

From silence to lively life: a convent restored to become a University center for Italian and foreign students.

A complex restoration intervention, intersecting structural aspects and finishing ones.

Type of intervention

Restoration Rehabilitation / Renovation

Concerned elements on the intervention project

- 1. Foundations and underground structures
- 2. Vertical structures
- 3. Horizontal structures and vertical connections
- 4. Roof and terraces
- 5. Façade and building envelope
- 6. Finishes and completion elements
- 7. Integrate services
- 8. General strategies for building recovery

Site Convent of St. Antonino and Military Wooden Mill, St. Antonino Square, near the Central Station, Palermo, Sicily, Italy

Objectives Restoration and reconversion of some buildings of the complex into a Centre of foreign languages (CLA) and the School of Italian for foreigners for the University of Palermo (ItaStra); restoration of fresco paintings.

Property Public: University of Palermo

Designer University of Palermo Technical Area, Arch. Costanza Conti; Eng. Antonio Sorce

Date 2012-2019



Background to the intervention

Fig.1: Internal view of the building. ©Francesco Renda

The seventeenth-century convent of St. Antonino is a treasure chest that holds four centuries of religious and secular history, a stone's throw from Palermo Central Station. The former convent, acquired by the University in 2004 and inaugurated in 2012, preserves the rooms and machinery dedicated to the manufacture of bread, remains of industrial archaeology whose pearl is the gigantic Military Wooden Mill that has been preserved almost intact. The architectural complex of St. Antonino, designed by the architect Mariano Smiriglio, was originally built as the convent of St. Antonino of Padua for the Reformed Friars of San Francesco. Before being transformed into a barracks, the building lived its religious history for three centuries. It was built, starting from 1630, to house the Franciscan friars. Until his death, the convent also housed the friar *Umile da Petralia*, a celebrated sculptor of crucifixes, one of whom is located in the adjacent church and friar Bernardino da Ucria, born Michelangelo Aurifici, from 1786 "Demonstrator of Botany" at the Deputation of the Royal Studies, the present University of Palermo. He was responsible for planting the Linnaean System of the Botanical Garden of Palermo, which took place between 1789 and 1791.

Two centuries later, in 1866, after the suppression of religious Orders by the Italian Government, the convent became a barracks for the subsistence of the Royal Army and housed the gigantic wooden steam-powered mill, capable of supplying massive quantities of bread for the inhabitants. In the early twentieth century the convent was heavily modified to be adapted to the new use: in the rooms that once housed the friars, the bread was produced for a half a century for the soldiers of all of Sicily.

After 1866, with the suppression of religious Orders and the

confiscation of their assets, the complex became a military headquarters. Actually the building houses, in the recovered spaces, some structures of the University of Palermo, the University Language Centre, a basic and applied research Laboratory dedicated to innovative materials and a Museum of industrial archaeology in the rooms dedicated to bread making history.

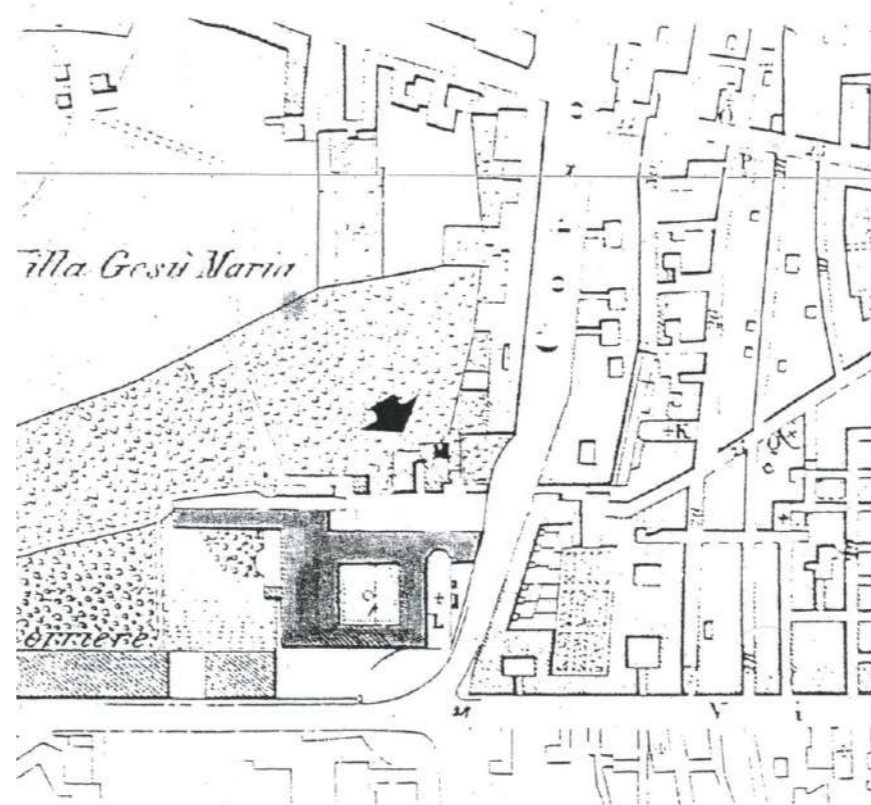


Fig.2: Map of Palermo at 1864. © Private Archive



Fig.3: View of the internal courtyard and portico. ©Francesco Renda

Description of the building

The monumental building has a central courtyard, with a colonnade on the ground floor, around which the original building develops; on the façade facing Perez street, there is a second building with a rectangular plan.

From St. Antonino square, it is possible to enter into the former Convent through an iron gate that delimits an open space belonging to the complex where, among other things, there are some buildings on a floor above ground and the local electrical substation.

Originally, the entrance to the convent took place directly from St. Antonino square, through the portal built adjacent to the church that led straight into the colonnade.

The building consists of two floors with the exception of the building facing Via Perez which shows a third floor, and an elevation in the area of the mill where some machinery is located.



Fig.4: Detailed view of the inner portico. ©Francesco Renda



Fig.5: Detail view of one of the arms of the inner portico with columns of compact grey limestone and shell limestone arches. ©Francesco Renda



Fig.6a: Detail view of one of the arms of the inner portico with stone cross vaults, set on corbels and metal chains to eliminate horizontal actions, before the interventions. © University of Palermo, Technical Area

As part of the adaptation works to the new barracks destination, interventions were carried out, partially modifying the original constructive characteristics of the complex. The most significant transformations were the replacement of most of the wooden roofs with modern reinforced concrete structures, set on the perimeter walls and anchored to reinforced concrete beams. In order to adapt the original structure to military use, other buildings were built in the free areas, located respectively to the South and North-West areas and along Perez street.

The central squared courtyard has undergone significant tampering over time, with respect to the original architectural and construction configuration:

- the portico was closed with masonry, to create various rooms with different destinations, used as deposits;



Fig.6b: Detail view of one of the arms of the inner portico with stone cross vaults, set on corbels and metal chains to eliminate horizontal actions. ©Francesco Renda

- in the north corner, a large terrace with reinforced concrete pillars and beams was built at the first floor to serve the military housing (presently it does not exist anymore being demolished);
- the original stone paving was entirely covered with a layer of bituminous conglomerate;
- Inside the buildings overlooking Perez street, as well as in the building located to the South-East of the complex, paths have been created with tracks for the transit of trolleys used for handling materials and products related to the business of the military bakery.

The Diagnosis of the building (values and state)

The building complex, in the part where no restorations had yet been taken, was in a state of neglect and was characterized, in some parts, by phenomena of decay and/or structural instability in correspondence of masonry (damage, overhangs, detachments, etc.) which represent points of structural vulnerability, also considering that the original structural behavior of most of the buildings has been changed due to the construction of massive concrete works presenting considerable weight (solid slabs, reinforced concrete beams, etc.). A notable configuration of decay also affected the superstructures (floors, external plasters, etc.), the fixtures and roofing; showy spots of humidity, caused by the infiltration of rainwater, can be found in different areas of the complex.

On the occasion of the ceremony for the official handover of the monumental complex to the University of Palermo in 2004, interventions were carried out to remove the debris and unsafe portions and put in safety the complex. On that occasion, the

demolition of the terrace with a reinforced concrete structure built inside the cloister was also realized, having serious degradation phenomena at the bases of the pillars.

The portion of the building subject to recent restoration works concerns the North-West wing of the cloister, adjacent to the church of St. Antonino and it spreads over two floors. At the ground floor there is a colonnaded passage - one of the four sides of the cloister - covered by cross vaults; the larger upper floor rests partly on the colonnaded passage and partly on the side chapels of the church. The conducted surveys and investigations demonstrated that the building volume - built above the colonnade - has undergone various transformations over the years: presumably and originally, above the portico, there was a terrace subsequently closed by the Franciscan friars, useful to the construction of the convent cells and the corridor of disengagement. These new volumes, certainly of modest workmanship, were created, as evidenced by the traces found on the vestments, by setting the wooden roofs on the church masonry, below the windows, incorporating the buttresses. Following the acquisition of the convent by the army, because of the new intended use, a large space covered by a pitched roof on trusses was created.

The trusses are set on stony arches, made in contrast between the buttresses of the church and on the masonry weighing on the loggia, raised to create the new volume. Subsequently, and presumably to ensure a connection between the walls of the new volume, a massive reinforced concrete floor was built, bearing on reinforced concrete beams anchored to the masonry of the church and that of the façade overlooking the courtyard. Due to the serious state of decay, and to restore the original nineteenth-century configuration, now historicized, a partial demolition of that reinforced concrete floor was done. That allowed us to detect the actual structural hierarchy of the building.

The result is a space in which the interpenetration of the different volumes of the church and the convent is evident, as transformed by the military. The main entrance to the convent, framed by a stone portal adjacent to the entrance to the church, leads directly into the cloister from Sant'Antonino square; it is now in disuse.

Restoration works

The architectural design of this portion of the building aimed at realizing some offices for the professors of the University Language Center, in continuity with the activities already planned at the first floor.

The criteria and methods of intervention were aimed at recovering the original architectural and construction configuration of the monumental complex, while maintaining the sign of the transformations undergone during the period of occupation by the army.

Particular attention will be paid to the rehabilitation of the cloister, by restoring the colonnade, the original windows, the flooring; the entrance portal along St. Antonino square was also restored.

In the first floor, with an emergency intervention, part of the reinforced concrete floor was eliminated, presenting a serious state of decay and risk of collapse, also constituting an element of serious vulnerability to seismic actions.

The restoration site allowed us to carry out in-depth investigations in situ, discovering the existence of the ancient windows on the courtyard and the original flooring; the system of trusses/arches/buttresses also emerged, which unites the convent building and the church in a single

architectural-constructive structure. The project plans to keep the construction system described above, as well as the trussed roof in view, allowing an immediate reading of the structural hierarchy of the building. The new rooms, intended as teachers' offices, will be built using modular and light partition walls with glass and steel, restoring the original windows of the convent cells.

The traces of an ancient roof, found under the windows of the church, are the witness of the probable existence of an original disengagement space between the same church and the convent, which allowed access to the original cells. In this space it is planned to build a large corridor adjacent to the arches that will serve the teachers' offices. The new environment will be equipped with direct natural lighting, created by means of a metal and glass structure that, at the same time, responds to the need to isolate the windows of the church, while also ensuring their lighting.

The techniques and materials used for the restoration were determined by an in-depth study of the original state and of the construction materials used for this monumental complex.

The main interventions are summarized below:

- restoration of the courtyard façade, restoring the openings of the original system;
- remaking of plasters using traditional materials and techniques (lime-based plasters);
- conservation and restoration interventions of all the stone elements, making up individual building components (columns and capitals, vaults, arches, etc.);
- revision of the roof Sicilian tiles, reusing where possible

the existing ones;

- revision of existing trusses and replacement of those seriously damaged;
- reconstruction of the rainwater disposal system, using copper gutters and downspouts;
- replacement of external doors and windows, using wooden frames having traditional construction characteristics and designs.



Fig.7: View of the complex, actually. ©Francesco Renda

The carried out structural interventions were aimed at achieving an adequate level of safety, through the construction of works intended to eliminate the points of vulnerability existing in the original buildings, without distorting their overall construction and structural behavior. An in-depth and detailed survey of the original state was carried out, necessary to identify the types and construction characteristics of the individual building components, as well as the crack patterns and the state of decay affecting the load-bearing structures. Since these are



Fig.8: View of the complex, present. © Manfredi Saeli

structures falling within the seismic area, the used techniques have preferred the execution of seismic protection works similar to the original existing ones (metal tie rods, etc.) in order to eliminate any thrusts transmitted to the walls.

Basing on the inspections, the phases in which the structural rehabilitation and consolidation intervention is divided are indicated below, done after the execution and installation of the necessary protection and shoring works:

- consolidation, where necessary, of the foundation and thick walls making up the original system;
- dismantling and reconstruction of the walls and parts of them severely degraded and/or with significant overhangs, insufficient thicknesses and inadequate textures;
- disassembly and remaking of the roofs;

- consolidation and restoration of the stone vaults;
- disassembly and replacement of the reinforced concrete horizontals and reconstruction of floors with typological characteristics similar to the original ones (wooden floors, roofs with wooden trusses, etc.);
- construction of traditional anti-seismic protection works (metal connections at the heads of the wooden beams, metal tie rods with adjustment sleeves, solid brick curbs reinforced at the top of the walls of the last elevation);
- restoration of existing metal chains, or if necessary, replacement of the same.

Local weakness in the masonry walls, near degraded jambs of the openings (doorways and windows), of the grafts and crossings, and in the presence of voids and/or niches, have been eliminated with masonry performed with the "scuci-cuci" technique (elimination of bad masonry and replacement with a more efficient one, taking care to the indentations).

Where truss replacement is necessary, the new structures have a type and static functioning similar to the pre-existing ones. Particular attention was paid to the connection to the masonry and to any overlying stiffening planking, as well as to the housings of the heads of the wooden beams.

The consolidation of the arches and vaults was carried out, as far as possible, proceeding with the disassembly and reassembly of the damaged parts, subject to the provision of adequate ribs and shoring. Only when such type of intervention is not feasible, inert carbon fiber bars of small diameter were used.



Fig.9a: New wooden floors. © Manfredi Saeli



Fig.9b: New wooden floors; detail of the reinforced wooden beams. © Francesco Renda

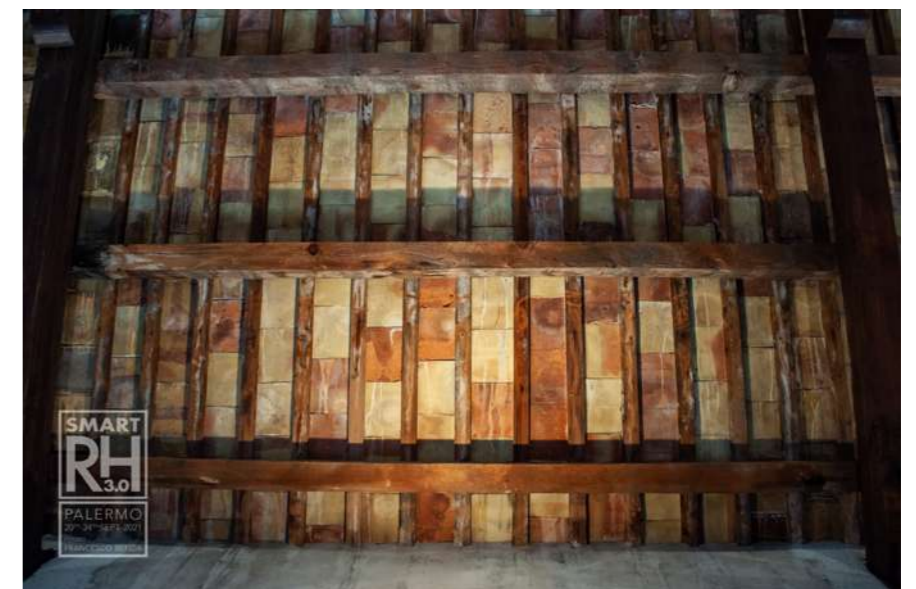


Fig.10a-b: Timber structure of roof with trusses. © Manfredi Saeli & Francesco Renda



Fig.11a-b: View of new timber structure of a roof with steel tie rods to eliminate pushing actions. ©Francesco Renda



Fig.12: View of restoration phases. ©University of Palermo, Technical Area



Fig.13a: Render of the same room after restoration. ©University of Palermo, Technical Area

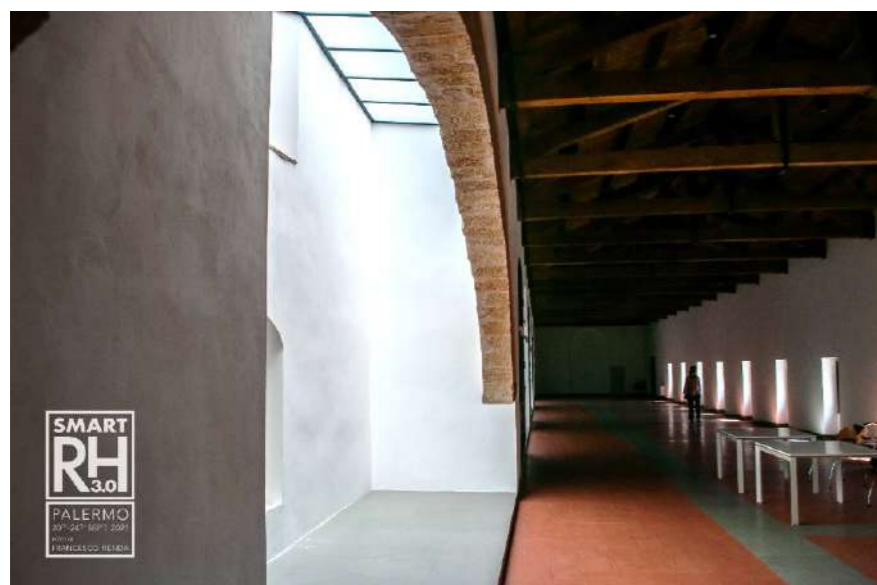


Fig.13b-c: View of the same room after restoration, actually. ©Francesco Renda & Luisa Lombardo

THE FINDING OF THE FRESCOES AND THE RESTORATION INTERVENTION

During the restoration of the former Convent of St. Antonino, conducted by the Technical Area of the University of Palermo in 2018, some frescoes of extraordinary artistic, historical and cultural value were found into the cloister of the Convent, in correspondence with the entrance adjacent to the Church of S. Antonio da Padova. The cycle of frescoes (17th-18th century) had remained hidden for about 150 years under a layer of 19th-century plaster. It seems likely that the authors of the same frescoes were friars belonging to the Order of the Reformed Observants of St. Francis.

The restoration intervention was characterized, in the first phase, by the removal of the thick layers of whitewash that hid the entire pictorial cycle. The pictorial surface was covered by a more or less dusty residual layer of the yellowish lime/gypsum paints, not removable with water. The descalco operations were carried out dry with the aid of scalpels and metal blades where part of the more superficial layers were swollen and not adhered. Preliminarily to the cleaning phase, a preconsolidation of the plasters was performed, noting a certain disintegration of the same which, post-cleaning, was followed by consolidation. Samples useful to apply the most suitable cleaning technique have led to a fair result in the use of ion exchange resin. During processing, to optimize the result, detecting the presence of an organic substance as a binder of the residual bleaching, the application of cellulose pulp tablets supporting solutions of suitable solvents was made, obtaining the removal of the residual chalky part and the part of organic glue. During the cleaning operations, unsuitable mortars were mechanically removed which were then reconstituted with mortar more

suitable for color and granulometry.

The pictorial reintegration, performed in watercolor, observed the criterion of chromatic selection and the mending with neutral tones of the abraded portions, in order to reduce the visual interference caused by the multiple and extensive falls of the pictorial film and more or less deep abrasions. This technique made it possible to bring out the original pictorial material by minimizing the restoration work, whose primary purpose is the conservation of the asset.



Fig.14: View of the restored paintings. ©Francesco Renda



Fig.15: Restoration phases of discovered fresco paintings. ©University of Palermo, Technical Area

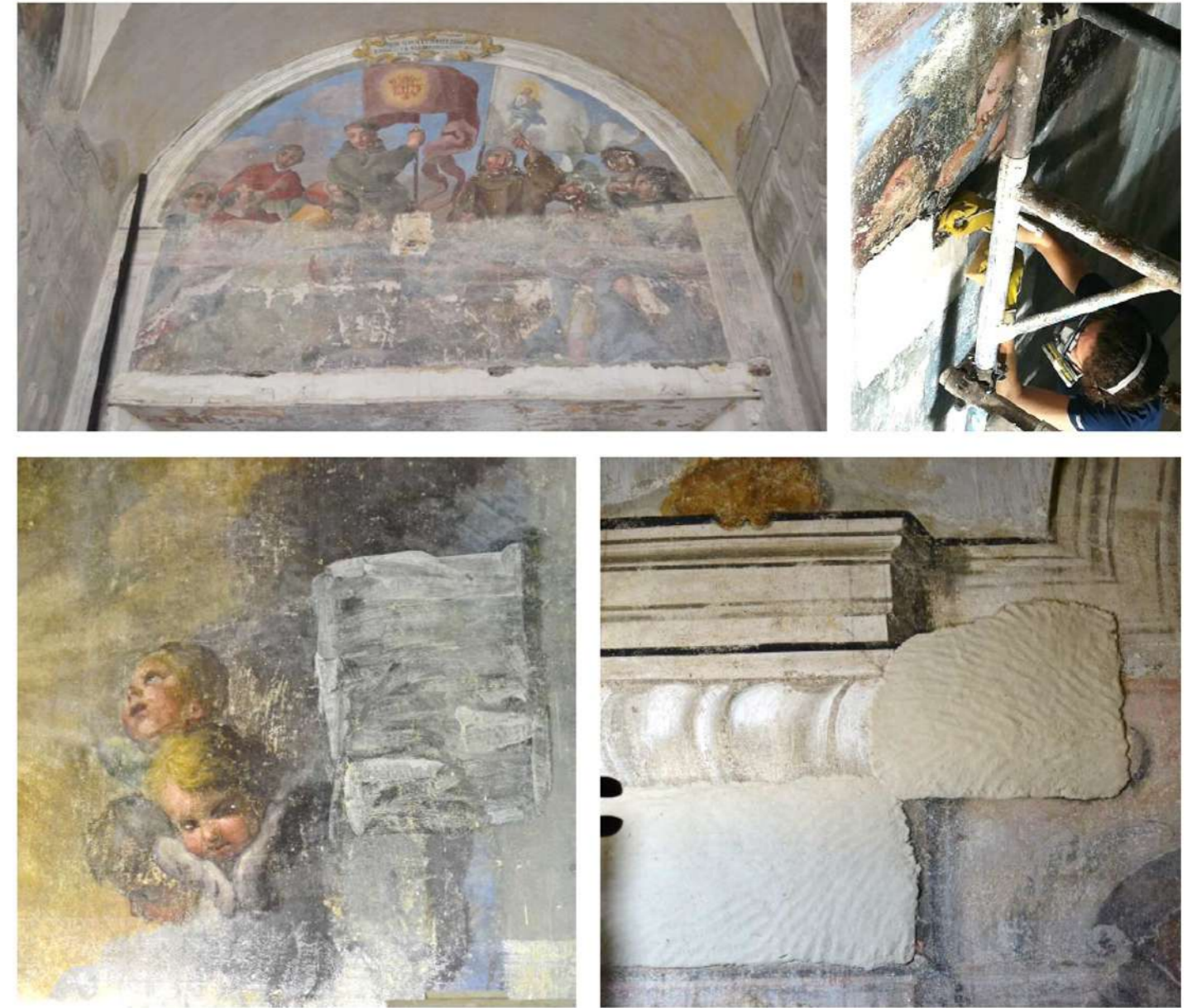


Fig.16: Restoration phases of discovered fresco paintings. ©University of Palermo, Technical Area



Fig.17: Restoration phases of discovered fresco paintings; details before and after interventions. ©University of Palermo, Technical Area

Assessment of the results

Restoration interventions demonstrating traditional techniques can be reproduced successfully in a contemporary building yard.

An important step forward for the university logistics that it will welcome. The center of foreign languages and the school of Italian for foreigners - adds the Rector - will represent a new cultural lung in the city center in contiguity with the other university establishments, improving student services and, above all, qualifying the internationalization process that the University is carrying on the last years.

UNIPA also opens a new space for the city, for the organization of events, demonstrations. It is a historical space that is given back to the city, it is a space for children but also for all citizens.



Fig.18: Restoration phases of discovered fresco paintings; details before and after interventions. ©University of Palermo, Technical Area



Fig.19: Visit to the former Military Mill spaces, now museum spaces, of the Smart Rehabilitation 3.0 Partners project, during the Staff Training Course in Palermo, accompanied by the arch. Costanza Conti, September 2021. ©Francesco Renda



Fig.20: Visit to the former Military Mill spaces, now museum spaces, of the Smart Rehabilitation 3.0 Partners project, during the Staff Training Course in Palermo, accompanied by the arch. Costanza Conti. ©Francesco Renda



Fig.21: Visit to the former Military Mill spaces, now museum spaces, of the Smart Rehabilitation 3.0 Partners project, during the Staff Training Course in Palermo, accompanied by the arch. Costanza Conti. ©Francesco Renda



Fig.22: View of the chimney of the Military Mill. ©Francesco Renda

<https://palmokids.blog/palermo/cosa-fare-a-palermo-con-i-bambini/annaorsi/le-vie-dei-tesori-il-mulino-di-santantonino/>

<https://magazine.leviedeitesori.com/il-mulino-ritrovato-nelle-vie-dei-tesori/>

References

All the information contained in this sheet is taken from reports (drawn up in the final step of the restoration work) carried out by the Technical Department of the University of Palermo.

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<https://www.unipa.it/Affreschi-Ritrovati-e-riapertura-del-Chiostro-inaugurati-al-Complesso-Monumentale-SantAntonino/>

http://musei.unipa.it/s_antonino.html