

A largest painted wooden ceiling in Europe, rich of history and original construction techniques.

A restoration reconciling good practices of safeguarding and enhancement with the use and visitability of the site during the works.

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	Chiaromonte Palace, also known as Steri, Marina square, Palermo, Sicily, Italy
Objectives	Restoration of the wooden ceiling of the Magna Room (Sala Magna)
Property	Public: University of Palermo
Designer	Building work Director: Arch. Costanza Conti Unique Responsible for the restoration procedure: Eng. Antonio Sorce Rest. Contractor: ARES Srl, Martina Franca (TA), Italy High surveillance and protection: Superintendence of Monuments of Palermo
Date	2017-2019



Background to the intervention

Fig.0: General view of the Sala Magna wooden ceiling. © Manfredi Saeli

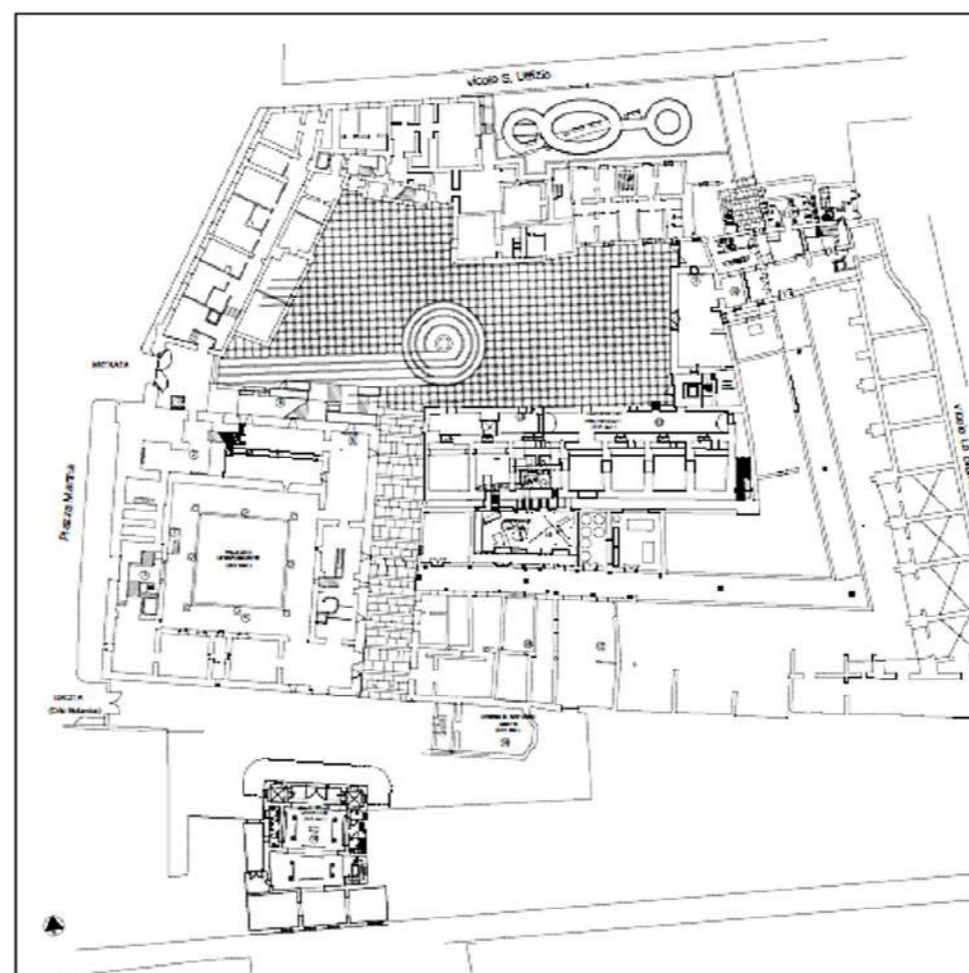
The University of Palermo has launched a program aimed at the restoration, recovery and improvement of its monumental assets, including the restoration of the wooden ceiling of the Magna Room (Sala magna) of the Steri Palace, that represents an extraordinary masterpiece of the Chiaromonte period, being also one of the most significant interventions.

Largest painted wooden ceiling in Europe of this period, much simplified as regards the preparatory layers that in the pictorial drafts, no less very refined, with the use of oil tempera with resinous substances additives and pigments that had been analysed during the diagnostic phase before to surgery.

The executive project for the restoration of the wooden ceiling of the Magna Room of the Steri Palace was approved by the Superintendence of Monuments of Palermo, the estimated amount was € 2,393,000,00.

The ceiling has been the subject of an epochal restoration, carried out by the University of Palermo, which involved the removal of the painted boards from the beams and the transfer to a laboratory directly set up on site: here the boards are subjected to consolidation, tissue paper intervention, cleaning and retouching. It is, therefore, an extraordinary opportunity for investigation, and this meritorious work is added to the numerous commitments of the University on the restoration front.

At the Steri, the restoration of the entire monumental complex has been underway for years. The restoration of the courtyards now allows the performance of concerts and orientation days, while exhibitions and conferences are held in the many other areas of the complex.



PLANIMETRIA GENERALE DEL COMPLESSO MONUMENTALE DI PALAZZO CHIARAMONTE



FOTO AEREA DEL COMPLESSO MONUMENTALE DI PALAZZO CHIARAMONTE

Fig.1: General plan and aerial view of the monumental complex of Chiaromonte palace, Steri. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)



Fig.2: View of the internal courtyard of the monumental complex of Chiaromonte palace, Steri. ©Francesco Renda

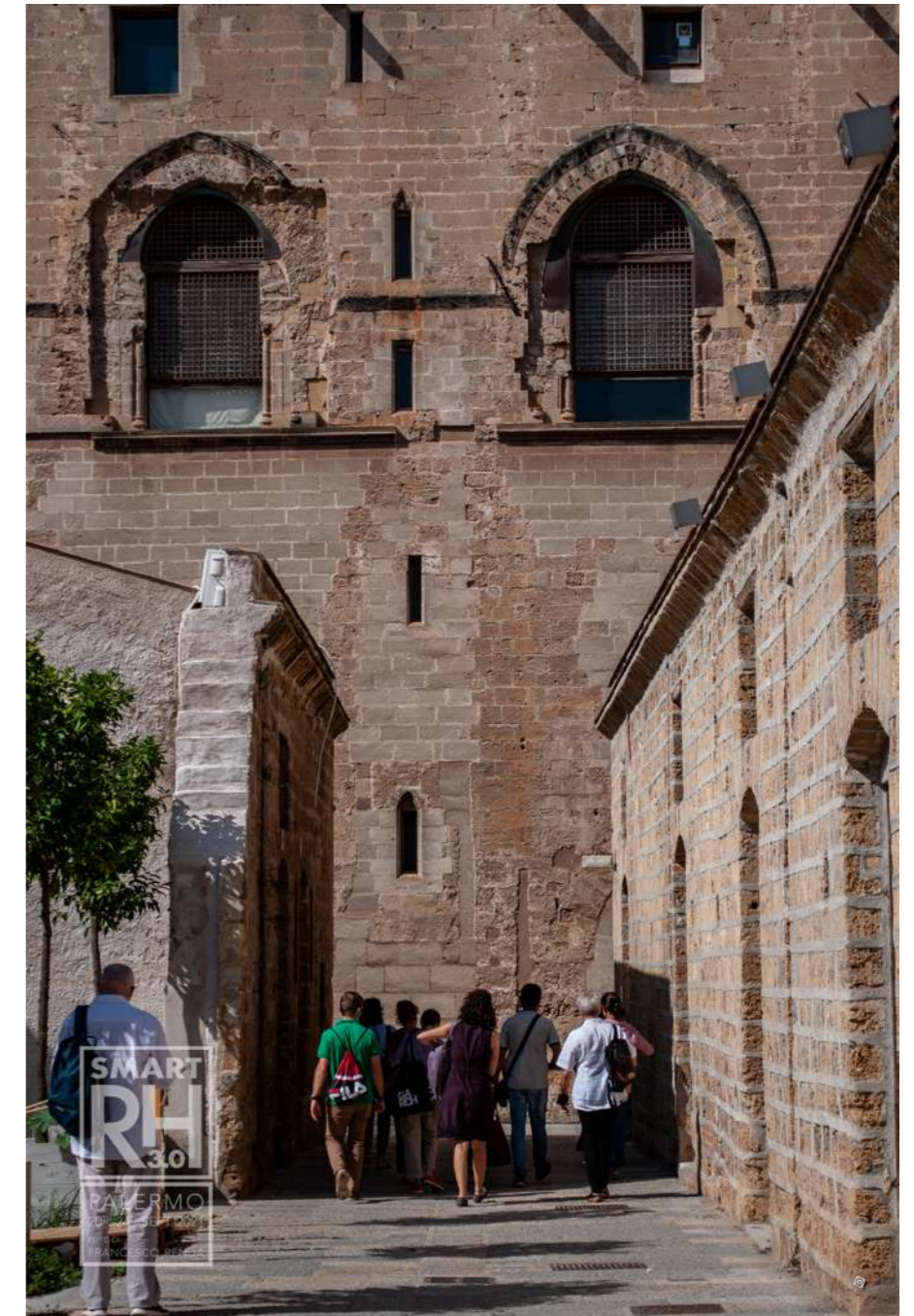


Fig.3: Detailed view of the internal courtyard of the monumental complex of Chiaromonte Palace, Steri. © Francesco Renda

Description of the building

Chiaramonte Palace, also known as the “Steri”, is one of the symbolic places of the city of Palermo. It contains seven centuries of Sicilian art and history and represents the first example of the novel architectural style that appeared in Sicily at the beginning of the 14th century, the so-called *chiaramontano* style. Elegant and solemn, the Palace is enriched by splendid colonnades and beautiful mullioned and triple mullioned windows.

Dating back to 1320, it was the home of Manfredi I Chiaramonte, Count of the immense and powerful feud of Modica. Between 1468 and 1517 it hosted the Spanish viceroys and between 1601 and 1782 it was the seat of the Inquisition Tribunal, a period in which the building was adapted to the new function with the construction of prisons and torture cells on the lower floor of the building.

After being the seat of the Court and the Customs Office, a long period of neglect and building abuses, it was restored in the seventies by the architects Carlo Scarpa and Roberto Calandra, it is now the headquarter of the Rectorate of the University of Palermo.

The “Sala delle Armi” (trad. room of the arms), one of the jewels of this palace, represents one of the main rooms of the original Chiaromonte residence, probably, at the time, intended for public audiences. Its transformation began when the original entrance was hidden by the seventeenth-century staircase. Further and heavily remodeled at the time of the Holy Office (very small cells are built on three levels), it was used as a prison for the Inquisition. Traces, today, are the wall paintings still visible in the cells. The return to the original layout is due to the restoration of 1970, again based on a project by the architects E. Calandra and C. Scarpa.

On the upper floors there are two large rooms: on the first floor

is the Magna Room called also “of Barons”, adorned with a precious wooden ceiling which represents, with its decorations, a fantastic sequence of medieval scenes narrated with vivacity in the dimensions of the wooden beams which, in their succession, constitute a continuous narrative cycle, a real treatise on medieval history.

The room, at the behest of the author himself, also houses the famous painting by the well-known painter Renato Guttuso, called *La Vucciria*. On the second floor, the recently restored “Sala delle Capriate” (trad. Room of Trusses), whose prestigious setting is used for ceremonies. It is characterized by the splendid three-light walls, currently houses some eighteenth-century paintings from the Regional Interdisciplinary Gallery of Sicily in Abatellis palace.



Fig.4: View of the interior garden (XIV century *viridarium*). © Francesco Renda

The wooden ceiling extends over a width of approximately 8 meters and a length of 28 meters and consists of 24 rectangular section timber beams, placed at a height of about 8 meters, resting on wooden shelves. The beams are divided into two



Fig.5: View of the interior palace courtyard. ©Luisa Lombardo

fields by a central band that develops along the longitudinal axis of the room. The intervals between each wooden beam give rise to deep rectangular recesses in which the architectural system of the 24 major beams is repeated in miniature with their respective corbels. The structural beams-system of the ceiling is entirely covered with painted panels. All the published studies

identify in the origin of the ceiling iconography a complex network of literary culture, having a close symbiosis with the use of manuscripts as sources.

Over the centuries the wooden ceiling has undergone various transformations, also related to the different functions of the room. Limiting this description to the latest interventions, the restoration work that the architect Giuseppe Patricolo undertook between 1898 and 1899, consisting on the delicate operation of dismantle and consolidation of the timber structure, flanked by Giuseppe Alfano who was dedicated to reproducing the lacking part of the ceiling decoration.

In the second half of the last century, a corrugated sheet slab with reinforced concrete screed was built above the painted ceiling, which replaced the load-bearing function of the original wooden beams, which today is the only supporter of the painted panels.



Fig.6: General view of the wooden ceiling, from below. ©Francesco Renda



Fig.7: Detailed view of the Magna Room (Sala Magna), hosting the wooden ceiling and restored by the arch. Carlo Scarpa. ©Francesco Renda



Fig.8: Detail of the painted wooden ceiling, from the intrados. ©Francesco Renda

LA SALA DEI BARONI

immagini di cantiere

- 1 - 2 Il soffitto dipinto è sostenuto da 24 travi principali a sezione rettangolare appoggiate su mensole lignee e da un'orditura secondaria costituita da travicelli, a cui è stata ancorata mediante chiodature, una struttura articolata di pannelli dipinti.
- 3 Pannello con grave degrado causato da agenti xilofagi.
- 4 Particolare di un pannello con fratturazioni, mancanze e degrado diffuso della pellicola pittorica.

1	2
3	4

Fig.9: Detail of one of the posters clarifying the structure and the degradations of the ceiling, explaining the restoration works. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

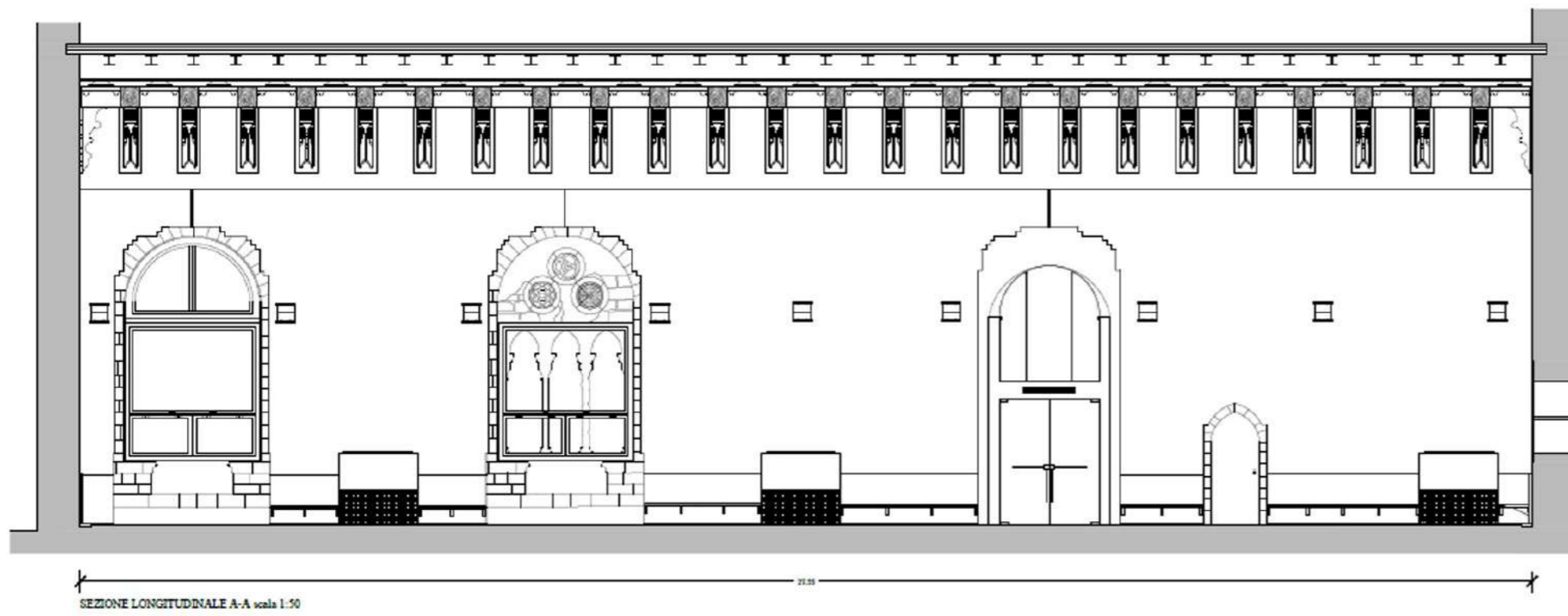


Fig.10: *Sala magna*, longitudinal section. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

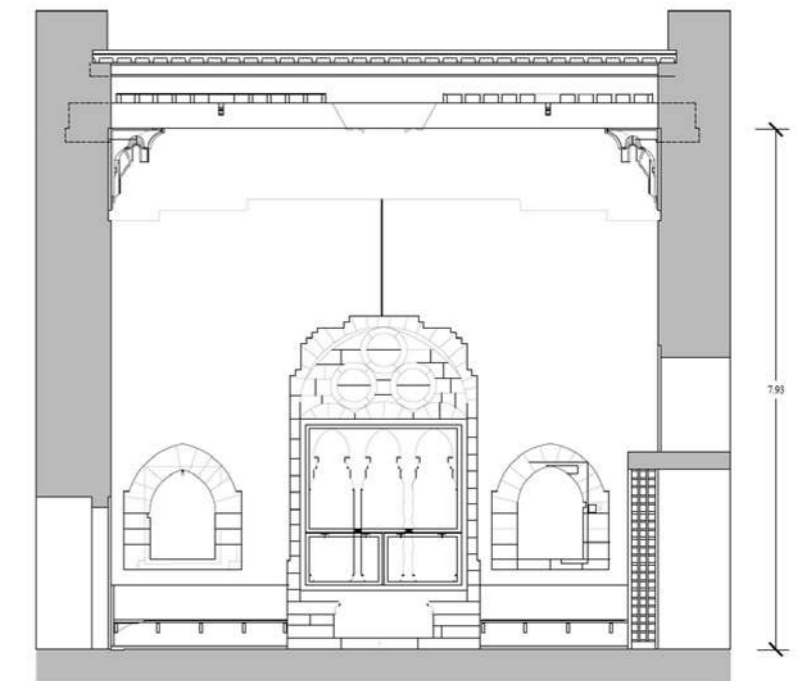


Fig.11: *Sala magna*, cross section. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

The Diagnosis of the building (values and state)

Since 2005, due to the worrying disintegration of the pictorial films and wooden supports, the Technical Area of the University of Palermo has launched several studies and investigations that converged into the implementation of pilot interventions, aimed at investigating the causes and the state of deterioration of the complex system constituting the ceiling.

During these interventions, special diagnostic and restoration laboratories were set up, making it possible to identify intervention criteria and methodologies, also evaluating the relative costs and implementation times. The techniques and materials adopted were chosen through scientific studies, including the identification and characterization of the materials used for the realization of the paintings, the identification of the causes and mechanisms of degradation, as well as of products and technologies used in the previous interventions.

The painted panels were in an amazingly poor state of conservation, attributable both to the natural aging of the constituent materials as well as to previous restoration interventions. Consequently, they presented numerous forms of decay: superficial deposits, widespread gaps, abrasions, detachments and lifting of the pictorial film, deterioration of the binder and alteration of some pigments also complemented to lesions of the wooden support. The drafting of a ketone varnish applied in the previous restoration intervention had altered the material characteristic of the tempera technique and seriously altered the original colors. In addition, the attacks of xylophage's insects have widely affected the painted wooden panels and the support structures making up the ceiling framework, resulting in a significant reduction in the mechanical strength. The deterioration of the pictorial films and of the wooden elements was aggravated also by the construction of the floor in corrugated steel sheet which caused inevitable phenomena of condensation. These phenomena described above were triggered by interventions that had been carried out

during previous years with materials and methods that were extraneous or incompatible with the original ones.

In light of the very poor state of deterioration, almost close to collapse, the execution of the restoration work could no longer be postponed, highlighting the absolute need to proceed with the complete disassembly of the ceiling to allow effective consolidation of the wooden parts as well as the restoration of the pictorial films.

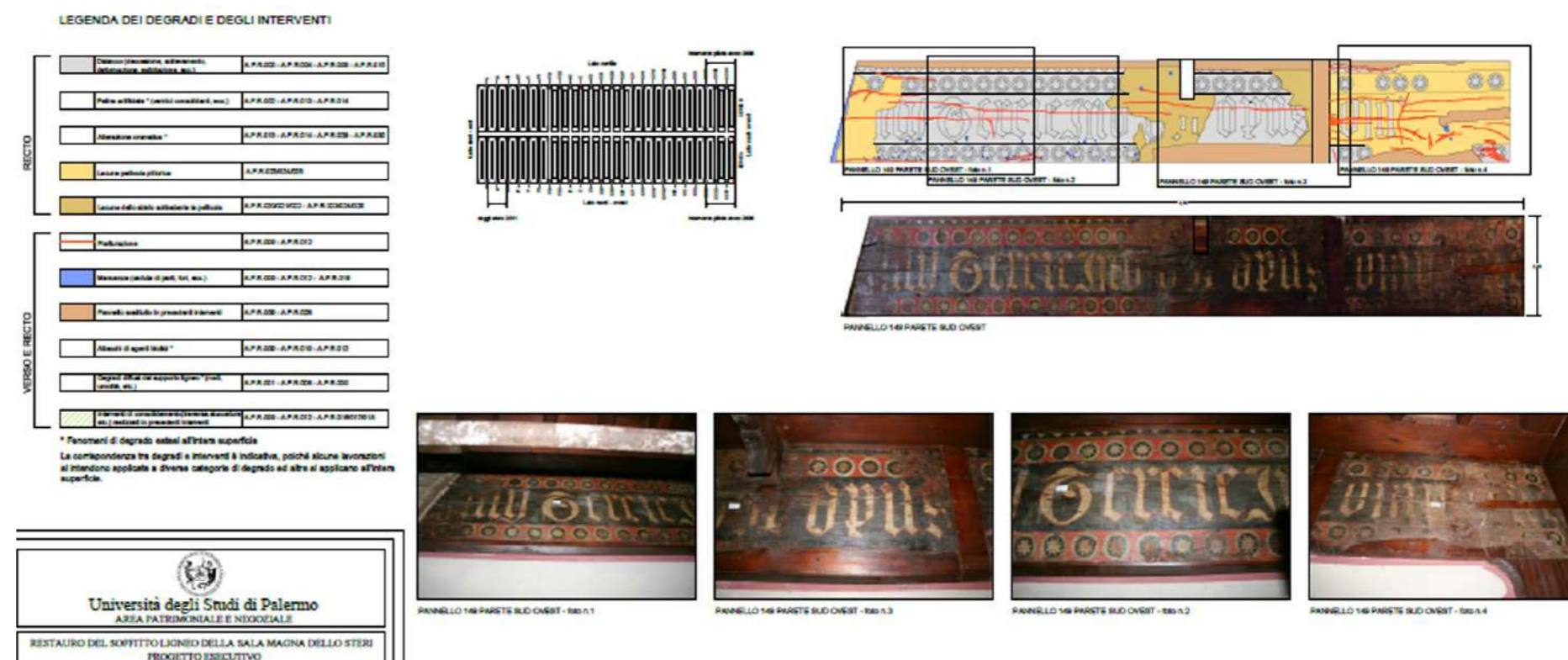


Fig.12: Executive design of restoration works; table of degradations and related interventions of one of the wooden ceiling panels. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

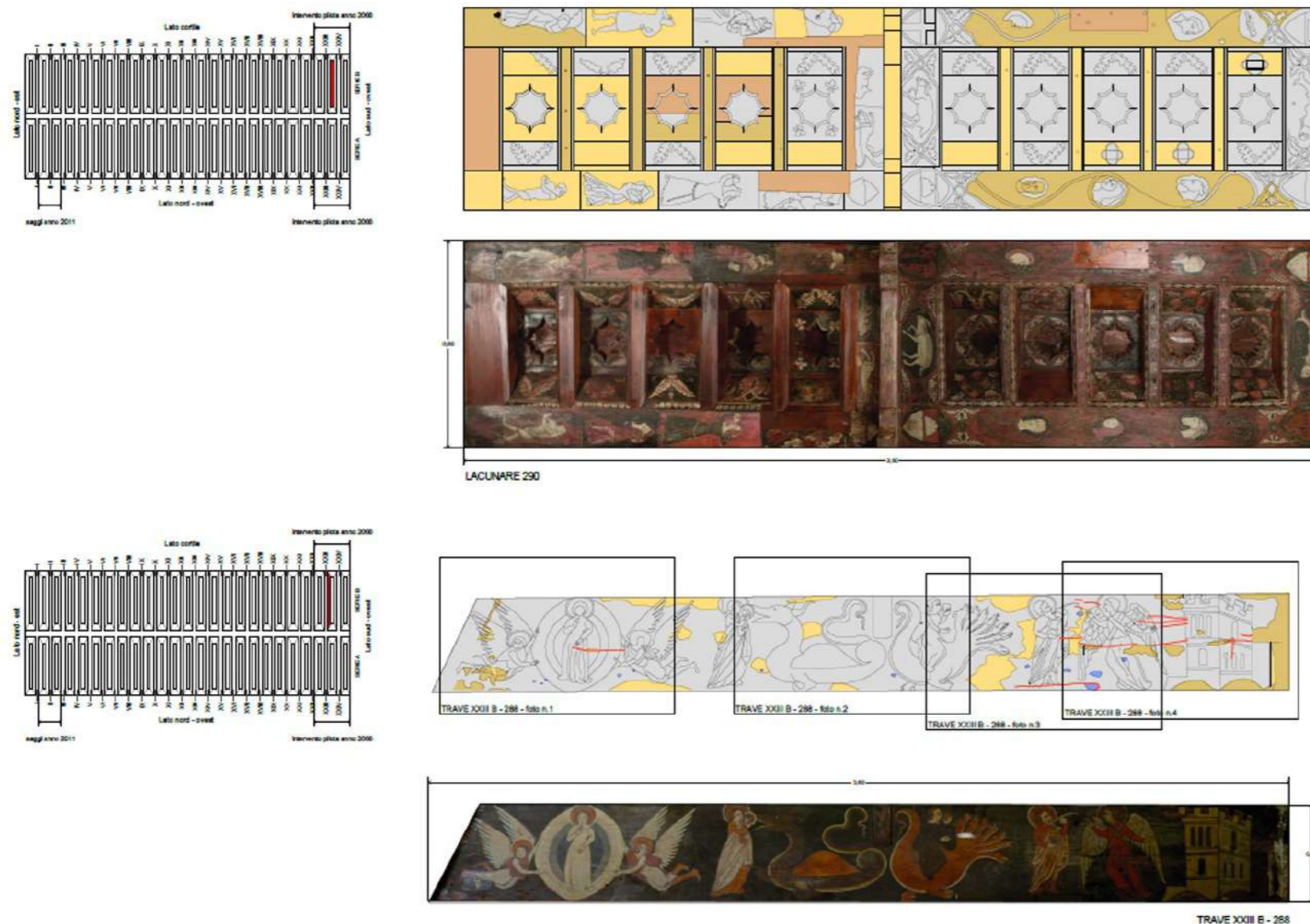
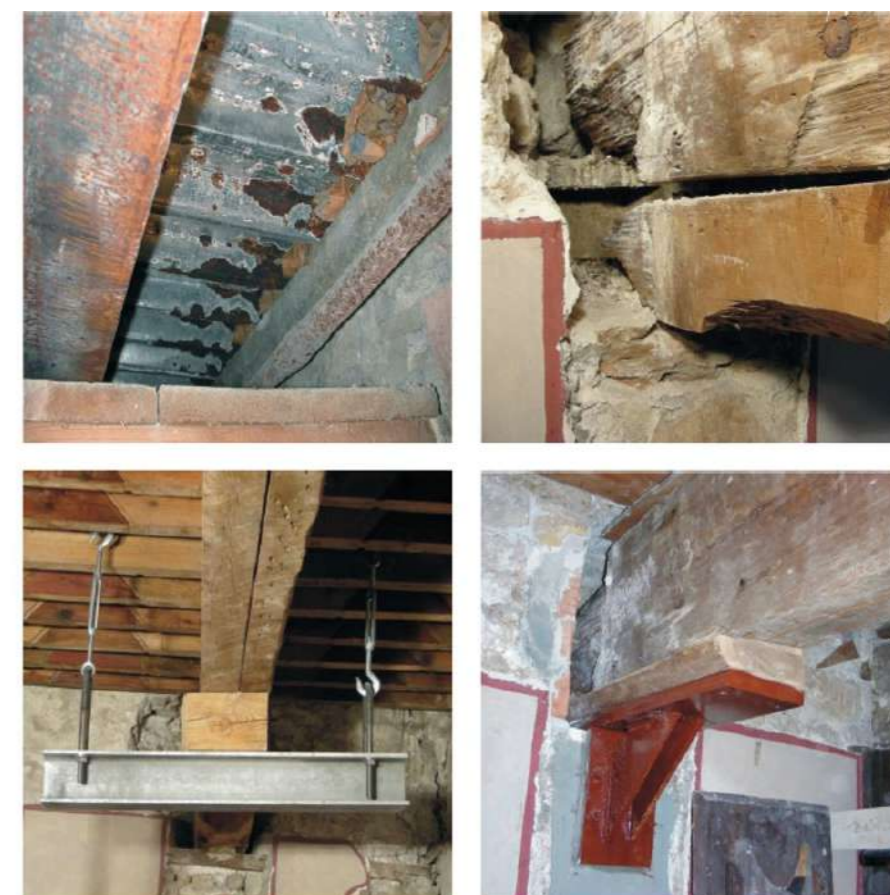


Fig.13: Executive design of restoration works; table of degradations and related interventions of one of the wooden ceiling lacunars. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

LA SALA DEI BARONI

immagini di cantiere



- 1 - Degradation of the ceiling in lamiera grecata realizzato nei precedenti interventi di ristrutturazione per sostituire il solaio ligneo preesistente.
- 2 - Gravi fenomeni di marcescenza delle teste delle travi principali a causa dell'assenza di un'adeguata areazione e della presenza di elevati tenori di umidità.
- 3 - 4 - Sostegno provvisorio tirantato per consentire il rifacimento delle mensole di appoggio delle travi e la realizzazione di adeguate nicchie di alloggiamento areate.

1	2
3	4

Fig.15: Detail of one of the posters clarifying the structure and the degradations of the ceiling, explaining the restoration works. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

Restoration works

Based on the acquired data and the collaboration of specialists in the field of diagnostics, history of art and restoration techniques, the Technical Area of University of Palermo in 2016 defined the executive restoration project, detailed in all its parts. In 2017, with the installation of the restoration site, it was possible to graphically and photographically document each element of the ceiling, promptly identifying the types of constraints, the state of conservation of the constituent materials, the pictorial film and the preparatory layers of the painting.

Each of the wooden elements has been the subject of a detailed filing, which constitutes a fundamental knowledge base of the entire system, also for future maintenance and/or conservation interventions that may become necessary in the future.

The restoration was carried out, in agreement with the Superintendence, through interventions aimed at ensuring a lasting conservation of the property by adopting the criterion of "minimum intervention". In this way the optimal conditions for the preservation of the artifact were re-established, significantly improving the reading of the figurative text.

The restoration work involved both the front and the back of the individual wooden elements and were carried out in special site laboratories, located into the Sala Magna itself, which allowed the touristic visits of the site and its use as well from the academic community.

Prior to handling and disassembly, the painted boards were protected and pre-consolidated. The wooden support was subsequently restored, by inserting spruce wood wedges and/or by filling the cracks and gaps, with a putty suitably formulated for valuable wooden materials, and by consolidating the pictorial film.

The cleaning interventions, suitably preceded by the execution of initial tests, led to the removal of the ketone paint applied during the restoration of the 1970s and allowed the removal of coherent deposits above the original pictorial film.

The complete disassembly of the panels, coffers, and shelves revealed traces of the original polychromies, in excellent condition, and provided precise information on the assembly and decoration technique of the ceiling coffers. The investigations on the materials also allowed us to identify, for the first time ever, traces of metal and plaster in the decorative elements.

The cleaning of the shelves, blackened over time by previous restoration interventions and the probable use of oil lamps, has also restored the legibility of heraldic coats of arms, inscriptions and figures that mark the rhythm of the narrative development of the panels that cover the beams.

According to an approach of "minimal intervention", the pictorial reintegration was performed by simply integrating the micro-gaps and abrasions of the pictorial film, using watercolor glazes and tonal balancing of the exposed wooden support. With the final painting, a protective film was created in order to ensure adequate conservation of the paint layers from any degradation agents. These interventions are compatible, reversible and distinguishable with respect to the original pictorial surface.

To restore the load-bearing structure of the wooden ceiling, the painted panels were removed revealing the entire load-bearing structure, consisting of wooden beams. In the last century a new floor in corrugated metal sheet was built above the beams supported by steel section beams (HEB 200) which deprived them of the function of supporting the floor above. The fir beams are placed at the ends of the parietal limestone masonry for

about 70 cm on plates and dormers (metal brackets bolted to "Vignolles" rail irons), dating back to the late nineteenth-century restoration work of the Architect Patricolo.

The corrugated metal sheet showed widespread corrosion, with consequent disintegration of the overlying reinforced concrete screed and the metal reinforcement, which made it necessary to replace large portions of these construction systems and reconstitute the disintegrated concrete screed by casting of rheoplastic grout. With regard to the check tests carried out on the wooden beams, a strong deterioration of some of them was observed, determined by the biotic alteration of the wood due to the humidity and the temperature of the interior environment in which the wooden ceiling is located and the lack of ventilation of the holes' housings the wooden beam heads. Therefore, it was necessary to create some wooden prostheses, replacing the most severely degraded heads, also limiting the intervention to the irrecoverable portions of wooden beam and ventilated housing niches.

The studies on the microclimatic conditions of the room revealed critical issues in the attic of the upper floor, crossed by the non-insulated pipes of the heating and cooling system of the overhanging room (Sala delle Capriate). At this stage, it was necessary to prepare a structure of sheet metal panels covered with cork, to grant a protection of the painted wooden ceiling and a work surface for future interventions carried out on the extrados of the aforementioned floor.

Particular attention was given to the new monitoring and air conditioning system, in order to ensure an optimal microclimate for the conservation of the precious ceiling and the prevention of xylophages attacks favored by strong fluctuations of relative humidity, as well as the creation of condensation.

A monitoring system placed both above and below the attic will

document the history of thermo-hygrometric variations that affect the state of conservation of the wooden elements, allowing the maintenance design to adjust the air conditioning systems in order to uphold humidity and temperature values within the optimal limits, in relation to the different seasons.

Periodic inspection and maintenance interventions, scheduled on the basis of the elements of knowledge acquired and indicated in a specific maintenance plan, will guarantee the protection and conservation of the building as a whole.

Assessment of the results

The restoration work concerned both the front and the back of the individual wooden elements and were carried out in special site laboratories, located into the Sala Magna itself, which allowed interested visitors to use the site.

Far beyond the ability of this extraordinary wooden restoration yard to act as a significant example for the restoration of painted wooden structures, using innovative materials and techniques for contemporary wooden restoration. One of the most important restoration building yard aspects has been the possibility to allow the visitor to visit enter the yard and visit it, as well as visit and view the restoration phases, in a regime of absolute transparency, with the possibility of learning, knowing the tools and methods of conservation, protection and improvement of a cultural heritage.

The reception of visitors, subject to agreement with the Ceremonial office of UNIPA, will be guaranteed by the contractor's staff, who will take care of the formalities provided to grant access to the site, with particular reference to the obligations related to safety.

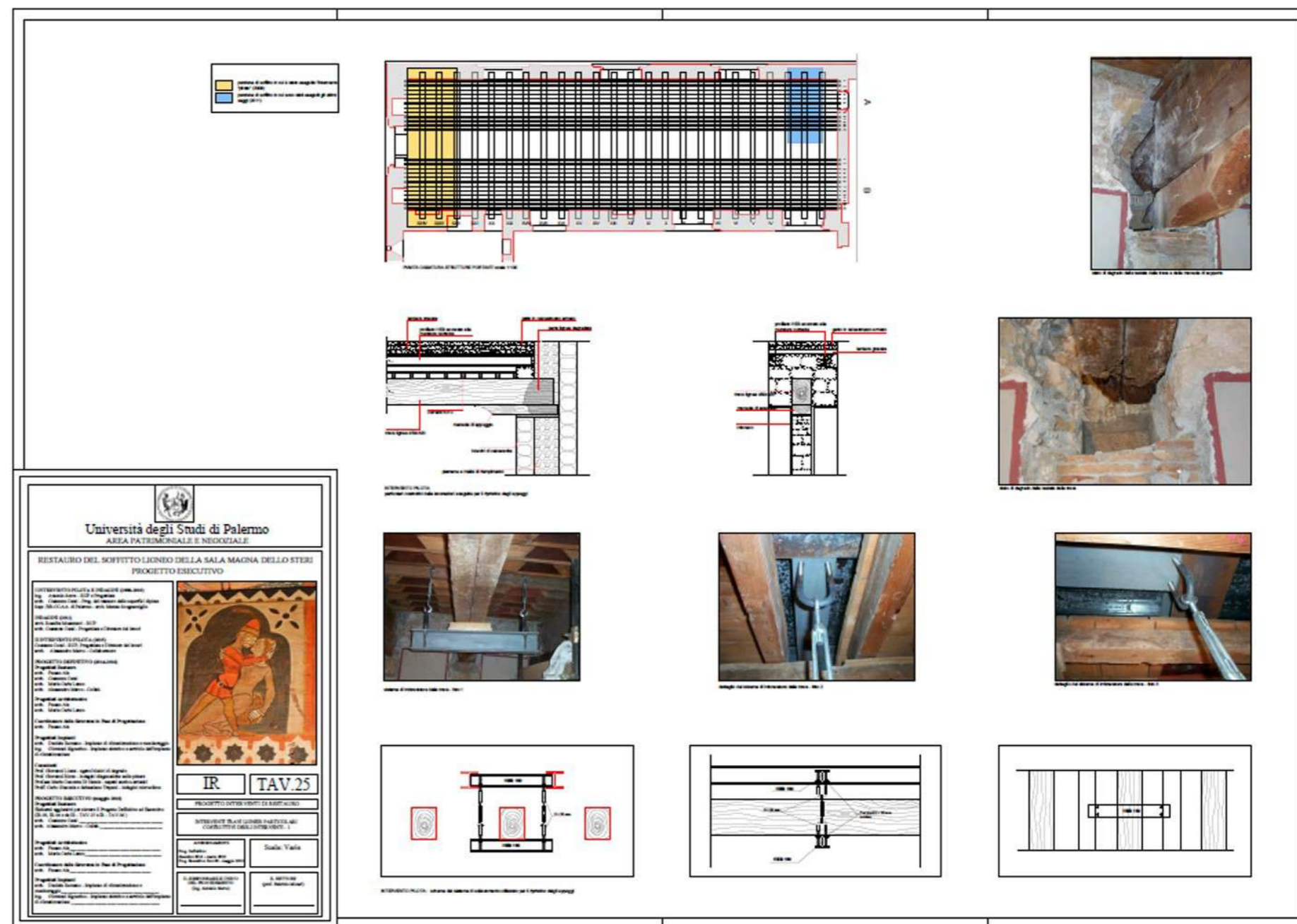


Fig.16: Executive design, table of interventions. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

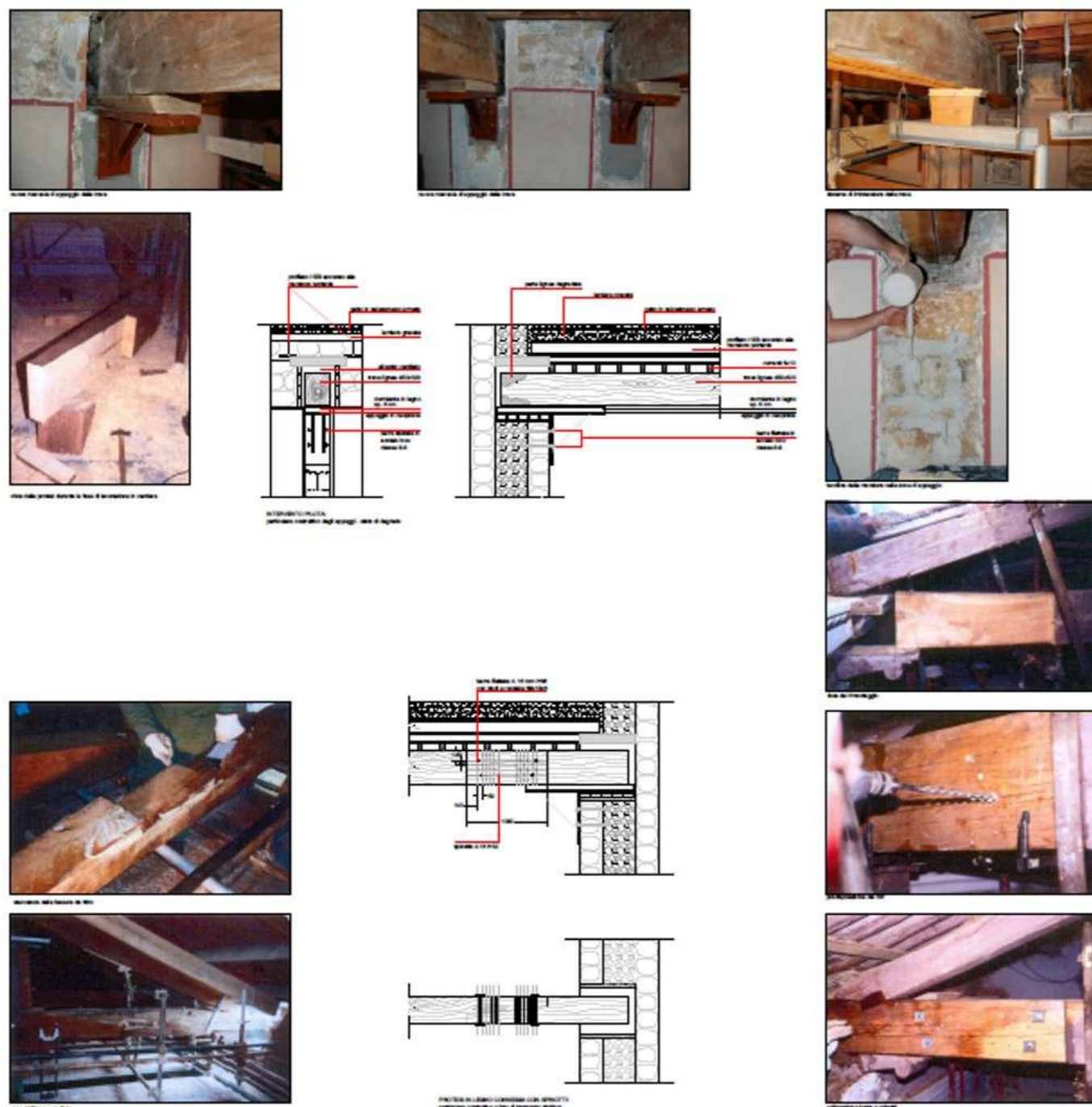


Fig.17: Executive design, table of interventions. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

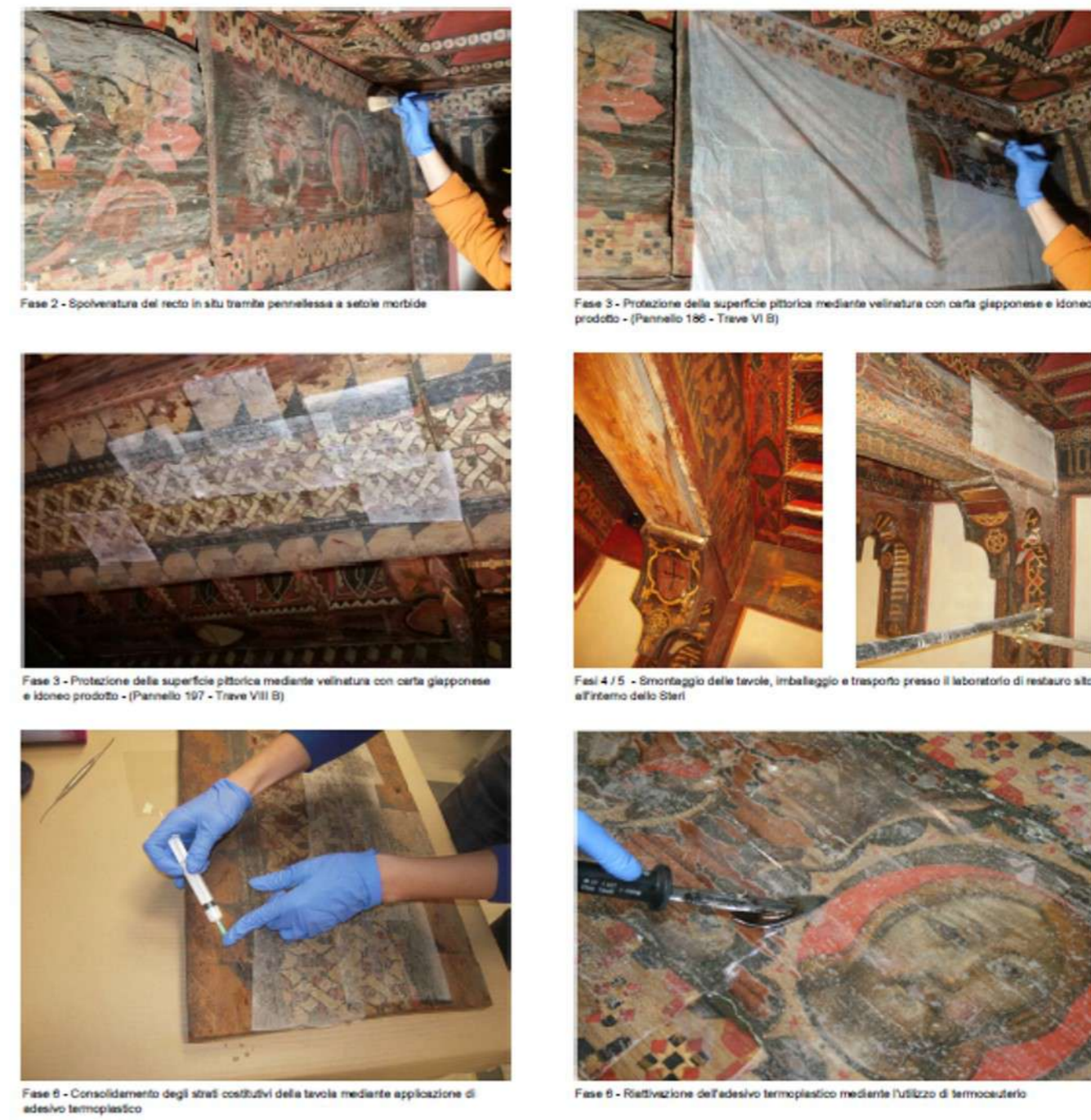


Fig.18: Protection and pre-consolidation interventions, disassembly of the wooden boards and transport to the restoration laboratory located within the same room, consolidation phase of the pictorial surface and reactivation of the thermoplastic adhesive by means of *termoceuterio*. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)

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 Area of the University of Palermo.

We thank Eng. Antonio Sorce (current Manager of the General and Institutional Affairs Area and Head of the Technical Area of the University of Palermo) and the Arch. Costanza Conti (Patrimonial and Negotiating Area of the University of Palermo, Special Service 06, Architectural Restoration Sector, Director of the works of the restoration site).

<https://www.unipa.it/Restauro-del-soffitto-ligneo-della-Sala-Magna-allo-Steri/>

<http://musei.unipa.it/steri.html>

<https://www.ilsicilia.it/sala-magna-dello-steri-il-restauro-ad-opera-aperta-del-soffitto-ligneo-video-servizio/>

Lo Steri di Palermo nel secondo Novecento. Dagli studi di Giuseppe Spatrisano al progetto di Roberto Calandra con la consulenza di Carlo Scarpa, a cura di A. I. Lima, Palermo, 2006.



Fase 8 - Misurazione del pH mediante l'uso di un piaccometro da contatto e indagini diagnostiche sui pannelli



Fase 11 - Esecuzione di test acquosi con diversi gradi di pH e test di solubilità con solventi organici e solventi "green", al fine di verificare mediante osservazione a luce visibile e ultravioletta la miscela idonea per gli strati filmogeni da rimuovere. Successiva pulitura delle superfici.



Fase 12 / 13 - Risanamento del legno di supporto al di sotto degli strati preparatori mediante applicazione a spatola utilizzando finissima polvere di legno e colla animale (particolare del Pannello 197 - Trave VIII B, prima e dopo l'intervento)



Fasi 14 / 15 - Locale reintegrazione pittorica delle superfici abrase, mediante utilizzo di colori ad acquarello compatibili, reversibili e distinguibili rispetto alla superficie pittorica originale. Abbassamento tonale del supporto ligneo a vista. Protezione finale mediante idonei prodotti.

Fig.19: Diagnostic investigations, removal of incongruous film-forming layers and cleaning of the pictorial surface, restoration of the wooden support below the pictorial surface and local interventions of re-integration of the same painting. © University of Palermo, Technical Area (Eng. A. Sorce, Arch. C. Conti)