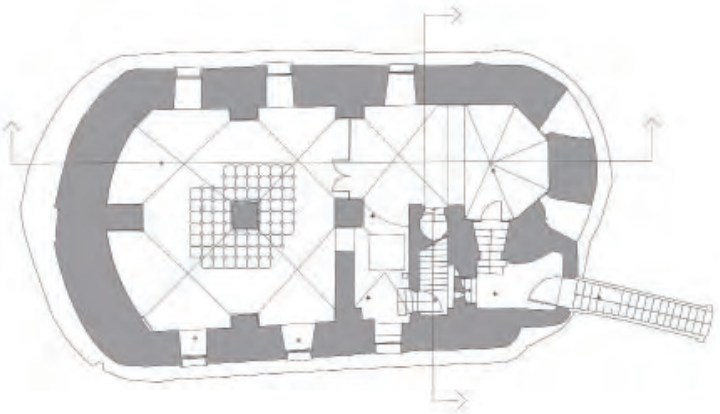

Fig. 270 - Survey of the first floor

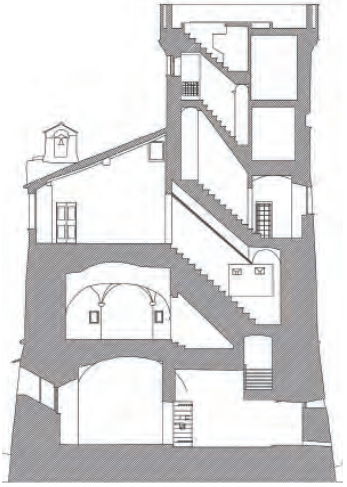

Fig. 271 - Cross-section of the Castle of Rapallo

Fig. 272 - Simulation of an operation of consolidation using cerclage with a carbon strip later plastered

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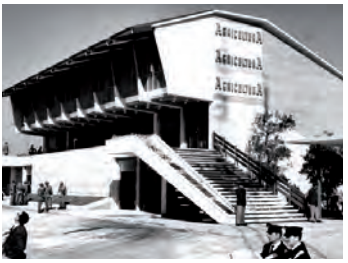

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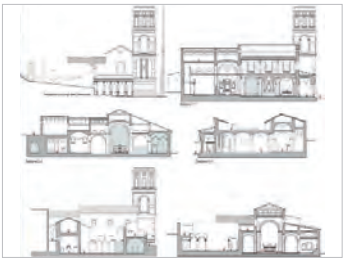

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Restoration project for the Church of *San Michele Arcangelo* in Darzo (TN)

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Restoration project for the Church of *San Gennaro in Villamena*, Minori (SA)

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Chiara Mondino, Benedetta Murzio, Mariana Teixeira

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Raffaella Aliotta, Antonella Barbaro, Rosanna Bergese, Loredana Fracchia, Simona Iacino, Maria Tantillo

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Restoration of the church of *San Filippo Neri* in *via Lomellini*, Genoa

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The Parish Church of *San Vito* in Morsasco (AL)

Antonella Caldini, Tiziana De Iaco, Matteo Ferrari, Grazia Finocchiaro, Francesca Giambanco, Maria Previti, Maria Cristina Ruggieri

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Former church of *Santa Maria del Canneto* in Taggia (IM)

Andrea Canziani, Lorenza Comino, Francesca Fabiani, Laura Maggiolo, Daniela Zambelli

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Renovation of *Piazza Marconi* in Castelnuovo della Berardenga (SI)

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The monastery of *San Gregorio in Conca* in Morciano di Romagna (RN)

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The *Teatro Sociale di Camogli* (GE)

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2000; Research contract: Palchettisti Association of the Teatro Sociale di Camogli

The Monastery of *Santa Maria di Valle Christi* in Rapallo (GE)

Carla Arcolao, Cristina Bellingeri, Paola Brignardello, Elena Bronchi, Elisabetta Canevello, Luisa De Marco, Mogadashi Feraidoon, Vincenzo Passarello, Francesca Romeo, Barbara Volpato

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The Hospital Convent of *SS. Trinità dei Frati Ospedalieri di San Giovanni di Dio* in Filetto (MS)

Angela Baila, Alessandra Carlesi, Stefania Dassi, Alessandra Gallo-Orsi, Cristina Lacchini, Maristella Pafundi, Marcella Panetta

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The Civic Tower of Rapallo (GE)

Nicola Gallo, Debora Pizzorno, Laura Romanò

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The monumental complex of *San Nicolò del Boschetto* in Genoa

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Il Castle of Rapallo (GE)

Marta Gnone, Roberto Leone, Anna De Palma, Roberta Risso

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Il volume raccoglie gli esiti delle attività condotte, nell'arco temporale di 25 anni, da docenti e studenti della Scuola di Specializzazione in Beni Architettonici e del Paesaggio dell'Università di Genova (già Scuola di Specializzazione in Restauro dei Monumenti). La Scuola offre una preparazione professionalizzante a coloro che prediligono, nel proprio ambito di interessi, la tutela e la conservazione attiva dei beni architettonici e paesistici e ai quali si richiede, sempre più, una preparazione scientifica e tecnica altamente qualificata. L'universo dei manufatti cui il restauro volge la sua attenzione è straordinariamente ricco e in continua espansione e sfugge a ogni pretesa di totale e autonomo dominio da parte di una specifica disciplina e, a maggior ragione, di singoli operatori tecnici. Il percorso formativo post-laurea magistrale della Scuola, caratterizzato da una ricchezza disciplinare e di approcci formativi, risponde così alla estrema complessità dell'intervento di conservazione, restauro, riuso e valorizzazione del patrimonio architettonico di interesse culturale, non esclusivamente monumentale.

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