ACTA OF THE INTERNATIONAL WORKSHOP

ITALIAN TOP CONSERVATION WORKSITES: MANAGEMENT, MAINTENANCE AND RESTORATION

ROMA
FIRENZE
BOLOGNA
RAVENNA
MANTOVA
FERRARA

24 MARCH
25 MARCH
26 MARCH
27 MARCH
28 MARCH

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The ICE-Italian Trade Promotion Agency is the government organisation which promotes the internationalisation of the Italian companies, in line with the strategies of the Ministry for Economic Development. ICE provides information, support and advice to Italian and foreign companies.

In addition to its Rome headquarters, ICE operates worldwide from a large network of Trade Promotion Offices linked to Italian embassies and consulates and working closely with local authorities and businesses.

ICE provides a wide range of services overseas helping Italian and foreign businesses to connect with each other:
- identification of possible business partners
- bilateral trade meetings with Italian companies
- trade delegation visits to Italy
- official participation in local fairs and exhibitions
- forums and seminars with Italian experts
Assorestauro is the first association established in Italy for materials, equipment and technology producers and service providers for the restoration and heritage conservation sector. Among the associations involved in this sector, which includes various institutional bodies that represent designers or restorers, ASSORESTAURO is the first to finally give voice to the industry and the sector of specialised services, promoting their interests in promotional, legal and cultural areas. ASSORESTAURO seeks to represent the sector, both nationally and internationally. In regard to the Italian market, an increased sensitivity towards our architectural heritage, together with the diffusion of new technologies, point to a growth in the sector in recent years, both from the cultural point of view (debates, magazines, conventions, exhibitions) and from that of technology (innovative materials, machines and equipment, software, plant design etc.). This provides the industry with a great opportunity for increasing and strengthening the occasions for dialogue, which are often lacking, with professionals, on the one hand, and with institutions (Government departments, Universities) on the other. As far as foreign markets are concerned, there is a clear perception of the need to capitalise on the great prestige that Italy enjoys abroad in matters of cultural heritage and on the remarkable investment in cultural technology that Italian companies have made in recent years, in order to translate specialist skills and know how into business opportunities abroad.

ASSORESTAURO therefore has the scope of coordinating, protecting and promoting the interests of its associated companies, and fostering their progress and development, endorsing their products and services and representing them in their relations with the institutions and organisations working in the field of research and training, regulations and promotion. It also acknowledges the support and patronage of the main restoration Italian Trade Show and Events, recognising, together with its associated companies, the value of a trade fair appointment that has become an international point of reference.

The company carries out the following specific activities:

- it promotes studies and research and collects news, items and statistical data useful for sector information, and carries out studies, monitoring and analysis of the situations and developments in the markets;
- it participates in the elaboration and publishing of international regulations for the qualification of associated companies, assisting them and protecting them in the certification of the quality and security systems of their products and services;
- it directly and indirectly organises training or updating courses, research and conferences for the development and dissemination of technologies and the use of their products;
- it promotes and holds conventions, synergies and agreements among associations throughout the world.
The Trajan Markets and their Great Hall
The Restoration Project and the Interventions – Part II: the Structural Intervention for the Improvement of the Seismic Safety

INTRODUCTION

The Great Hall Vault of the Trajan Markets is one of the largest and very impressive among the survived original roman vaults. It is made by roman pozzolanic concrete with a very thick shape which allows a nearly monolithic behaviour, just reduced by the possible negative effects of many cracks. But the weaker structural elements, in case of seismic actions, are the supporting structures. These last are today not sufficient and/or not sufficiently laterally counteracted to resist to the horizontal actions associated to seismic effect on the Great Vault mass.

On site investigations have been devoted to the identification of the geometry of the main structural parts and elements as well as of the mechanical features of the constituting materials of
THE STRUCTURE BEHAVIOUR BEFORE THE RETROFITTING

THE TRANSVERSAL BEHAVIOUR AND THE CRACK PATTERNS

The Great Hall structures, that surround and contain the Great Room, only apparently from a thick body with a squared plan; on the contrary they are two bodies, separated by a Great room itself (Fig. 1). These two buildings develop their plan parallel to the Great Vault axis, in the NE-SO direction. Thus, both of them are weaker in the transversal NO-SE direction.

Among them, the northern one appears more sound as it is less high and transversally thicker.

Vice versa, the Southern one is thinner and higher as it starts from the level of Via Biberatica (Fig. 1).

The weaker conditions of the Southern building is clearly shown by the crack pattern, also, with a tendency to the detachment of the Southern façade on Biberatica Street. Moreover it is necessary to take into account that these two buildings have to support the big mass of the Great Hall vault, under static and seismic actions too.

From this point of view, it is important to notice the weakening of the transversal wall, in the Southern building, caused by the doors placed near the Southern façade, at the same level of the Great Hall pavement.

The seismic action of the past, are the causes of the cracks on the arches over the doors said before and of the cracks on the transversal walls, in the lower level, just under those doors and near the southern façade; cracks that show a clear weak condition under the Great Vault thrust (in NO-SE direction) with also a clear tendency to a detachment of the Southern façade on Biberatica Street (fig. 2).
It must be taken into account that, before the retrofitting, the transversal seismic acceleration of the Great Vault mass is alternatively supported only by the Southern building and only by the Northern one (changing the sign of the acceleration itself); as it is easy the arise of hinges in the key and in the springing of the Great Vault (Fig. 2).

Moreover, this behaviour may be accentuated by the different transversal stiffness of the two buildings, as this difference can easily cause opposition of phase in the transversal oscillations of the two buildings.

THE LONGITUDINAL BEHAVIOUR, PARALLEL TO THE HALL AXIS

The seismic action longitudinal component founds a very weak structural configuration of the supports at the “matronei” level.

All the supporting pillars and the counteraction lateral arches have their main stiffness planes in the transversal direction while the weaker ones are in the longitudinal direction (Fig. 3).

It is important to notice that the present masonry structural configuration is due to the restoration works carried out in the twenties and thirties of the last century, when they were demolished all the not original roman masonry added along the centuries and especially in the XVI century.

Thus, and especially at the “Matronei” level (Fig. 3), the structure is weaker than in the period from XVII up to the XIX centuries and also weaker than the original configuration, as some roman structural elements (some secondary vaults) are disappeared, along the past centuries.

THE NUMERICAL ANALYSIS

The analytical study of the vault and its surrounding structural elements was carried out by means a numerical 3D model developed for the static and dynamic structural behaviour evaluation, using the Algor program produced by Algor Inc.

The 3D Finite Element mesh is refined in such a way to describe with an adequate accuracy all
the constructive details, using 3D “brick” finite elements.

In Table 1 the material mechanical characteristics (specific weight, Young Modulus and Poisson coefficient) used for the different part of the structures are reported.

About the seismic spectral acceleration, the present Italian Code states a ground acceleration of around $a=0.192g$ at the building foot, which means an amplified acceleration of around $a=0.260g$ at the Great Vault level.

In the Figures 4 and 5 are reported the results of the seismic static equivalent analysis in the transversal direction while in the figures 6 and 7 are reported the static equivalent analysis in the longitudinal direction.

In the figure 4, all along the intrados of the vault key there are tensile stresses that reach the 210 KPa and justify the deep and large cracks visible before the last restoration.

It is important also to notice in figure 5 the strong compression stresses in the foot of the short pillars supporting the Vault: the minimum principal stresses reach the 1822 KPa.

However, the worst situation arise with the seismic action in the longitudinal direction. The static equivalent analysis reported in figure 6 shows the risk of overturning for the pillars engaged along their weaker section axis: the vertical stresses reach 1142 KPa in the compressed side; while reach 311 KPa in the side on tensile stress.

The little arches that laterally counteract the vault (figure 7) are unable to resist to the longitudinal seismic action, as in this case they are bent horizontally reaching tensile stresses up to 350 KPa.

<table>
<thead>
<tr>
<th>Material</th>
<th>Weight [kN/m³]</th>
<th>Young Mod. [kPa]</th>
<th>Poisson mod.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caementicium</td>
<td>15</td>
<td>2,000,000</td>
<td>0.15</td>
</tr>
<tr>
<td>Travertine</td>
<td>24</td>
<td>20,000,000</td>
<td>0.10</td>
</tr>
<tr>
<td>“cocciopesto” Mortar</td>
<td>18</td>
<td>200,000</td>
<td>0.20</td>
</tr>
</tbody>
</table>
THE REINFORCEMENT INTERVENTION AND RETROFITTING

THE INTERVENTION PHILOSOPHY

Evaluating the opportunity to “improve” structural behaviour seismic behaviour of an historical building, it is important to study its global structural behaviour, but it is also necessary to check if each structural element may compromise, with localized failures, the structure as a whole.

In the case of the Trajan Markets Great Hall, there is a clear “global” weakness in the transversal structural behaviour, due to weaker configuration of the Southern building, in case of seismic actions in NO-SE direction; but, in the same time, there is a “localized” weakness of the pillars supporting the Great Vault in case of seismic actions in NE-SO direction.

The failure of only one of these pillars may cause the collapse of all the Great Vault. In the case of historical buildings, the seismic behaviour improvement has to be obtained with the minimal alteration of the original structure.

Thus it is better to apply a “diffused” and reversible intervention instead of a more strong and concentrated one, which last is necessarily more invasive and, thus, also less reversible. A “diffused” intervention has to be extended as more as possible to all the structure, in such a way to better connect the different structural elements, to guarantee their collaboration and, thus, to use more efficiently the original strength.

On the contrary, too localised interventions may cause the alteration of the original global behaviour, more higher stresses concentrations and, thus, also possible local damages. In the case
of the Great Hall, for the transversal (NO-SE) seismic component, it was necessary a “diffused” reinforcement of the shear walls, mainly in the Southern building.

At the same time, for the longitudinal component (NE-SO) of the seismic actions, it was decided to not to try the reinforcement of the single pillars supporting the Great Vault; on the contrary was designed a shear braced horizontal stiffening to connect. Both the sides, the vault mass to the Northern and the Southern buildings.

THE TRANSVERSAL REINFORCEMENT

The intervention is a system of horizontal ties, distributed on each transversal wall of the two buildings supporting the Great Vault, in such a way to improve their shear strength in the NO-SE direction.

More in detail, in the weaker Southern building these ties are distributed not only on each shear wall but also on each level, as shown in figure n. 8.

Moreover, as shown in figure 9, for each shear wall it is placed a couple of bars nearby each side of the wall itself, instead a single one, in such a way to be less invasive, avoiding to drill horizontally those walls for all their length. To guarantee the collaboration of both the buildings in counteracting the Great Vault mass thrust during a seismic action, they are placed horizontal connections over the two series lateral arches among the two buildings and the Vault itself.

Then they are placed also some ties, across the Vault, inside its thickness, also to counteract the effect of possible not in phase transversal oscillations of the two buildings. Thus it is placed a system of horizontal distributed ties also in the Northern building, but only at the III and IV level, in such a way to involve its transversal shear walls all along their length.

The distribution and the number of these ties placed in the two buildings and in the Vault, allow to reduce their diameter down to 22 mm.
THE LONGITUDINAL DIAGONAL BRACED SHEAR REINFORCEMENT

The intervention is a system of nearly horizontal stainless steel diagonally counterbraced shear reinforcement, placed in the free spaces among the Great Vault and the lateral buildings, just over the “matronei” level (Figures 8 and 9).

This shear reinforcement is designed in such a way to transfer to the two lateral buildings, parallel to the Hall axis, the main part (around the 65%) of the longitudinal seismic action involving the Great Vault mass, reducing the overturning moment on the pillars supporting the Vault itself. Four free spaces on each side are occupied by the diagonal counterbraced reinforcement and each diagonal is made up by two tie bars with 22 mm of diameter (figure 11). Thus during a longitudinal seismic action 16 diagonal braced tie bars work together at the same time.

THE NUMERICAL ANALYSES

The numerical model, which simulate the reinforcements through stiffening boundary elements along the two longer side of the Great Vault, show a clear improvement in the Vault structural behaviour.

Particularly in figure 10 is reported the stress reduction in pillars supporting the Vault, in case of longitudinal seismic action: compared to the case without reinforcements, the static equivalent analysis shows as the vertical stresses are reduced from 1,142 kPa to 810 kPa, on the compressed side, while the tensile stresses are reduced from 311 kPa to 174 kPa.
CONCLUSIONS

The Trajan Markets Great Hall shows a high sensibility to seismic actions.

This fact is due to the weakness of its supports: the weak structural behaviour of the Southern building, in case of transversal actions, and the weak behaviour of the pillars at the “matronei” level, in case of longitudinal actions. While in the first case there is an indirect risk of collapse for the Vault, related to the possible partial failure of the Southern building, in the second case, with the longitudinal component of the seismic action, there is an immediate risk of collapse of the Vault as a whole, related to the easily overturning of the pillars. The intervention designed and already applied, with its “distribution” calls the collaboration of all the supporting structures, reducing the efforts of the single structural elements.

In this way, avoiding stresses of this intervention typology is a warranty for the possibility to use the future probable improvements in the retrofitting techniques.
Laser cleaning techniques

After many years from the first applications in the field of restoration, laser technology has become, by now, a consolidated and widely used procedure among Italian restorers. This cleaning method is widely used in Europe also, but it’s substantially limited to the use in work sites destined to the architectural restoration of stone works.

During the last decade, in Italy, the research, in collaboration with the Industry has, instead, developed a new generation of lasers, expressly designed, and tested on the work site, for new applications characterized by a specific fragility. First of all, the lasers designed for specific interventions on metal surfaces, golden bronze, silver, iron etc., have been perfected. In this way, a solution was found to the very complex conservative issues related to our Renaissance’s main sculptural cycles. Other types of lasers have appeared to be extremely efficient for cleaning the frescoes. In this case, a solution had to be found for issues like removing whitewash, carbon black and also recent protective agents (Paraloid) which have been added during the past years and which have been, successively, subject to degradation. Gong from the Renaissance and medieval-style frescoes, the laser technique has been successfully tested also on the ancient Roman mural paintings. Thanks to this new method, it became possible to reread and discover
new depictions and scenes in the roman catacombs which would have been, otherwise, impossible to clean using chemical or mechanical methods.

A new type of laser, developed by ELEn. SpA during a recent project coordinated by the NRC, has been successfully experimented in Pompeii, in the aim of contributing to the conservation of this Human Heritage site.

A few hundred meters outside of the northern walls of the ancient city of Pompeii, we can find the ancient suburban villa known worldwide as the Villa of Mysteries. It was built during the II century B.C. and it saw its heyday during the Augustan Age. After that, it was partially destroyed by the earthquake in 62 A.C. and it was finally covered by the Vesuvian eruption in 79 A.C.

It's one of the most beautiful and famous frescoes from the second Pompeian style with full-sized figures and strong references to Greek painting. The ten frescoed scenes show mostly feminine figures whose meaning is not clear. Probably they are feminine initiation rituals dedicated to Dionysus or to preparing the bride for marriage.

Besides the particulate caused by the eruption, the vegetable elements adhering to the walls, owed to the landfill following the eruption, the main degradation is owed to the various protective layers used throughout the centuries.

The cleaning procedure with laser technology aimed at contributing to restoring this cycle of frescoes to its original splendor has been developed in June of last year, in the Villa's restoration site. This type of technique, applied for the first time on such an extended and important cycle of paintings, represents a valid alternative for surfaces that are extremely sensitive to chemical and mechanical agents.
The external façade and colonnade of Fava Palace after the restoration
The restoration of Fava Palace: an interdisciplinary approach

Palazzo Fava is a refined historic buildings in Bologna. It’s situated in the north-west of the historic center, near the Cathedral of St. Peter. The configuration of the building takes shape as early as the medieval age, and it’s built on existing Roman and medieval structures. It was modified many time in particular during the late sixteenth century, when it had took the contemporary shape and it had become the Fava family’s residence.

The palace is an elaborate architectural complex composed of a series of plans and different blocks with decorative elements of great value. In particular, the main floor is dressed by high artistic and important frescoes made by Annibale, Ludovico and Agostino Carracci and their school. The restoration work has focused on decorative surfaces and stone and stucco equipment, inside and outside of the historic building.

The most important part of the work has focused on the piano nobile, embellished by elaborate wooden ceilings and frescoes. The work complexity required the professionals expertise with experience gained in different areas of conservation to obtain an excellent result.

THE ANALYSIS OF THE ARCHITECTURE AND DECORATIVE DEVELOPMENT

It was carried out an analysis campaign, began in 2006 and continued throughout the course of the work to understand the development of architectural complex. These investigations have provided important information about the changes of the building over the centuries.

The analysis had two objectives: the first one to define the main period of construction and coating materials that have characterized the life of the building and the second one to analyze the techniques and the materials used in each period that we have identified in the first part of analysis. This research had the objective to obtain information about the restoration choices and architectural design.

We used the methods of architecture archeology: we analyzed coatings (USR) and the walls (USM) in strategic points.

Starting from the direct observation of the masonry: we recognized the discontinuity of interfaces and the correlation between them with a “deductive method.” Then we have proceeded to the analysis of the stratigraphic masonry units with 209 samples using the Fast Archive...
Data Sheets (SAV) and USM schedule where we have taken note of the analysis data about construction techniques and materials. The coatings were investigated by observing the layers that emerged from degradation and by small openings documented in 89 samples. The analysis was supported by:

- a study of historical information;
- a laboratory analysis of samples;
- an elaboration of maps and architectural survey to ensure an immediate reading of the analysis results by operators and technicians involved in the restoration work.

We identified 5 blocks that composed the architectural complex of Palazzo Fava and seven periods that extend from the XV century to the XX century.

THE CONSERVATION STATE

When the Fondazione Cassa di Risparmio di Bologna bought it, the Fava Palace was in a serious state of abandonment. At the beginning of the restoration work, the conservative general conservation showed a complex situation, with structural problems and also deterioration of the decorative paintings. The preservation state of the artifacts showed very heterogeneous because of the events that occurred over the time and different degradation processes, related to the different constituent materials. Moreover previous maintenance works had procured significant conservation problems. Before the restoration works, the decorations were flattened and obscured by dust and alteration of the materials put up during the previous restoration interventions, like repainting and film-forming substances. The paintings were affected by the phenomena of delamination and detachment of the plaster and the color caused by some previous infiltrations. Both in the murals then in the wooden ceilings we are present significant situations of degradation that had compromised the readability of large areas decorated and
caused the loss of substantial pieces of painting. In addition, many layer of white dye covered the sculptural apparatus, hinding the constitutive colors and covering with their thickness the original form of the decorations. Interpreted and evaluated the results of the preliminary diagnostic tests, the solutions related to the various stages of restoration were assessed in accordance with the Work Manager. In particular, for the restoration of the wall paintings has been developed a “working model” representative of an intervention methodology applies to all of the frieze in the painted rooms, which takes into account the original painting technique, different between room and room for the presence of different authors, and the state of preservation and the degradation processes past and/or current, as well as the conservation history of the earlier restoration work, unfortunately not documented by news reports or written.

THE METHODOLOGY OF INTERVENTION

The complexity of the restoration and the heterogeneity of the materials in the building necessitated the confluence of specialized professionals in various areas of the restoration. This synergy was needed in order to set the most appropriate methodology for the restoration of artifacts that had different characteristics from the point of view of materials and its state of preservation. The works were undertaken simultaneously working on wall paintings, wood ceilings and stone and stucco sculptures, as part of the renovation of the entire building.

The most important part of the work has focused on the main floor where Leonardo, as Consorzio del Restauro, undertook the restoration of the rooms decorated by Carracci, called rooms of Jason and Aeneas, Sala degli Scolari, the Atrium and the room called Rubbianesca. The restoration has allowed the recovery of the fine chromatic values and restoring the correct state of conservation of the artifacts. Were first carried out pilot interventions coordinated by the Opificio delle Pietre Dure, testing methodologies of cleaning and consolidation aimed at creating a working model valid and indicative of a general methodology of optimal intervention. The method was developed from the beginning, deliberately characterized by a certain flexibility in the times of contact and methods of application of the cleaning reagent, in order to adapt to various contingencies; it has been a good starting point for the next general restoration during which, in some situations, it was necessary to make changes to maintain substantial homogeneity of the final result of the restoration, both from the conservative point of view that aesthetic. Precisely for this reason coupled with the intervention phase were made chemical investigation of microsamples carried out in the Scientific Laboratory of the OPD with the aim to clarify the technical and conservation issues that emerged during the progress of the work. Due to the specific expertise of professionals involved in the restoration it was possible to obtain the result of excellence that we see today and the restitution to the public of a treasure chest full of precious works of art. The result is correlated to the consultation between the direction of the Opificio delle Pietre Dure of Florence, “Soprintendenza per i Beni Storici Artistici ed Etnoantropologici” and “Soprintendenza per i Beni Architettonici e Paesaggistici di Bologna”.

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Despite the complexity of the intervention and the significant differences between the constitutive materials of the works that coexist in the same environments, the effect achieved with the restoration is to a considerable unity. The very harmonious synergy of the restored decorative elements gives to the building the characteristics of rare preciousness and elegance. Today the building is a structure that regularly hosts exhibitions: in its spaces are staged exhibitions of works from the Foundation CARISBO and other masterpieces from important public and private collections, Italian and international.
The architectural complex of San Colombano, in the heart of Bologna, is composed of a series of religious buildings that developed around one another over the centuries. The oldest part is formed by the Church of San Colombano founded, according to historical sources, in 610 by Peter I the Bishop of Bologna, a disciple of Colombano, an Irish monk (542-615). Dates back to 1591 the construction of the annexed Oratory. The church is part of an architectural ensemble so extremely complex that has posed a number of difficulties of interpretation, both for architectural and decorative history, which has marked the development, and for the conservation status of which is now before the intervention of restoration.

PRELIMINARY ANALYSIS

Due to the complexity of the decoration of the church hidden by a white painting present in the most of the interior surfaces of the building, it was necessary to provide a thorough and accurate analysis of all the walls. Accurate stratigraphic analysis of the coatings has allowed us to identify seven different intervention periods with distinct characteristics and dating. Each coating phase is characterized by decorative motifs and different materials that, in some cases, were the rearrangement of a previous stage due to repainting and localized intervention.

Because of the complexity the decoration was not possible to proceed in a unique way without that compromised the final outcome of the work: it was made the methodological choice to proceed in progressive stages, with the first general “descialbo” (surface removal of the white painting to highlight the decoration under the first layer) that could clarify the stratification of the decorations postponing to a later time, after careful analysis, the intervention of selective “descialbo”. In this regard through the reorganization of the material found it was designed a scheme that resulted in rationalization of the distinct phases of execution. It was also performed a study with microstratigraphic analysis in polished section and in thin section made in laboratory, with the aim to define the type of constitutive materials of the different layers present in the preserved coating.
AIMS OF THE RESTORATION

The mapping and the study of the different layers of the paintings has permitted to have a fundamental tool for the general reading of the decorated surface. Thanks to in-depth study and correct analysis of the state of conservation, in accordance with the Work Manager, have been made conservative choices that would allow a correct reading of the paintings in its various phases of execution. The main objective of the restoration was to bring to light the decoration of the church that had the characters of interest in terms of figurative unit, painterly quality and ultimately better conservation of material.

At the operational level restoration was proposed with the aim to:

- bring to light the decoration of the church largely covered by a white painting;
- restoring the adhesion and cohesion necessary to the stability of support both in depth and superficially;
- fix the paint film to prevent further loss of painting;
- reestablish a good continuity of the images and a better readability with a correct restoration of paintings.

The only parts remaining were covered by white painting and were placed in the central apse, lantern and some fragments in the lateral naves. The present aspect of the Church is given mainly from the decoration attributable to the XVII century with figurative scenes, but having maintained the repainting of the eighteenth century that had retraced the geometric framing and the imitation marbles of the seventeenth century. and had enriched the vault of cherubs and other floral elements. In the apse, given the excellent state of preservation and completeness iconography, has been retained nineteenth century decoration. After finishing the “descialbo” of all the decorations we proceeded with the painting restoration aimed at returning the readability of the work where was possible: accompanying the surviving fragments of the decorations in the lower part, that were more incomplete, with a neutral tint and operating in the high part with a more integrative intervention to guarantee the figurative continuity. The work carried out has also allowed us to confirm that the structures of the Early Medieval Church was based on the remains of Roman buildings. In fact it was found an entire crypt perfectly preserved in the space that it occupied from the Middle Ages to the end of the fifteenth century when it was completely underground. The crypt, made entirely of reused Roman bricks, still had two paintings that are particularly important for the rarity of the find. It has a numerous frescoes on the walls, includ-
ing a thirteenth-century fresco depicting “Christ on the cross with St. Mary and St. John” and several fragments in the apse pertinent to a series of paintings before at least a century. Following the discovery of the paintings depicting Christ crucified, it was necessary to proceed with the safety measures through the operations indicated by the “Opificio delle Pietre Dure of Florence” both for that and for the paintings in the apse emerged. The following phase bring to a campaign of temperature and relative humidity measurements as well as various processes of documentation and technical reports related to both aspects of the restoration and archeology. Finally we proceeded in the areas of painting with the creation of special protections, designed to maintain the temperature and humidity levels appropriate to the conservation of artifacts. The work, carried out under the scientific direction of the “Soprintendenza per i Beni Archeologici dell’Emilia-Romagna”, have returned to the buildings their beauty and provided important information on the development of the city between the Late Antiquity and Middle Ages. San Colombano now houses a collection of ancient musical instruments donated by Maestro Luigi Ferdinando Tagliavini to the CARISBO Foundation, as well as a music library donated by the heirs of Maestro Oscar Mischiati.
A hundred years from the transfer of the national museum in the complex of San Vitale, carried out by Giuseppe Gerola in 1913-1914, we introduce the new hall of the Herms and Antiquities, and with it an extensive program of renovation of the museum. The first cloister, and the lapidary collections of ancient art, enriched by precious sculptures of Roman production, regain their relevance at the beginning of the tour in new areas brought back to the architectural dignity of the halls of the Benedictine abbey. Fished from the sea, extracted from the earth, recovered from the stores where they were kept during the clearing up after the war and the re-stagings of the seventies, the sculptures on display illustrate mainly the perpetuation of the repertoire greek Hellenistic - Roman world empire. The room is set up as a small museum of antiquities with valuable specimens of Roman portraiture, genre subjects, deities and hermae of which we propose new identifications, dating, and comparisons, opening up future contributions to knowledge. In particular the in –depth analysis of the five Herms of Greek heroes and philosophers reconstructs the history of transfers of works from the collections of Este family from Rome to Ferrara, accidentally passing through Ravenna, and then their recovery chance in the Adriatic. The sixteenth century antiquarianism returns the protagonist together with the figure of Pirro Ligorio, in the extraordinary position of the portraits - the two Miltiades, Epicurus, Carneades, Dioniso - Plato - as designed for the “libraria” in the castle of Este of Ferrara, but now displayed in the National Museum in Ravenna. We have created a new context that has to be valorised together with the space of the cloistered Benedictine monastery, the stored objects, in the intertwining stories of his collections.
Scientific Restoration project of Palazzo Guiccioli (already Osio)

It’s been years since Palazzo Guiccioli has been an absent building, lying in the heart of Ravenna in a dimension of mutual indifference with the passers-by. This is what a building mirrors when, un-lived, it doesn’t live.

The essence of the project is to give back to the building its historical memory; it is morphologically made of a complex of buildings facing an inner yard, with constant changes and transformations.

This means to rebuild the genesis of the building through a careful philological reading. This gave life to an articulated structure, different in its building characteristics, as well: an incomplete and severe structure built by a foreign family (The Osio) which left just a few traces of itself except for the Palace, in the territory of Ravenna, buildings added in successive ages to complete the functions and uses of the period.

The essential core of the compound was realized between the end of the 17th century and the beginning of the 19th century, when the Guiccioli Family used to live there. It became a witness of strong family events both for their historical importance and for the characters’ value: the young Teresa Gamba Guiccioli, her husband the Count Guiccioli, Lord Byron, Luigi Carlo Farini with many other protagonists and historical and social events. The restoration projects consists in a reorganization of the monumental complex as a site of different activities with its cultural heart in two museums, The Byron Museum and the Risorgimento Museum.
Educational classes, a management area, commercial units, cafés and an inn – a restaurant in the underground will complete the painting facing the inner yard. As the main theme is the 19th century, the place becomes a sort of stage where each single element has its own peculiar significance.

The focus point of this approach is based on a few considerations on the cultural atmosphere of the age. The atmosphere is emphasized by the museum lay – out at a high interactive technology. The diving in the “dwelling”, which is the main theme of the project, starts directly from the entrance. The high ceilings will put up images of contemporary graphics and the space will be redundant of evocative sounds.

Through the open gates you enter the garden yard that will allow the visitor to enjoy the restaurants and shops. From the hallway you enter directly the museum side, articulated on two floors throughout the saloon and by the elevator in the middle of the stairs. From the garden you can enter the high terrace through the existing stair and, from here, to the terrace located above the Literary Cafè.

The two terraces will allow a transition altitude which is important for the distribution in the palace and the beauty of the view. The same staircase is the emergency stair, as well. On the west side, inside the area hosting the cafè, an elevator for disabled people opens an access to the upper floor of the main building where we can find the offices. Inside the so – called Literary Cafè there is another elevator which gives access to the Cafeteria roof - garden.

It’s a place for conferences and poetical performances, books’ presentations and a simple relaxing break.

It’s connected to the main floor, where the Risorgimento Museum stands, through an iron staircase which leads to a tiny but functional chamber, before entering one of the halls of the
Museum.

The Café terrace is connected, as above mentioned, to the covering terrace of the wing structure with a porch.

To this terrace you can get by making use of the staircase in the corner between the east and south wing with an exit on the porch. The exit is gifted with landings of access from the upper and main floor, as well.

This gives way to a communication, even if articulated between outside and inside, between the wings of the palace.

From the entrance hall you can get straight to the restaurant through a passage wall brought to life, again.

The restaurant is forged like a Taverna (Taverna Byron) whose dark tones and refined warmth mirror the brick masonry and the paneling and furnishing wood. To allow the use of the yard for a restorative purpose, a connection between this and the restaurant has been hypothesized.

From the entrance hall, on the opposite ceiling, another reopened gate will allow the entrance to a bookshop.

A third existing reopening, to the right of the door, allows to inspect the technical places where several technical plant elements are located. (electrical wiring, antifire, air conditioning)

On the entrance hall ceiling, scenes with iconographic themes connected to the museums will be put.

In the upper floor a ticket center and a cloakroom service will be placed in the first hall. The other halls will be dedicated to the Byron Museum. From the first stair landing of the flight of steps, you go straight to the main floor through the wide staircase in whose chamber a glass elevator with an above lighting is located.

On the stairwell ceilings we will find a wall decor with the technique of trompe l’oeil in theme with the content of the museum. We will restore the existing parapet of the early twentieth century, just like the whole stairway, by adapting it to the rules on safety. The existing pavement restoration and the risers and treads of the staircase will be executed.

The main floor will host the Risorgimento Museum, part of the preliminary project whose purpose is to make rooms accessible.

The diagnostic activity has returned the type of building elements and their state of preservation. It allowed the knowledge of the site through the identification of new tracks and morphological sediments, allowing for a more accurate reading of the historical and stylistic characteristics of the building and its events. The diagnostic investigation carried out, have allowed, compared to the final draft, greater precision in the identification of the issues of intervention on the struc-
tures, methods and criteria for the treatment and restoration of finishes and the choice of plant systems at the level of general distribution.

The diagnostic technique was effective especially for the plant changes, allowing you to identify pathways that complied with the wall hangings, through the adoption of existing tracks and pits, voids, walls and crawlspace, many of which are the result of work carried out during the late nineteenth century and the last century. The building also has decorations of particular value but in a degraded mode. In particular, the painted vaults, many of them in serious condition, were first carefully inspected at a close range via mobile scaffolding to assess the conservation status and to prevent further losses of decorations. In some cases there were collapsing plaster or even serious gaps in upheavals and disruption of the paint film. These preliminary operations safety measures have served to curb the degradation into which they poured the decorations and prepare them for future restoration.

It followed a widespread campaign of stratigraphic surveys, which involved the vaults that didn’t show decorations and especially the walls of the rooms, which were often covered by layers of
wallpaper or paintwork. The essays, aimed at the discovery of the original decorations and coloring, have proved to be largely what was the hidden face of the building, which was manifested in generous layers of decorative testimony to the social and cultural status of the owners and the constructive and decorative vicissitudes of the building. The findings from the surveys provided a rough guideline on the decorative trim of the Palace, which is expected rich and multifaceted and that only a radical uncovering will be able to complete.

A common denominator of many rooms is a white plaster whose surface is smooth and compact. This is probably the finishing coeval to the construction of the building. On top of it, several traces of decorative cycles have been revealed. This testifies the presence of materials and styles belonging to the end of the seventeenth century up to the early twentieth century. Stucco, gilding, wooden frames and probably precious curtains enriched the halls of the Palace. The walls have surfaced, at times, solemn decorations, such as emblems of the Osio family, intriguing gallant scenes or allegorical plants with exquisitely decorative curtains, Herms or flowers belonging to the eighteenth-century taste or calligraphic decorations of a neoclassical taste, all with the common denominator of the extreme elegance.

Foundation and Walls

On the foundations of reinforced concrete below the main walls of the oldest buildings magnetometric tests were carried out to identify the internal armor. To verify the consistency of
the concrete casting we have used a sclerometer. The walls, which were detected with the endoscope, resulted of various types and genesis.

In the basement a wide excavation was carried out where the foundation suffered of such dissimilarity, we proceeded with the removal of the concrete pavement and we discovered a pavement of terracotta tiles.

The construction of the wing with a porch that separates the two yards, was built with no doubts in the second half of the 19th century, referring to the data collected in the city’s registers. The two courtyards are completely separated in the next map made by the City in 1882.

During the surveys on the walls, in the western part of the building two large arches subsequently swabbed are clearly visible from the inside of the rooms. It is therefore possible that the building had an upper floor in connection to the main building.

The foundation of the body to the west has been rebuilt with concrete over the works carried out over 30's by the State Military. This part of the building, is substantially rebuilt in its entirety at that time, as evidenced by the elaborate planimetric found in the archives of the Military Command of Bologna. The boundary wall with the other property is the only thing remaining probably from the Renaissance or the 17th century.

BEARING WALLS AND FLOORS

We could give the same details we briefly described regarding the foundations for bearing walls and floors. Many were, in fact, the interventions occurred over time. The thermographic surveys revealed, under the plaster, several walled gates, some of which will be reviewed and replicated in the project.

From the walls of the basement and ground floors were picked up some samples of brick, on which tensile tests were carried out. In the laboratory it was then analyzed the density, to determine the resistance. Various tests like the sclerometer, were made in the mortar to determine the degree of compression and resistance.
ACTIONS ON STRUCTURES

The interventions aimed at restructuring are varied and widespread. The intervention is based primarily on the need to make an improvement to the structural behavior in relation to possible seismic events. Then we have faced the need to adapt the lift of the floors for future use (the construction of two museums open to the public). Each intervention was compatible with the fulfillment of the original construction techniques and the use of suitable materials. It therefore adhered to the principles of conservation.

The depth of the foundation are first verified by the archaeological surveys. With the technique of Georadar the archaeological risk of the court has been verified in order not to compromise any pre-existing with the construction of underground utilities.

WALLS

On the walls we will proceed with “cuci-scuci” technique in detached parts and couplings with carbon fiber for the clamping of cracks and lesions. The joints are emaciated and will be removed and replaced with similar and homogeneous mortar.
Analytical characterization of samples of cleaning through Mobile Lab Ibix

Cleaning the surfaces of historic architecture is a delicate and difficult task to standardize, given the number of employed technologies and the variability in both material and state of degradation. This usually makes any methodology developed for a specific case study difficult to repeat. For this reason it is necessary to have a set of tools that permit a comprehensive analysis of the properties of the material using specific operating standards and then develop preliminary tests that make it possible to optimize all the phases of the cleaning process, ensuring the best possible outcome from a conservation point of view. “Palazzo Guiccioli” surfaces cleaning was optimized through a diffuse analytical characterization of materials and degradation phenomena carried out by means of IBIX MOBILE LAB®, an innovative portable kit (weighing about 12 kg and with dimensions of 55.9 x 47 x 21.6 cm) that makes it possible to perform on-site tests on historical buildings following specific european (EN) and italian (UNI-BC) standards for cultural heritage. The objective of cleaning optimization was to achieve the maximum effectiveness with the minimum damage to the surface. Given the number of parameters that could be selected to set up a customized cleaning methodology, a scientific approach to the preliminary testing phase was mandatory. IBIX MOBILE LAB® allowed to carry out the chemical/physical analyses needed to define these parameters using a dedicated software (IBIX Mobile Lab for Linux - v.1.0) with an intuitive interactive interface that guided the operator through the analytical procedure and the comparison between different samples’ results. This feature made it easy to perform the basic analyses on natural and artificial stones for all the professionals involved in the project. The control software can also manage the diagnostic project database and the features include a fully automatic technical report creator.
The analyses carried out by IBIX MOBILE LAB® are the following:

- **Optical microscopy:**
  Portable USB microscope; magnification: 10X min, 150X max; built-in LED light

- **Reflectance Spectrophotometry and Colourimetry:**
  Reference standard: EN 15886:2010 “Conservation of cultural property - Test methods - Colour measurement of surfaces”

- **Measurement of water absorption under low pressure**

- **Moisture content by gravimetric determination**

- **Total soluble salts content**

- **Sulphate, nitrate, chloride quantitative measurements**

- **Ambient parameter measurement**
  Infrared pyrometer to measure surface temperature
  Psychrometer to measure air temperature and humidity
Interventions for structural consolidation and seismic enhancement of “Palazzo della Ragione” in Mantova

The edifice concerned by safety works was built around XI-XII century to fulfill public civic functions and to receive assemblies, civic meetings and, in case of adverse weather conditions, the market that usually took place in the square below. Over the centuries, several changes were made to the building. In 18th century the triple lancet windows were blocked and large and bright windows were opened, whereas in the first half of the XIX century the palace was brought back to its original structure by removing the Baroque additions. In the large inner hall, we can see remarkable frescoes remains that illustrate war episodes occurred around the end of XII century, in addition to characters of sacred history dating back to the middle of XIII century.

Following the earthquakes of May the 20th and 29th 2012, serious damages have been detected, mainly located in the upper walls, side NE (towards Palazzo del Podestà) and SW (Piazza Concordia side). Therefore, the Municipality of Mantua designated companies Piacenti Spa and Consorzio CCC (coordinator of CMSA Soc. Coop.) for the execution of structural interventions.

Joint-pointing intervention

Degradation of merlons mortar
aimed at the elimination of deficiencies found and the improvement of the building’s static and dynamic behavior. External façades, realized using facing bricks, were affected by large vertical and sub-vertical cracks which have been restored by means of an accurate joint-pointing intervention and localized injections. Even fissures located on internal surfaces have been carefully blocked and covered, paying particular attention to prevent damages to wall decorations visible on sides NE and SW. Mortar joints between bricks composing merlons proved to be affected by particularly high degree of leaching. For this reason interventions included joints re-pointing, after partial removal of damaged surfaces. Mortar used for the work have been selected for grain size and colour in order to adapt it to the already existent one, trying to minimize visual intrusion, which is inevitable in this interventions typology.

The project also involves the accurate restoration of pilasters placed in the triple and double openings positioned on all of the four sides. They were completely blackened due to the presence of black crusts and dirt deposits. Many of the pilasters were affected by cracks, flaking phenomena and micro-fissures. The earthquake caused, in some of the pilasters, fractures crossing the stone and detachment of large stone segments. The restoration of pilasters and relative corbels has been realized through a preliminary surfaces cleaning using wraps composed of sepiolite, cellulose pulp and ammonium carbonate solution.

At a later stage, fibreglass bars have been applied in order to repair fissures and cracks. The pilasters affected by worst decay have been disassembled, moved to our laboratory and reinte-grated where parts were missing. Stone corbels have been filled with putty to prevent further water seepage. On completion of the interventions, a finishing protective layer was applied. Cleaning operations on external and internal surfaces and biocide treatment localized in the cloister area (Piazza delle Erbe) are currently under way.
Leaching process of mortar joints, N-W facade

Alveolization phenomena, S-W facade

Removal of damaged bricks

Replacement of bricks
Safety operations for the Tower of Palazzo del Podesta’ (known as Torre delle Ore)

As a consequence of the earthquakes that struck Central Italy in May 2012, many edifices were affected by structural damages. In order to protect those buildings, several projects were made for safety enhancement and post-seism rehabilitation. In the context of this project we find the safety project for “Torre delle Ore”, the civic tower part of “Palazzo del Podestà” complex. “Cooperativa muratori, sterratori ed affini (CMSA)” building company coming from Montecatini Terme and Piacenti Spa company from Prato managed the interventions. Work operations began in September 2013 and were completed in January 2014. Structural interventions mainly concerned the masonry restoration by means of brick substitution, cracks fixing, installation of two orders of tie-rods, partial replacement of projecting metal elements. When the intervention began, the edifice was affected by irregular decay on the four façades, due to different exposure to atmospheric agents. Specifically, a significant leaching process of mortar joints in correspondence with extended portions of North-West and South-West façades (respectively looking on Via Broletto and Piazza delle Erbe). Due to this phenomenon, several bricks resulted to be insufficiently anchored to masonry and often out of their housing. In correspondence with bell cell wide openings, masonry resulted completely absent because of previous collapses and maintenance interventions. All tower façades presented bricks and masonry portions affected by fractures and erosion phenomena. Continuous wind-gust exposure produced alveolization phenomena in some of the bricks. In the area of bell tower openings, fixtures, constituted by basic frames and metal wires, resulted not to be anchored in masonry in multiple areas. Therefore Piacenti Spa company intervened with operations aimed at brick masonry restoration and fixtures anchoring enhancement. Facing brick masonry was processed through pointing of joints in the areas affected by fissures and original mortar loss. Pointing has been achieved by means of initial operations of non-compact mortar removal, accurate cleaning of brick joints, wetting of surfaces to be treated and application of hydraulic lime mortar compatible with original one for grain size, texture and color. At a later stage, the areas surrounding treated surfaces have been cleaned by use of water and flat brushes in order to limit as much as possible the visual interference of the intervention. The masonry portions affected by highest degree of decay and brick disconnection have been treated using cuciscuci method. These measures have been realized by means of accurate demolition of decayed portions, cleaning and removal of no longer suitable elements, and reconstruction using ancient recovered bricks layed upon a bedding made of lime mortar suitable for grain size and colour. In order to restore the correct anchoring of metal fixtures located in the four bell cell openings, old pins have been replaced with new tessellations. New pins anchor the fixture in correspondence with metal rods welded to the frame. http://www.salonedelrestauro.com/it/index.php
The reparation and the seismic strengthening of the Monastery of “San Benedetto in Polirone”

The Monastery of “San Benedetto in Polirone” is a monumental complex whose origin dates back to the eleventh century. After 6 years of restoration from 2005 to 2011, The Municipality of San Benedetto Po, owner of the building, was using its spaces for several different public purposes such as a museum, public library, hostel, space for conferences, storage etc. The previous interventions aimed mostly to an overall refunctionalization, to the requalification of technological systems and to the restoration of historical plasters and decorations, and partially included even structural strengthening (because the area wasn’t considered seismically exposed).

After the earthquake occurred in may 2012 in Modena and Mantova, the complex was badly damaged and, in some local portions, was risking to collapse. The earthquake hit the hardest in the portions of the complex called “Ala Giorgi” and the “Secolari” cloister, where the structural situation was already critical and no restoration was accomplished yet. In December 2013 the Monastery was appointed by Europa Nostra as one of the 7 most endangered monuments in Europe.

The first priority was to secure the structures from further deterioration and collapse. Since the building is entirely scheduled under the protection of the Superintendence for Architectonical...
Historic Heritage of Brescia, Cremona and Mantova, every single intervention on the monument needed to be discussed and authorized in advance. During every step of the work, the group has developed a continuous discussion and exchange with the responsible of the Department in charge of the complex, in order to optimize the effectiveness and the quality of the decisions. Since the first weeks after the seismic event, many urgent interventions were accomplished:

The arches in the “Secolari” cloister and the main entrance of the museum were reinforced with wooden provisional structures specially designed to maximize their efficiency in accordance with the context. The lightweight decorated ceiling of the “monumental stair” and of the “Monastic Library” were protected and sustained with dedicated punctual scaffoldings. The “Ala Giorgi” – already structurally unstable before the quake – needed to be strengthened with provisional nylon cables, wooden trusses and local supports of arches and doors.

After the overcome of the emergency phase, with the structures temporarily safe, the team began to deal with the design of the reparation and seismic consolidation of the whole complex. The peculiarities of each area of the Monastery, the modification occurred during its history and the different building techniques involved, requested an accurate and almost tailored approach in full respect of the great artistic value of the building.

The dimensions of the complex and the haste to enhance the strengthening work pushed the Municipality to split the interventions in separated portions with different contractors, but under the same unified technical supervision. The interventions described in the following lines are only part of the whole reparation work that will need more time and much more important funding to be completed.

ALA GIORGI

The area of the “Ala Giorgi” was heavily damaged by the earthquake because of preexisting
structural weaknesses. The roof was the weakest portion in consideration of the lack of connections among each structural element and was the only area without decorated plasters. The wooden structure was completely restored with metallic reinforcements and with the insertion of new dedicated metal-ties. Such interventions were necessary to connect the perimetral walls with each other and with the wooden trusses of the roof. After these works, the roof was refurbished and completed with thermal insulation, a new waterproof layer and the reallocation of roof tiles in accordance with the surroundings.

Other new tie-rods were located at the first floor to contrast the horizontal push of vaults and arches. The foundations in the underground rooms were reinforced with bricks and mortar with the same dimensions and peculiarities of the existing.
REFETTORIO

The building of the “Refettorio” is a large and empty room composed of four spans with cross vaults each almost 15 meters wide. The first cross vault collapsed almost a century ago, while the remaining three resisted even the earthquake. The survived vaults exposed large and dangerous cracks after the quakes, mostly concentrated in the perimetral portion, inducing to fear the possibility of their collapse. Such vaults were realized with a heavy double layer of bricks, and after an accurate analysis were considered stable. The problem was identified in the perimetral walls that needed to be better connected mainly in the top area. The intervention proposed start off from the reparation of the cracks in the vaults with appropriate injections and on the reinforcement of the horizontal connection among perimetral walls. Such connection will be realized thanks to a new wood and metal structure. A new metal ring made with UPN 200 will be connected with the existing walls just under the roof, and a series of new metal joints will be applied between the existing trusses and the metal ring. Each joint will be connected with metal cross-braces in order to set several smaller spans among the original larger ones. The principle of the intervention is quite simple and is based on the idea that smaller spans have a much better behavior than larger ones in case of hearthquakes.
The simplicity of the principle didn’t actually follow the realization; in fact every existing wooden element was different from each other and differed in height, size, position and state of preservation. Every single joint needed to be verified, controlled and often adapted to meet the specifications requested. In many cases the structures were modified and adapted during the history and offered different dimensional configurations. Moreover, the area of intervention (between the roof and the vaults and among the existing trusses) was particularly difficult and uncomfortable because of the small operative spaces, the lack of light and the sloping floor. Many unexpected chances occurred during the development of the work, but finally the strengthening system was completed.

After the completion of the structural interventions and the consolidation of the cracks with special mortar injections, the internal decorated surfaces will be restored in order to return the overall aspect.
MUSEUM

The restoration of internal decorated and historical surfaces of the area of the Museum was completed only from a short time before the earthquake. The interventions were focused even on the architectural reorganization and on the requalification of the internal systems, but they almost didn’t affect the structures. Only portions of the masonries were consolidated with mortar injections and with the reconstruction of small portions.

The damages in the Museum where mainly concentrated in the corridors along the “San Simeone” cloister. The corridors are characterized by high cross-vaults made of bricks above which there is the wooden structure of the roof.

After an accurate analysis of the existing situation - including the definition of every local and global weakness, the team designed several interventions mainly regarding the strengthening of the roof. The vaults along the corridors presented widespread superficial and deeper cracks caused by the seismic force. Every crack was accurately opened along its entire length, trying – where possible – to preserve original plasters. Then, a special consolidating mortar was injected through the cracks in order to recompose discontinuities.

The material filling the sides of the vaults was accurately removed and replaced with a lighter material (to enhance the overall seismic behavior). New wooden elements were connected to the perimetral top of the walls over the corridors to create a sort of ring. The ring was interconnected with special metal joints to the existing trusses of...
the roof. Thanks to these new metal elements, two couples of cross-braces were inserted just above the vaults and higher under the roof.

The general aim of the intervention is to enhance the connection of the walls to acquire more stiffness and reduce the horizontal push of the vaults. As it was for the Refettorio, even for the area of the museum, the complexity of the interventions was depending on the impossibility to apply a standardized approach: in fact every joint needed to be personalized and adjusted because of the singularity of each element.

After the completion of structural intervention, all internal surfaces will be cleaned and accurately restored.

MONASTIC LIBRARY

The ceiling of the “Biblioteca Monastica” is a lightweight structure partially hanged to the upper roof trusses, made of vegetal weaved fibres supporting the decorated plaster.

Such light structure has suffered heavy damages and a partial collapse after the earthquake, because of the peculiarities and weaknesses of the building technique itself. The lightweight and elastic structure of the ceiling seismically behaved differently from the heavyweight perimetral walls, thus resulting in a partial collapse and in widespread cracks. The intervention proposed consists in the realization of a wooden ring, fixed on the top of the perimetral walls and connected with the existing trusses to improve stiffness. In addition the design team proposed the insertion of a couple of new plywood trusses side by side with the existing bearing structure of the ceiling to reinforce it and connect it to the surrounding walls.

After the completion of the reinforcements, the internal surfaces will be completely restored, the decorations will be cleaned and repaired and the collapsed portion – if possible – will be reinstated.
Detail of the reinforcement of the ceiling.
international projects in progress
FERRARA
RUSSIAN SCHOOL OF RESTORATION
FRIDAY 28 MARCH

10.00-10.30
Presentation of MED ART Follow UP Sheick Suleyman Mosque restoration Project exhibition

10.30-12.30
Seminar: Internationalization Politics Turkey/Russia

14.00-16.00
Seminar: Restoration in Russia

16.00-18.30
B2B meetings
Assorestauro Stand
Pad 4. Stand C15-16
L’azienda nasce nel 1977 con il nome “SANA CASA”, l’attività principale era il recupero delle murature contro l’umidità capillare ascendente. Nel 1987 deposita il proprio sistema e marchio “UMIBLOK” ed inizia la produzione di attrezzature specifiche per l’edilizia. L’azienda si estende, partecipa a fiera specializzate nel settore, è conosciuta sia in campo nazionale che estero, esegue lavori di massima importanza su monumenti e presenta svariati brevetti. Dal 1998 la ditta “SANA CASA” viene conferita nella “UMIBLOK S.r.l.”, la quale continua la stessa attività e brevetta un nuovo taglia-muro il quale, oltre a creare una barriera impermeabile alla base della muratura contro l’umidità di risalita, riesce ad assorbire le vibrazioni provenienti dal sottosuolo.

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Syremont SpA

ANNO DI FONDAZIONE: 1987
CERTIFICAZIONI:
ISO 9001:2008 - OG02 II CLASSE, OS02-A I CLASSE, OS06 II CLASSE

Syremont SpA nasce nel 1987 dal Gruppo Montedison da cui eredita una specifica competenza sui fl uorurati. Dopo 26 anni al servizio della ricerca, diagnostica, restauro dei beni culturali in tutto il mondo, oggi Syremont è in grado di offrire una più ampia gamma di prodotti e servizi a supporto di prodotti per il restauro (Linee Akeogard® Edilgard®); progetti e interventi di restauro e conservazione; disinfezione di materiali organici (sistema VELOXY®); progettazione e ingegnerizzazione tecnologica e impiantistica finalizzata alla creando una forza di tipo elettromagnetica che spinge i dipoli dell’acqua verso il terreno.

Syremont begins in 1987 within the Montedison Group from which it inherits a specific competence in fl uorine-based chemicals. After 26 years of service to the research, diagnosis, restoration of cultural assets in all over the world, today Syremont is able to offer a wider range of products and services to support restoration products (Akeogard® Edilgard® lines); projects and interventions of restoration and conservation; disinfection of organic materials (VELOXY® system), planning and design of technological systems to support restoration products. Syremont creates an electromagnetic field that pushes the water dipoles towards the ground.

ANNO DI FONDAZIONE: 2003
CERTIFICAZIONI: ISO 9001:2008 - OS02-A I CLASSE, OS06 II CLASSE

Studio AERREKAPPA S.R.L. was founded in 2011 by Cristina Caiulo, architect and Stefano Pallara, engineer. Its field is the restoration of historical heritage and the renovation of private and public property, with innovative materials and techniques such as lime plaster and floor biocompatible. Studio AERREKAPPA S.R.L. designs, directs and executes works of restoration of historic buildings and the enhancement of prestigious properties, both public and private. Each project is for public fruition and divulgation, such as museums, exhibits, sound and light events, spectacularized guided tours, theme parks, media production, communication and marketing. Production cycle. Management models analysis - design - intervention - management.

ANNO DI FONDAZIONE: 2005
CERTIFICAZIONI:

Studio di Architettura SERAILI MARCO E Adele Sironi

ANNO DI FONDAZIONE: 1988
CERTIFICAZIONI: ISO 9001:2008 - OS02-A I CLASSE, OS06 II CLASSE

SERAILI MARCO E Adele Sironi

ANNO DI FONDAZIONE: 2008
CERTIFICAZIONI: ISO 9001:2008 - OS02-A I CLASSE, OS06 II CLASSE

SERAILI MARCO E Adele Sironi


- Divisione Geofisica Applicata la cui attività è incentrata sulla progettazione e erogazione di servizi di diagnostica e monitoraggio, eseguiti con tecniche geofisiche non invasive, applicate a beni culturali, architettonici e archeologici.

- Divisione Tecnico Ambientale la cui attività è incentrata sulla progettazione e erogazione di servizi applicati alla gestione ambientale, nella Sezione regionale della Toscana, Categoria 9 Bonifica dei siti – classe D. Nel 2007 ha vinto il Premio della C.C.I.A.A. di Livorno per il concorso “Impresa Innovativa”.

- Risanamento, restauro con un’attenzione costante per la bioedilizia, pitture, rivestimenti e sistemi di isolamento termico per esterni. Calcestruzzi, massetti e fondi di posa.

- Analisi e progettazione, viabilità, progettazione e realizzazione di infrastrutture sotterranee, infrastrutture stradali e viarie.

Il SPC s.r.l. ha sviluppato nel corso degli ultimi 25 anni una esperienza unica e un know-how interno specifico raggiungendo l’eccellenza nel campo dell’ingegneria strutturale con una esperienza oramai riconosciuta in tutto il mondo.
RENOVA RESTAURI è impresa specializzata in lavori di ristrutturazione e restauro prevalentemente rivolti a manufatti di pregio o valore storico. Grazie alla armonizzazione tra strumenti ed attrezzature innovative e tecniche/materiale tradizionali il nostro obiettivo strategico aziendale è creare valore aggiunto sugli assetti patrimoniali oggetto di intervento, garantendo alla committenza (sia essa pubblica o privata) alta qualità e controlli sistematici sul lavoro eseguito.

RENOVA RESTAURI is a company specialising in reconstruction and restoration, its primarily concern is in buildings of interest and historically important buildings. The balance between innovative equipment and traditional materials allows us to create additional validity to the heritage buildings in question, guaranteeing the customer (both private and public) a high quality of work and systematic checks on the work undertaken.

Our company is specialized in the restoration of metal, glass and historic chandeliers. We carry out work on lamps of any kind, size and style, and especially those typical Italian history such as Murano and Venetian chandeliers crystal chandeliers Maria Theresa or Empire. The client, public or private, can count on our support for the restoration and museum, all executed with high standards of quality craftsmanship. Company accredited by the Sovraintendenze

Restauro di intonaci policromi e di decorazioni-materiali lapidei-consolidamenti strutture murarie e opere lignee-deumidificazione e impermeabilizzazione di strutture murarie.

Restoration of polychrome plasters and decorations-stones-consolidation of wall and wood structures-repairs,dehumidification and waterproofing walls.

Pimar S.r.l. was born in 1994 as a natural continuation of the Marrocco family’s activity in the field of the natural stone from Lecce, which has its roots in the past century. The company gained know-how is very high and has been handing down for 150 years. The present company leaders, the brothers Giuseppe, Giorgia and Daniele Marrocco, together with their father Salvatore, who is the current president, have developed and evolved the company, always in the name of the research, ... that can be truly defined a “family stone”, so that it can continue to meet all requirements and be employed in more and more different new contexts.

Pimar S.r.l. nasce nel 1994 come naturale continuazione dell’attività della famiglia Marrocco nel settore della pietra leccese, che affonda le radici nel secolo scorso. Il know-how aziendale maturato è assai elevato e si tramanda da 150 anni. Gli attuali vertici aziendali, i fratelli Giuseppe, Giorgia e Daniele Marrocco, insieme al padre Salvatore, attuale presidente, hanno sviluppato ed innovato l’azienda, sempre all’insegna della ricerca, ... che si può proprio definire una “pietra di famiglia”, affinché possa continuare a soddisfare al meglio ogni esigenza architettonica ed essere impiegata in sempre più numerosi e nuovi contesti.

PIACENTI SpA

INTERVENTI > TYPE OF WORKS

MATERIALI > MATERIALS

CERTIFICAZIONE ISO 1994

INTERVENTI > TYPE OF WORKS

MATERIALI > MATERIALS

CERTIFICAZIONE ISO 1994

INTERVENTI > TYPE OF WORKS

MATERIALI > MATERIALS

CERTIFICAZIONE ISO 1994

INTERVENTI > TYPE OF WORKS

MATERIALI > MATERIALS

CERTIFICAZIONE ISO 1994
Piacenti Spa a Piacenti spa svolge attività di progettazione, conservazione e restauro di beni di interesse storico-artistico e economici ed organizzativi che le permettono, autonomamente, l'esecuzione di grandi lavori pubblici e privati. Opera sinergia con le altre e viene coordinata dall'ufficio tecnico e diagnostico. L'azienda possiede i requisiti professionali, monumentale, disponendo di personale altamente specializzato nel trattamento di manufatti lignei policromi, di dipinti dell'impresa, che si avvale di attrezzature tecnologiche e di ampi laboratori, ogni competenza settoriale lavora in su tela e tavola, di stucchi e pitture murali, di reperti archeologici, materiali ceramici, metallici e lapidei. All'interno autonomously, to carry out big public and private contracts for restoration and conservation works. It works in Italy, technical and diagnostic offices. The firm has all professional, economic and organizational requirements which allow, in Italia, Cina, Turchia, Moldova e Russia.


Nicola Restauri Srl è una realtà d'eccellenza nel campo del restauro, riconosciuta a livello internazionale, in the recovery, preservation and restoration of ancient and modern works on canvas, wood, paper, stone, archaeological finds, frescoes and stucco in churches and palaces. In the laboratory of Aramengo (AT) of

Nicola Restauri Srl is an international recognized company in the field of restoration, serving Public, Private, in the recovery, preservation and restoration of ancient and modern works on canvas, wood, paper, stone, archaeological finds, frescoes and stucco in churches and palaces. In the laboratory of Aramengo (AT) of

ISO 9001-2008

P.M. Sas di Pesenti Patrizio & C. PGL di Dott.ssa Nadia Pastore

pm@pm-serramenti.it tel. +39 035 844665 - fax +39 035 844673

PM Serramenti produce windows and doors made of high quality wood. Founded in 1986, operates in the stabilimento di Mornico al Serio (Bergamo – Italy), where, in a single production area, production, trade and administration activity are carried out. The range of products includes wooden and wood-aluminum windows, doors and entrance doors, shutters generally. PM still retains its traditional craftsmanship creating a design, coatings, wood paneling and furnishings. A selected department consists of design and execution activity, managing and coordinating design, wood and wood paneling and furnishing, and execution of works. PM produces in its design and execution activity, managing and coordinating design, wood and wood paneling and furnishing, and execution of works. PM produces in its

Nicola Restauri Srl

Tel. +39 0141 909125 - Fax +39 0141 909170

Via S. Giulia 65 - 10124 Torino

www.nicolarestauri.com

LICENZIAMENTO: ISO 9001-2008

CERTIFICAZIONI: 90002, 009-002, CLASS 2, 002, CLASS II 58, 002, CLASS II

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METADISTRETTO VENETO DEI BENI CULTURALI
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30175 Marghera (VE)
Tel. +39 041 5093046 - Fax +39 041 5093086
distrettobbcc@vegapark.ve.it - www.distrettobbcc.it

Il Metadistretto Veneto dei Beni Culturali è sorto in base alle Leggi Regionali 8/2003 e 5/2006 con lo scopo di promuovere e coordinare progetti a livello nazionale ed internazionale, favorendo la collaborazione fra le aziende e le istituzioni che operano nel settore. Fanno parte del Metadistretto 24 istituzioni e oltre 300 aziende impegnate in tutti i settori legati ai beni culturali: restauro beni mobili e immobili, allestimenti museali, produzione di materiali per il restauro, laboratori di analisi e diagnostica, valorizzazione dei beni culturali, sistemi informatici, editoria.

The Venetian Cluster of Cultural Heritage was born on the basis of the Regional Laws 8/2003 and 5/2006 to promote and coordinate the projects at national and international level encouraging the collaboration between companies and institutions operating in the sector. 24 Venetian’s highest Offices and over 300 companies are part of the Cluster, involved in all sectors linked to the cultural heritage: restoration of movable and immovable assets, museum arrangements, production of materials for restoration, analysis and diagnostics laboratories, valorization of the cultural heritage, informatics systems, publishing.

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novaria_r@starnova.it

Restauro Opere d’Arte


MENCI SOFTWARE Srl
Località Tregozzano, 87 - 52100 Arezzo
Tel +39 0575 383960 - Fax +39 0575 382051
info@menci.com - www.menci.com

MENCI SOFTWARE is a leading company for metric survey technology starting from images. We produce software solutions for photogrammetry, mapping, cartography, orthophoto. Main application field are: Cultural Heritage, Archeology, Architecture, Geology, Territory. Our principal products are: ZScan and Evo tech, easy to manage and allows a very simple 3d coloured point cloud generation; UFly that uses images taken by UAV for mapping, 3d point cloud and ortho generation; OPK solution, for large format images orthophoto massive production.
SERVIZI > SERVICES

INTERVENTI > TYPE OF WORKS

MATERIALI > MATERIALS

ANALISI E PROGETTO > TESTING & DESIGN

LEONARDO Srl

Analisi e Restauro

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LEGNODOC Srl

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Via Borgo Valsugana 1 - 59100 Prato (PO)

Mapei Spa

www.mapei.com

mapei@mapei.it - www.mapei.com

Tel. +39 02 37673.1 - Fax +39 02 37673214

il Gruppo Mapei, composto da 68 aziende consociate con 59 stabilimenti operanti nei cinque continenti, è
today the major producer worldwide of adhesives and complementary products for the installation of all types of
tile and wall coverings.

The company is also specialized in other chemical products for building, from waterproofers to special
admixtures for concrete, products for the restoration of ancient buildings and special wall
finishes. Mapei is a leader in composite materials and is specialized in other chemical products such as
impermeabilizers, special mortars and admixtures for concrete, products for the restoration of ancient buildings and special wall
finishes.
Fondata nel 1975 da Claudio Navarra e guidata oggi dai figli Attilio e Luca, ha dato continuità ad una "ultra centenaria" tradizione imprenditoriale della famiglia Navarra nel settore delle costruzioni: l’attività edilizia della Famiglia ha avuto inizio nel 1880 con la realizzazione di importanti opere pubbliche. La sede principale è a Roma, dove vengono accentrati i servizi technicali e amministrativi, mentre il proprio ufficio a Milano coordina le attività di costruzione in... progetti per le forze militari e le forze di polizia; la restituzione di chiese, edifici di notevole interesse storico e artistico; infrastrutture, strade, sviluppo urbanistico; residenziali per lo sviluppo immobiliare.

Over the last five years, the steady growth expressed by a significant increase in revenue, the professional experience gained through considerable investment in terms of human resources have enabled the company to achieve high quality standards.

Il lungo e vasto patrimonio di conoscenze di IMPRESA PANDINI e la costante ricerca e miglioramento hanno reso la società un leader in ambito edilizio. È una realtà moderna, dinamica, che ha capitalizzato il proprio ricco patrimonio di conoscenze e esperienza, condividendolo quotidianamente con i suoi oltre centocinquanta collaboratori. L’esperienza del punto di riferimento nel settore delle costruzioni in termini di affidabilità, sicurezza e qualità. Tra le opere passate e la ricerca verso la continua innovazione sono da sempre gli elementi trainanti dell’Impresa. È

La lunga esperienza alle spalle e la continua ricerca e miglioramento rendono Kimia SpA un leader ricco di connotazioni storiche e di consegne" protettive e di pulizia, isolamento e deumidificazione: una gamma di soluzioni per il restauro e recupero ad alta durabilità, calce idrauliche naturali, soluzioni per impermeabilizzazioni, pavimentazioni, trattamenti niché), applicati con risultati di durabilità eccellenti, ma non solo... Kimia è anche malte preconfezionate il consolidamento strutturale (inizialmente in carbonio e vetro, ora anche in acciaio con matrici inorga-

La produzione e la vendita di colori minerali KEIM sono la base della loro ineguagliabile qualità. Le caratteristiche principali dei sistemi KEIM, ecologico, economico, minerale. Produzione e vendita di pitture minerali ai silicati puri e prodotti complementari minerali. Pitture per facciate, pitture e Velature per calcestruzzo, pitture per interni, pro-

La lunga esperienza alle spalle e la continua ricerca e miglioramento rendono Kimia SpA un leader ricco di connotazioni storiche e di consegne Protettive & cleaning treatments, insulation and dehumidification: a range of solutions for restoration and recovery like: high durability prepackaged mortars, natural hydraulic limes, steel composite structures, protective & cleaning treatments, insulation and dehumidification: a range of solutions for the restoration and recovery of historical and artistic buildings, infrastructures, roads, urban development; residential for the real estate sector.

Over the last five years, the steady growth expressed by a significant increase in revenue, the professional experience gained through considerable investment in terms of human resources have enabled the company to achieve high quality standards.
Il Forum Italiano Calce è un’Associazione no profit, che promuove lo sviluppo di esperienze e di conoscenza dell’impiego della calce nel costruito e nel restauro attraverso: scambio, confronto e diffusione di notizie e informazioni sul mondo della calce; organizzazione di congressi, seminari, incontri e corsi; promozione della ricerca scientifica/pratica su calce, malte e pitture a base di calce; sostegno allo sviluppo di tecniche appropriate a livello industriale e artigianale per la produzione di calce aerea e/o idraulica naturale.
La Ferrari Restauri si occupa di restauro di monumenti, dipinti murali, opere policrome su tela, sculture chimiche, progetti di restauro e riqualificazione architettonica. Si occupa anche della ricerca e della vendita di prodotti per la conservazione fotografica e d'archivio.

La Ferrari Restauri keeps ancient building and handworks. Preliminary we usual make diagnostic researches for studying the objects. A section is responsible for researching and selling products for storing photographic and archival documents conservation.

La Società. El.En. ha sponsorizzato i restauri dei bassorilievi del SS. Sepolcro a Gerusalemme, David del Verrocchio e David di Donatello al Museo Nazionale del Bargello.
Cooperativa Archeologia nasce a Firenze nel 1981 per operare nell’ambito della ricerca, della conservazione e della valorizzazione dei beni culturali. È attiva, per mezzo di sedi distaccate, su tutto il territorio nazionale e in alcuni paesi esteri. Cooperativa Archeologia dà priorità alla qualità dell’intervento e all’unicità e importanza sociale dei beni su cui agisce. Le attività vengono eseguite con un organico di oltre 200 operatori specializzati nel proprio settore di intervento e affiancati da consulenti scelti tra ricercatori altamente qualificati.

Cooperativa Archeologia è una cooperativa societaria a scopo noleggio, a seguito della quale è nata nel 1981 con lo scopo di promuovere e coordinare la ricerca, la conservazione e la valorizzazione dei beni culturali. L’attività è condotta attraverso sedi distaccate in tutta Italia e in alcuni paesi esteri. Cooperativa Archeologia si concentra sulla qualità delle operazioni e sulla unicità e importanza sociale dei beni su cui interviene. L’attività è svolta da un organico di oltre 200 operatori specializzati nel proprio settore e da consulenti scelti tra ricercatori altamente qualificati.

Certificazioni:
- UNI EN ISO 9001- UNI EN ISO 140001- OHSAS
- Procedura in corso per ISO e OHSAS

Cooperativa Archeologia è nata negli anni '80 e prosegue nella ricerca applicativa della tecnologia elettro-cibernetica per l'eliminazione dell'umidità muraria da risalita. La propria area di influenza abbraccia l'intera Europa.

Ecodry Italia (deumidificazione muraria con elettrofisica) è esclusivista per l'Italia dei prodotti tecnologici della società tedesca Ecodry Systeme GmbH – Sauerlach (Germania), specializzata nell'eliminazione dell'umidità muraria da risalita negli immobili in generale e con particolare esperienza nel recupero del patrimonio architettonico di complessi pubblici di importanza storica, religiosa, culturale e artistica. La società tedesca Ecodry Systeme GmbH – Sauerlach (Germania), specializzata nell'eliminazione dell'umidità muraria da risalita negli immobili in generale e con particolare esperienza nel recupero del patrimonio architettonico di complessi pubblici di importanza storica, religiosa, culturale e artistica.

Ecodry was born in the 80s and continues in the application research of electro-cybernetic technology for the elimination of moisture in walls from rising in buildings in general and with particular experience in the recovery of the public architectural heritage of historical, religious, cultural and artistic importance. The German company Ecodry Systeme GmbH - Sauerlach (Germany), specialized in the elimination of moisture in walls from rising in buildings in general and with particular experience in the recovery of the public architectural heritage of historical, religious, cultural and artistic importance.

Ecodry Systeme GmbH – Sauerlach (Germania), specializzata nell'eliminazione dell'umidità muraria da risalita negli immobili in generale e con particolare esperienza nel recupero del patrimonio architettonico di complessi pubblici di importanza storica, religiosa, culturale e artistica. La società tedesca Ecodry Systeme GmbH – Sauerlach (Germania), specializzata nell'eliminazione dell'umidità muraria da risalita negli immobili in generale e con particolare esperienza nel recupero del patrimonio architettonico di complessi pubblici di importanza storica, religiosa, culturale e artistica.

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CIR-Chimica Italiana Restauri è un apprezzato e conosciuto produttore di formulati chimici ad applicazioni nei settori del Restauro Monumentale e dell’Edilizia Civile. L’offerta dell’azienda prevede, inoltre, una completa linea ANTIGRAFFITI ed una per il trattamento delle PAVIMENTAZIONI. CIR offre alla sua clientela un valido supporto di consulenza, formazione ed assistenza tecnica.

La Soprintendenza ai Beni Artistici e Storici di Napoli Capodimonte e poi dal 1988 per la Soprintendenza stesso ambito dell’Associazione.


Il Consorzio Artigiano Raffaele Rumolo è una ditta specializzata nel restauro di opere d’arte e di superfici materiali lapidei, tarsie marmoree, mosaici, soffitti dipinti, manufatti lignei, materiali archeologici, dipinti su tela e su tavola ed arredi di pregio, e nel restauro monumentale completo di edifici storici e vincolati.

La prima associazione delle imprese private gestori dei servizi museali. Fondata nel 2001, Confcultura è l’unica organizzazione in Italia rappresentativa delle imprese private che gestiscono i servizi per la valorizzazione, fruizione e promozione dei Beni Culturali. La missione che ispira l’azione dell’Associazione è la convinzione che i beni culturali siano fattori di sviluppo e di progresso per l’intera società e che si debbano giungere forme più mature di collaborazione fra le istituzioni pubbliche e il settore privato specializzato. A questo fi ne Confcultura rappresenta le esigenze e le proposte delle “imprese della cultura” nei confronti delle principali istituzioni politiche ed amministrative, incluse le Soprintendenze, le Direzioni Regionali, il Ministero per i Beni Culturali e le Attività culturali, il Parlamento, il Governo e le forze sociali che operano nello telaio e su tavola ed arredi di pregio, e nel restauro monumentale completo di edifici storici e vincolati.

Il Consorzio è composto da una equipe di venti formatori editoriali, per la valorizzazione del nostro patrimonio storico e artistico con l’obiettivo di raggiungere forme più mature di collaborazione fra le istituzioni pubbliche e il settore privato specializzato. A questo fine Confcultura rappresenta le esigenze e le proposte delle “imprese della cultura” nei confronti delle principali istituzioni politiche ed amministrative, incluse le Soprintendenze, le Direzioni Regionali, il Ministero per i Beni Culturali e le Attività culturali, il Parlamento, il Governo e le forze sociali che operano nello
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**ANNO DI FONDAZIONE**: 1988

**CERTIFICAZIONI**: UNI EN ISO 9001 : 2008

Commercio e produzione di materiali ed attrezzature per il restauro, la conservazione, la diagnostica, gli arredi museali. Progettazione e realizzazione di laboratori ed attrezzature per l’analisi e per il restauro del patrimonio culturale. Società certificata UNI EN ISO 9001:2000
La società B5 Srl indirizza e promuove l’esperienza e la specializzazione in progettazione architettonica e strutturale, consolidamento e restauro degli edifici, direzione lavori in Italia e in Europa, di uno studio professionale di tradizione più che trentennale, con le competenze in materia di innovazione tecnologica e metodologica di giovani professionisti affermati (arch. Francesca Brancaccio, ing. Ugo Brancaccio), attraverso i contributi e le specificità dei singoli soci. La B5 Srl opera nell’ambito di un Sistema di Qualità, adottando al suo interno e nei rapporti con i Committenti i criteri espressi dalle Norme UNI EN ISO 9001:2000.

B5 Srl engineering achieved a great experience and known-how in architectural and urban planning, in restoration of civil and monumental buildings, supervision of working in Italy and abroad, which comes from a successful long-term tradition, thanks to forty-year professional tradition with the innovative contributions and abilities of Francesca Brancaccio, Ph.D. and MA in architecture and Ugo Brancaccio, engineer, both specialized in the restoration of monuments. B5 Srl engineering operates in a Quality System, adopting in the relationship with customers, the criteria expressed by the regulations UNI EN ISO 9001:2000.


The company Berlucchi srl was established in December 1981 by the brothers Francesco and Roberto Berlucchi, carrying on the professional activity of their father Eng. Antonio. Today, the company works on new buildings and on restorations and is divided in two sections: Eng. Roberto Berlucchi is responsible of the Designing division, meanwhile his son, Eng. Nicola Berlucchi is responsible of the Restoration division. The designing team is composed by two senior partner engineers and nine employees (engineers, architects and technicians).

L'idea imprenditoriale dell'archeoRes prevede la fusione delle logiche imprenditoriali con la passione per il restauro dei soci fondatori. La società opera su tutto il territorio nazionale nei settori specialistici del restauro monumentale, e la conservazione del patrimonio architettonico, artistico e archeologico, utilizzando le competenze e le conoscenze di altissima qualità. L'impresa è specializzata in diverse aree come: archeologia, restauro edili, e strutturali e storici oggetto di indagine, stilando il progetto di rilievo più adeguato per offrire il risultato migliore.

Archimeter è una società impegnata nel settore dei rilievi di alta precisione. Specializzata in Laser Scanner 3D e RTK GPS, la società offre servizi che includono: Geometria, Rendering di interni ed esterni, Termografi a, Ricostruzioni 3D per l'archeologia, Virtual Tour. Afferma di garantire serietà e professionalità nei suoi lavori, utilizzando strumenti specializzati e sofisticati.

Ardea Srl si occupa di recupero strutturale di edifici civili, industriali e storici. La società è presente sul mercato con il marchio Betontex e ha sviluppato tecnologie specifiche come: compositi in fibra di carbonio, di vetro, aramide e fibra ad alto modulo. Proprietaria di brevetti e marchi, Ardea Srl è leader nella produzione di materiali strutturali e si occupa delle applicazioni Ardea Srl can offer a great warranty of good results and new solutions specifically optimized for many problems and situations often not solved by traditional technologies.

Art-Test s.a.s. di Emanuela Massa e collaboratori nasce a Firenze nel 2011. La società fornisce servizi e tecnologie innovative, strumenti e software specifici per il settore dei Beni Culturali. La società si è specializzata nella diagnostica ottica ad immagine su superfici dipinte. I suoi test non distruttivi ottici consentono a Art-test di indagare su un vasto campo di applicazione. I suoi obiettivi sono migliorare i servizi forniti in risposta alle esigenze dei clienti, evolvere la strumentazione per ottimizzarne le prestazioni, mantenere il rigore nella gestione dei progetti e continuare a migliorare la qualità dei risultati ottenuti attraverso prove su materiali di qualità diversa e in contesti diversi. La società offre analisi multispectrali, analisi chimiche e termografia a lunga doppio IR; inoltre collabora con tecnici qualificati nel campo dell'archeologia e del restauro.
AHRCOS è un’impresa attiva in campo di conservazione del patrimonio artistico e monumentale. La qualità dei prodotti, garantita da test sul campo e di laboratorio ed il continuo monitoraggio applicativo, assicura interventi di restauro attenti e rispettosi. Lo staff tecnico di AN.T.A.RES ha una lunga e consolidata esperienza. AN.T.A.RES offre inoltre un servizio di analisi diagnostica.

AHRCOS srl offre un vasto assortimento di prodotti, attrezzature e servizi per la conservazione e la restituzione del patrimonio artistico e monumentale. L’impresa è specializzata nella restituzione di strutture storiche e archeologiche con tecniche avanzate, operando con sistemi multipli e brevettati, riconoscendo tra i propri valori quello dell’arte dal sapore antico, che insieme alla conoscenza dei materiali e delle tecnologie di consolidamento sempre più evolute, fanno del restauro parte rilevante del proprio DNA professionale.

AHRCOS srl dispone di uno staff interno che si occupa di Ricerca e Sviluppo in collaborazione con varie Università Italiane. La conoscenza di tecniche tradizionali, unitamente alla costante ricerca e sperimentazione di più aggiornate modalità di intervento, ci consente di lavorare nel pieno rispetto della natura e della conservazione delle strutture, consci delle responsabilità e dell’impegno del nostro lavoro.

AhRCOS® è un’impresa leader nella riattivazione e la riqualificazione di strutture storiche e monumentali. L’impresa lavora con tecniche avanzate, operando con sistemi multipli e brevettati, riconoscendo tra i propri valori quello dell’arte dal sapore antico, che insieme alla conoscenza dei materiali e delle tecnologie di consolidamento sempre più evolute, fanno del restauro parte rilevante del proprio DNA professionale.

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Members List

Elenco dei Soci
La fi sica commerciale della Commissione Facchetti includes specifico interesse per il restauro e il recupero delle aree industriali dismesse. L'associazione è impegnata in incarichi conferiti dall'Istituto di Commercio Estero per la progettazione di percorsi formativi e l'assistenza finale per interventi di conservativo della restaurazione e del restauro di siti mondiali, compresa la Forza dei SS. Pietro e Paolo a S. Pietroburgo, Russia. L' associazione ha anche organizzato la formazione di professionisti di aziende associate ad Assorestauro. Il corso di formazione si è svolto con visite a prestigiosi cantieri in Italia e all'estero.

The association has been tasked by the Italian Trade Commission to devise training and technical assistance projects aimed at the conservational restoration of important sites worldwide, including the supply of the excellent machinery, equipment and materials made by Italian member companies. These projects provide examples of Italian work methods and equipment for the purpose of job training on every level, from work and worksite supervision to workers themselves, and to foster cooperation and experience-sharing between each country's experts.

Restoration projects include the Peter the Great Door on the Peter and Paul Fortress in St. Petersburg, Russia and the Clock Tower on the Dolmabhaçe Palace in Istanbul, Turkey. On behalf of ICE the association has also held training courses in Italy, with tours of prestigious sites at which Assorestauro members are working.

The first was held in Genoa, and a second in Bologna. The second was held at the Maniace Castle in Syracuse and titled "Seismic Risk and Sicilian Churches. Five Cases in the Southeast".

The Bovisa branch of the Milan Polytechnic was host to: "Recouping Abandoned Industrial Areas: Just a Local Resource or a Cultural Asset to be Protected?".
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<td>Cristina Caiulo Studio Aerrekappa Srl  Coordinatore</td>
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<td>Veneto, Friuli Venezia Giulia, Trentino</td>
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<td>Andrea Sandri Röfi  x SpA</td>
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<td>Lombardia</td>
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<td>Davide Mauri Leonardo Solutions Srl</td>
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<td>Piemonte, Valle d'Aosta</td>
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<td>Liguria</td>
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<td>Roberto Cappuccio Restauri Srl</td>
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<td>Emilia, Rimagna</td>
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<td>Carlo Amadori Acropoli Srl</td>
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<td>Toscana</td>
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<td>Emanuela Massa Art Test Sas</td>
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<td>Antonello Roccetti Kimia SpA</td>
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<td>Abruzzo e Molise</td>
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<td>Fausto Dramisino Archeores Srl</td>
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<td>Pio Claudio Massaroni Umiblok Srl</td>
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<td>Puglia</td>
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<td>Stefano Pallara Studio Aerrekappa Srl</td>
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Founded in 2005, the Italian Association for Architecture, Art, and Urban Conservation is the first Italian association of institutions, companies, and consultants created to represent the cultural assets restoration and conservation sector in Italy, and the first association of such kind in Europe. It promotes studies and research, gathers data that are useful for the sector, analyzes market situations, and participates in the development and dissemination of international standards for the qualification of member companies, whom it assists and aids in getting quality and safety certification for their products and services.

### Conferences

The first conference was held in Genoa with the cooperation of the Technical Scientific Committee of the Restauro Association on the theme of the port waterfront of Genoa; the second one was held in Siracusa Castle Maniace, with the title "Seismic Risk and Cultural Heritage.

### Bridges of Dialogue

The association promotes dialogue between the business world and the academic world, between companies and universities. It helps prepare international standards that qualify member companies whom it assists and aids in getting quality and safety certification for their products and services. It promotes the exchange of information among the sector, and it organizes conferences and other events to promote the association and its mission.

Initially created to promote dialogue between the business world and the academic world, and to foster cooperation, the Italian Association for Architecture, Art, and Urban Conservation has been active since 2005. It promotes dialogues among the sector's stakeholders, and it organizes conferences and other events to promote the association and its mission.