

REPORT

ARCHITECTURAL RESTORATION AND CONSERVATION

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Report Irma

Introduction

On 26 February 2026, our group had the privilege of visiting the small rural village of Irma in the northern part of the Province of Brescia, Italy.

The municipality of Irma is a very small alpine settlement located in the Trompia Valley, with a population of approximately 129 inhabitants and an area of about 5.12 km². Situated at an altitude of around 804 meters above sea level, it represents one of the smallest municipalities in the Province of Brescia. Like many small mountain villages, Irma faces demographic challenges such as population decline and an aging population, which have contributed to the abandonment of several historic buildings.

Beyond the architectural and technical objectives, the overall aim of the project was to explore strategies for increasing the village's attractiveness for tourism while respecting its historical identity and material authenticity. As a result of depopulation and the deterioration of the building stock, the preservation of the village's architectural heritage has become increasingly challenging. Restoration was therefore not considered solely as a technical intervention, but rather as part of a broader strategy for rural revitalisation.

In this context, a survey was conducted prior to the excursion in order to systematically document the existing building stock of the village. The survey included a classification of each building according to its current condition and use, distinguishing between inhabited, partially used, and abandoned structures. In addition, surveys were conducted with both residents and visitors to identify potential programmatic additions that could strengthen local social and economic activity. Suggestions included, for example, the introduction of small-scale facilities such as a café or bar that could serve as meeting points for both residents and tourists.

The architectural investigations carried out during the excursion—particularly the analysis of House Renica and House Corsini, as well as the examination of selected construction details throughout the village—must therefore be understood within this broader framework. The documentation of existing structures and the discussion of restoration strategies were directly related to the question of how architectural interventions can contribute to sustainable rural development.

By combining surveying techniques, typological analysis, and socio-spatial research, the excursion aimed to establish a foundation for context-sensitive restoration proposals that balance conservation ethics, structural integrity, and future-oriented use.

Survey Preparation and Digital Documentation – House Renica

The primary focus at House Renica was not only the documentation of the building itself, but also the preparation and methodological framework required for a professional architectural investigation. The exercise aimed to familiarize students with the tools, strategies, and safety considerations necessary before conducting a restoration-oriented survey of historic structures.

House Renica, historically referred to as the House of “Galli” (Italian for “chicken”), dates back to the 16th century. The building has a ground area of approximately 180 m² and consists of three storeys, each measuring roughly 10 × 18 meters. Constructed using traditional rural building techniques typical of the region, the structure represents an example of the local vernacular architecture.



Although the building appears as a single structure from the exterior, it actually consists of four interconnected building units. Each of these units includes three usable floors and a partially habitable attic. The complex is located along the narrow alleyway Vicolo Tre Archi, which provides access to the property through a vaulted passage leading to a small courtyard.

The basement spaces originally served as stables and storage areas, reflecting the building's historical function within the rural context of the village. Some of these spaces still retain their original structural features, including stone masonry walls and vaulted ceilings.

Today, the building is in a severe state of disrepair. Parts of the roof have collapsed, and several structural elements show significant deterioration. Due to safety concerns and the unstable condition of certain areas, not all interior spaces could be accessed or analyzed during the investigation.

Despite its current condition, the long-term objective of the project is to restore the building and adapt it for tourism-related use, thereby contributing to the revitalization of the village and increasing its attractiveness for visitors.

Drone-Based Photogrammetry

One of the three applied documentation methods was drone-based photogrammetry, primarily used to capture the exterior geometry of the building. Given the partial structural collapse and limited interior accessibility, aerial documentation provided a safe and efficient solution for obtaining accurate data.

Before the drone flight, ground control points (GCPs) were distributed around the building. These targets were used to record the precise geodetic position of reference points. The objective was to capture the building in a georeferenced manner, enabling a geologically and spatially accurate model. Proper placement of the control points was crucial: they were carefully distributed both in the planar dimension (x - y axis) and at different height levels (z -axis). This three-dimensional distribution ensured improved accuracy and stability of the resulting digital model.



The control points served multiple purposes:

- Georeferencing the building within a coordinate system
- Ensuring accurate scaling
- Allowing correct spatial positioning of the later generated point cloud
- Providing a standardized format that could be processed and shared among all participants using compatible geomatics software

After placing the targets, the referencing process was carried out to convert the collected data into a format accessible for further digital processing.

Flight Strategy and Image Acquisition

The drone flight was conducted manually, although an automated flight would also have been possible if a predefined flight path had been established. The manual approach allowed flexible adaptation to the site conditions and the partially unstable structure.

The documentation process followed a structured sequence:

1. Initial higher-altitude flight focusing on the roof and the visible target points.
2. Transition images were taken while gradually descending from above, capturing intermediate perspectives between roof and façade. These transitional images are essential for generating a coherent and continuous 3D model.
3. Circular flights at lower altitudes were conducted around the building to document the façades in detail.

Image overlap was a critical factor in ensuring successful photogrammetric processing. A minimum overlap of 60% between consecutive images is required; however, the target was approximately 80% overlap to increase model accuracy and density. Images were captured at intervals of approximately five seconds.

In total, between 200 and 300 photographs were taken to achieve high resolution and a dense point cloud. The variation in capture height and angle allowed areas of different resolution to be generated depending on documentation needs.

The drone camera was capable of recording images from 90 degrees (orthogonal to the ground) up to approximately 15 degrees above the horizon. This range allowed comprehensive coverage of roof surfaces, façades, and transitional architectural elements.

Terrestrial Laser Scanning

In addition to drone-based photogrammetry, terrestrial laser scanning was employed as a second documentation method to capture the geometry of House Renica with increased metric precision.



The Leica laser scanner was positioned at multiple locations around and, where safely possible, within the building. The purpose of using several scan stations was to minimize blind spots and ensure comprehensive spatial coverage. From each position, the scanner recorded the surrounding environment by emitting laser pulses and measuring their return time. The detected surfaces were translated into a dense set of spatial data points, generating a three-dimensional point cloud.

The scanner integrates cameras that detect and record the surrounding area, supporting spatial orientation and scan alignment. However, the resulting data is typically monochromatic (black and white), as the primary focus lies on geometric accuracy rather than photorealistic texture.

Accuracy and Resolution

Under optimal conditions and with considerable effort, the laser scanner can achieve an accuracy of approximately 2–3 mm. In standard practice, however, the accuracy usually ranges between 1–2 cm, depending on resolution settings, environmental conditions, and scanning time. Achieving very high resolution requires more time-intensive manual setups and finer scan configurations.

The precision of terrestrial laser scanning makes it particularly suitable for capturing structural deformations, irregular masonry surfaces, and complex geometries that are difficult to measure manually.

Registration and Post-Processing

After completing the individual scans from different positions, the datasets were registered using a dedicated mobile application. Within the application, individual scans can be interactively aligned, shifted, and rotated in order to match overlapping areas. The software performs significant parts of the alignment process automatically during post-processing, detecting common reference geometries between scan positions.

Once all scan stations are successfully registered, they form a unified three-dimensional point cloud representing the building.

Importantly, the laser-generated point cloud can theoretically be combined with the photogrammetric point cloud generated from drone imagery. The integration of both datasets allows for the combination of high-resolution geometric accuracy (laser scanning) with broader contextual and roof-level data (drone survey), resulting in a more comprehensive digital model.

Mobile Scanning – Heron MS Twin Color

As a third documentation method, a mobile mapping system (Heron MS Twin Color) was used. In contrast to the static terrestrial laser scanner, this system enables significantly faster data acquisition, although at the expense of reduced accuracy.

The device is integrated into a backpack system and is operated while walking along a predefined scanning route. The user controls and monitors the scanning process via a smartphone interface. The system is equipped with multiple cameras and sensors that capture a 360-degree representation of the surrounding environment during movement.



Data Acquisition and Output

Unlike the static laser scanner, which requires multiple fixed positions, the mobile scanner continuously records spatial information while the operator moves through the space. This results in:

- Integrated photographic data
- A video mode for dynamic recording

The mobile system allows rapid coverage of large areas, making it particularly useful for preliminary surveys or interior spaces that are accessible and safe to traverse.

SLAM-Based Operation

The Heron MS Twin Color operates using the SLAM principle (*Simultaneous Localization and Mapping*). This method allows the system to simultaneously:

- Determine its own position within space (localization)
- Map the surrounding environment (mapping)

Through continuous sensor fusion and trajectory calculation, the system builds a spatial model in real time. To improve accuracy, scanning trajectories should ideally form a closed loop. When the operator returns to the starting point, the system can better recalibrate and correct accumulated positional errors, resulting in a more stable and coherent model.

Accuracy and Performance

The mobile scanner is significantly faster than the static laser scanner, but less accurate. The achievable precision generally ranges between approximately 5 mm and 1 cm, depending on environmental conditions and trajectory quality.

While the static laser scanner provides higher geometric precision and is better suited for detailed structural analysis, the mobile system excels in speed, flexibility, and the generation of navigable digital environments.

Constructive Details and Material Observations in the Village Context

Facade Treatments and Insulation Strategies

During the village walk, one building with a partially orange-rendered façade was examined. The façade treatment appeared unusual, as the colored plaster covered only half of the exterior surface. This configuration was not structurally motivated but rather driven by aesthetic considerations.

The example led to a broader discussion on external insulation systems. In mountain regions such as Irma, external insulation can present certain disadvantages. When insulation is applied to the exterior, it often requires the façade surface to be significantly modified or re-rendered, potentially affecting the material authenticity of historic masonry.



Moreover, in alpine climates with intermittent occupancy—especially in buildings intended for tourism—internal insulation can be more appropriate. Although internal insulation reduces usable floor space, it allows interior spaces to heat up more quickly. This can be advantageous for seasonal or short-term use, where rapid thermal comfort is more important than long-term thermal mass storage.

Traditional Construction Principles Explained by Professor Scala

Throughout the walk, Professor Scala used selected examples within the village to explain traditional construction logic and material behavior.

One example concerned roofs where stones were placed directly on top of clay tiles. These stones serve a practical purpose: they prevent wind uplift, particularly in exposed mountain environments. This simple yet effective technique reflects climate-adapted vernacular knowledge.

Another example related to stone masonry construction. Stones in load-bearing walls should ideally be laid horizontally. This orientation ensures that erosion does not occur parallel to natural stone layers, which would accelerate material degradation. Proper bedding direction enhances durability and structural stability.



A further façade example revealed visible holes from former scaffolding systems. These openings provided insight into historical construction processes and building phases.

Structural analysis also showed that main façade beams were supported by timber elements beneath. The professor explained that timber support elements are often preferable to stone in such positions. Wood can better accommodate slight movements and reduces stress concentration, thereby slowing structural decay. In contrast, rigid stone elements may contribute to cracking and accelerated deterioration if differential settlement occurs.

Restoration Principles – House Corsini

The final part of the field study focused on Casa Corsini, a historic building located in Vicolo Tre Archi in the village of Irma. The structure dates back to the 17th–18th century and represents an important example of the traditional mountain architecture typical of the region. The building is currently undergoing renovation as part of a broader regeneration project aimed at revitalizing the historic centre of the village. The project is supported by a regional urban regeneration grant of approximately €500,000, and the restored building is intended to host small groups of elderly visitors seeking a quiet stay in the mountain environment.

In contrast to Casa Renica, where the emphasis was on documentation and surveying techniques, the discussion at Casa Corsini focused primarily on restoration strategies and structural decisions.

A fundamental principle presented during the visit was the intention to preserve and reuse as much of the existing building fabric as possible. The restoration approach follows a conservation-oriented philosophy: original materials should be preserved whenever structurally possible. If elements cannot remain in their original position, they should ideally be reused elsewhere in the building. This strategy minimises material loss and preserves historical continuity.

Roof Stabilization Measures

One example discussed was the stabilization of roof tiles. In order to prevent sliding or displacement—particularly under wind exposure—copper clips can be installed to secure the tiles. This solution allows the preservation of the existing roofing material while improving safety and durability without altering the overall appearance.



Timber Structure Interventions

The condition of timber beams was also addressed. Where wooden structural elements are severely deteriorated, full replacement may be unavoidable. However, if the damage is partial and structural integrity can still be maintained, reinforcement is preferred over substitution.

Possible strategies include:

- Adding supplementary timber beams
- Integrating supportive elements adjacent to the original structure
- Localized repair instead of complete removal

This approach reflects the broader conservation principle of minimal intervention.



Moisture Issues in the Basement

A significant problem identified in House Corsini concerns high moisture levels in the basement areas. Persistent humidity poses risks to structural stability and long-term material preservation.

To mitigate this issue, the installation of so-called “igloo” systems beneath the floor slab was discussed. These modular plastic dome structures create a ventilated cavity between the ground and the interior floor. By allowing air circulation underneath the floor, capillary rising damp can be reduced and moisture levels better controlled.

This intervention demonstrates how contemporary technical solutions can be integrated into historic buildings while addressing functional deficiencies without fundamentally altering the architectural character.



Conclusion

The field trip to Irma provided valuable insight into the analysis and restoration of historic buildings within a rural alpine context. The investigation of Casa Renica emphasized the importance of accurate documentation and surveying as a basis for restoration, while the observations within the village highlighted key principles of vernacular construction and material use.

The study of Casa Corsini demonstrated how restoration can contribute to broader strategies of rural revitalisation by combining conservation with new forms of use. Overall, the excursion illustrated the importance of context-sensitive approaches that integrate architectural, technical, and social aspects in order to ensure the sustainable development of historic settlements.

Report Villa Grasseni

Introduction

On 5 March 2026, we visited the Villa Grasseni in the province of Brescia. The visit focused on analysing the restoration techniques applied within the historic building and understanding how historical materials and artworks are preserved during conservation interventions.

Villa Grasseni represents a historic architectural complex that developed over several centuries. During the visit, particular attention was given to several rooms surrounding the Salone di Rappresentanza (also known as the Sala di Campanelli), where different restoration methods were demonstrated directly on site. These spaces contain wall paintings executed using different techniques, including fresco and secco painting, which require specific conservation strategies.

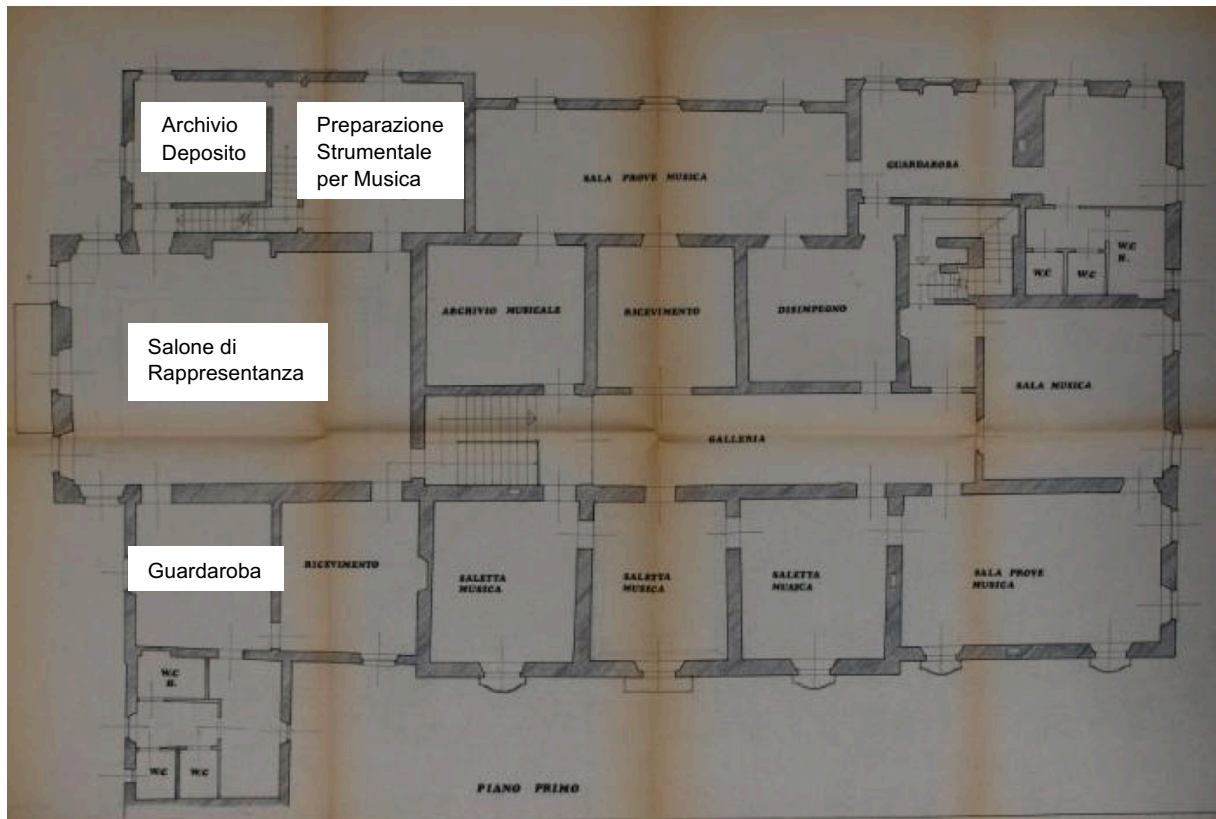
The aim of the visit was therefore not only to observe the architectural structure of the villa but primarily to examine practical restoration and conservation methods. The restorers explained various techniques used to clean, stabilise, and repair historic surfaces, including dry cleaning methods, consolidation of plaster layers, the treatment of cracks, and the investigation of underlying paint layers.

Historical Background of Villa Grasseni

The history of Villa Grasseni dates back to the early Middle Ages. The area was first documented in 905, when the estate, known as Corte Inflexures, belonged to the Monastery of Santa Giulia in Brescia. At that time the site consisted of several houses, a mill, and agricultural land used for cultivation and livestock farming.

Over the centuries the complex gradually expanded, and new buildings were constructed around the original rural nucleus. In 1641 the property belonged to the Bargnani family, later passing to the Emili family in the early nineteenth century. In 1852, the estate became the property of Giulio Grasseni, from whom the villa takes its current name.

Today, after restoration and adaptation by the municipality, Villa Grasseni hosts several cultural and social institutions, while still preserving architectural elements from different historical periods.



Guardaroba Artisti – Cleaning of Secco Paintings

The first rooms examined during the visit was the Guardaroba, located near the Salone di Rappresentanza. The room contains wall paintings executed using the secco technique.

A secco painting (dry painting) is a technique in which pigments are applied to dry plaster, unlike fresco painting where pigments are applied on fresh wet plaster. Because the pigments do not chemically bind with the plaster through carbonation, secco paintings are generally more fragile and sensitive to moisture. For this reason, restoration and cleaning must be carried out very carefully and often without the use of water.

The cleaning process in this room was therefore performed entirely with dry methods. The procedure started with the use of a soft dry brush to remove loose dust from the surface. Afterwards, conservators used a bread sponge, a traditional restoration tool made from the soft interior of bread. The porous structure of the bread absorbs dirt particles without damaging the paint layer. This method is frequently used in conservation because it is gentle and non-invasive.



No water was used during the cleaning process in order to avoid dissolving or weakening the paint layer. The complete cleaning of the room required approximately one week of work for two conservators.

The room also contains a fireplace with significant cracks in the plaster. To stabilise the structure, mortar was injected from both sides of the wall. This technique helps strengthen the plaster layer and protects approximately 1–2 cm of the original plaster surface. The work is typically carried out from the bottom upwards, allowing the injected material to properly fill the cracks and cavities. As a result of the intervention, some white traces of mortar remain visible around the fireplace.



Salone di Rappresentanza (Sala di Campanelli)

The Salone di Rappresentanza, also known as the Sala di Campanelli, is one of the most important spaces in the villa. In the future, the room is intended to be used as a wedding hall, concert space, and public event room.

Before any restoration work was carried out, the entire room was carefully documented through photographs. Documentation is a fundamental step in conservation practice, as it records the original condition of the artworks before intervention.

Cleaning Techniques

Several delicate restoration techniques were demonstrated in this room. One method involves the use of tweezers, allowing conservators to perform very precise cleaning operations. This technique is particularly useful for removing insect remains, dust, and other small particles, especially from detailed areas such as the frames surrounding the ceiling fresco.

Another cleaning technique involves the use of Japanese paper. The thin paper is placed between the brush and the painted surface to protect the fragile paint layer during cleaning. Japanese paper is widely used in conservation because it is very strong yet extremely thin and flexible, allowing controlled cleaning without damaging the artwork.

In some areas of the paintings the plaster had detached or swollen. To stabilise these sections, conservators used a syringe to inject consolidating liquids behind the plaster layer. The syringe is often used together with small pieces of cotton, which help distribute the liquid evenly and control the amount applied.



Materials Used for Consolidation

One of the main materials used in the restoration process is hydraulic lime (calce idraulica) mixed with water. This mixture is injected into cracks or cavities using a syringe. Hydraulic lime hardens through carbonation, allowing the material to consolidate with the original wall structure while remaining compatible with historic masonry.

In some cases, mixtures containing acrylic consolidants can also be used. These materials help strengthen fragile paint layers and improve adhesion between layers of plaster and paint.

For large cracks, a mixture of lime and sand is used to fill the gaps. This mixture allows cracks to be closed while maintaining material compatibility with the original structure.

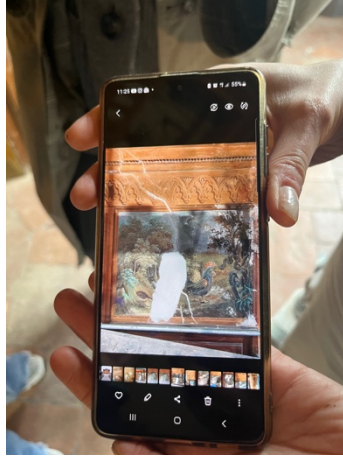
Reconstruction and Retouching

In cases where fragments of plaster or paint layers had detached, the original pieces were sometimes re-attached. When necessary, small metal supports were inserted to stabilise the fragments. These metal elements are specially selected to avoid corrosion and are often galvanised to prevent long-term deterioration.

The wall paintings in the room consist of two different pictorial layers. The original decorative scheme was executed as a fresco, painted directly onto fresh plaster. At a later stage, this fresco was partially covered by a secco painting, in which pigments were applied to dry plaster. Although the upper dry painting forms the visible surface today, the outlines of the underlying fresco are still partially visible in some areas.



If parts of the wall paintings were missing, restorers applied retouching techniques using watercolours. The original paintings in the room were created using tempera painting (*tempera all'uovo*), which uses egg as a binding medium. Watercolour retouching is used only on damaged areas and remains visually distinguishable from the original painting, which follows established conservation principles.



The direction of the brush strokes used for retouching depends on the dynamic composition of the painting, ensuring that the intervention integrates visually with the surrounding artwork.

In some areas, large parts of the paintings were missing, making it impossible to reconstruct the original motifs. In these cases, restorers only reintegrated the colour tone, without recreating architectural or figurative details. Reconstruction of shapes is only carried out when the original design is clearly known, such as in the ceiling fresco where the composition is more easily recognisable.

To assist in delicate painting work, conservators sometimes use a support stick wrapped with cloth at one end. This tool allows the restorer to stabilise their arm while working, preventing accidental contact with the painted surface and enabling more precise brushwork.



Preparazione Strumentale per Musica – Plaster Removal

In the room Preparazione Strumentale per Musica, the restoration focused on the wall structure and underlying layers. In some areas the plaster was intentionally removed, revealing pecking marks. These marks are created by carefully chipping the surface of the plaster.

The purpose of these small holes is to create better adhesion for new plaster layers. The roughened surface allows the new plaster to attach more effectively to the wall.

During this process it became evident that fresco paintings were located beneath later plaster layers. If the precise location of these frescoes is known, they can be carefully uncovered and

preserved. However, removing plaster without accurate knowledge of the fresco's position may lead to irreversible loss of historical material.

Behind the fresco layer, the structural wall is composed of brick masonry.



Archivio Deposito

The final room examined during the visit was the Archivio Deposito. Similar to other areas of the building, earlier fresco paintings were discovered beneath later paint layers.

In order to investigate these underlying frescoes, restorers carefully removed small sections of the upper paint layer using a scalpel. The openings are typically made in small rectangular test areas, allowing conservators to analyse the presence and condition of the original fresco.

Such stratigraphic investigations reveal that multiple layers of painting were often applied over time, reflecting changes in use, aesthetic preferences, or interior decoration. The discovery of these layers provides valuable information about the historical development of the building.



Conclusion

The visit to Villa Grasseni provided valuable insight into the practical application of restoration and conservation techniques. The focus on secco and fresco paintings highlighted the importance of careful, minimal intervention, using methods such as dry cleaning, lime-based consolidation, and precise retouching.

A key aspect of the project is the presence of multiple paint layers, which requires a stratigraphic understanding before any intervention. The use of compatible materials, especially hydraulic lime, ensures the preservation of the historic fabric while maintaining structural stability.

Overall, Villa Grasseni demonstrates a successful balance between conservation and adaptive reuse, showing how historic buildings can be preserved while being adapted for contemporary cultural use.

Prof. Dr.-Ing. Frank Braun: Architects and architectural monuments: Methodology, working steps, guiding principles

Introduction

This report summarizes the key points from the lecture by Prof. Dr.-Ing. Frank Braun on the methodological approach to working with historic buildings and architectural monuments. The lecture focused on the main phases of analysis and intervention, including recognizing and documenting the existing structure, investigating the building's history, carrying out status detection and assessment, and considering strategies for repair, reuse, and upgrading. It highlighted the importance of systematic documentation, interdisciplinary cooperation, and careful evaluation in order to preserve historic fabric while responding to present-day functional and technical requirements.

Recognizing and Documenting

The first and most important step in preparing a restoration project is to gain exact knowledge of the building. This begins with the plot and the overall building structure, followed by a detailed documentation of constructions and structural elements. Mistakes or carelessness in this phase can negatively affect all later stages of planning.

A key point is the identification of property boundaries, which makes the cadastral or land register map essential. Existing drawings can be useful, but they must always be checked critically, especially in historic buildings where right angles and regular wall thicknesses cannot be assumed. Because of this, new measurements are often necessary. Depending on the project, documentation may include line drawings, photographs, cross-sections, photogrammetry, or digital tools such as laser scanners and drones.

The lecture stressed that documentation should always be objective, systematic, and well organised, especially in buildings with a long and complex history. An important example was Lüneburg, a city with a very dense historic building structure. In a student project, the historical cadastral map (Urkataster) from 1875 was analysed to better understand the urban structure. Based on this, new drawings were produced with detailed measurements, including cross-sections, views, and photogrammetric mappings. In addition, a Raumbuch was created as a systematic record of all interior surfaces, documenting walls, floors, and ceilings room by room and surface by surface.

Investigating the building's history

The building itself is the most important source for understanding its history. By carefully observing room structures, construction methods, materials, design, and traces of use, it is possible to identify different building phases. Therefore, the key question is not "How old is the building?" but rather "How old are the different parts or layers of the building?"

This analysis is often supported by archival research, such as maps, drawings, permissions, and other documents from building authorities, preservation offices, and land registries. In more complex cases, museums and archives may also provide useful historical material, although this research is often very time-consuming.

The lecture also emphasized the importance of cooperation with restorers and, in the case of archaeological findings, with archaeologists. As an example, the Gadebusch Renaissance Castle was mentioned, where renovation began in 1992 after the building had stood vacant for a long time.

Status Detection

Status detection should be carried out in a scientific, systematic, and neutral way, without immediate evaluation or interpretation. The aim is to document the actual condition of the building as objectively as possible. Whenever possible, this documentation should be done in situ and based on drawings or photographs, so that all important findings can be clearly located and recorded.

Typical aspects to observe include cracks, deformations, uneven floors or ceilings, loss of substance, efflorescence, biological infestation, hollow layers, surface irregularities, unusual smells, and pollution in building materials. The lecture also emphasized that this phase often requires interdisciplinary cooperation with specialists such as structural engineers, restorers, or material experts.

Depending on the project, the documentation can be very simple, for example by marking damaged areas, or much more detailed, with precise drawings that record the condition of individual building elements.

Status Assessment

Status assessment is the subjective evaluation of the results from the previous status detection. In this phase, the findings are interpreted and discussed by architects, experts, and preservation authorities, and the results are recorded in plans or written texts. As noted in the lecture, there are no binding standards for this process in Germany.

The assessment includes three main aspects: the constructive assessment of the building's structural condition and necessary interventions, the building historical assessment of the age of different parts, and the preservation assessment of which elements should be preserved and where new interventions may be acceptable.

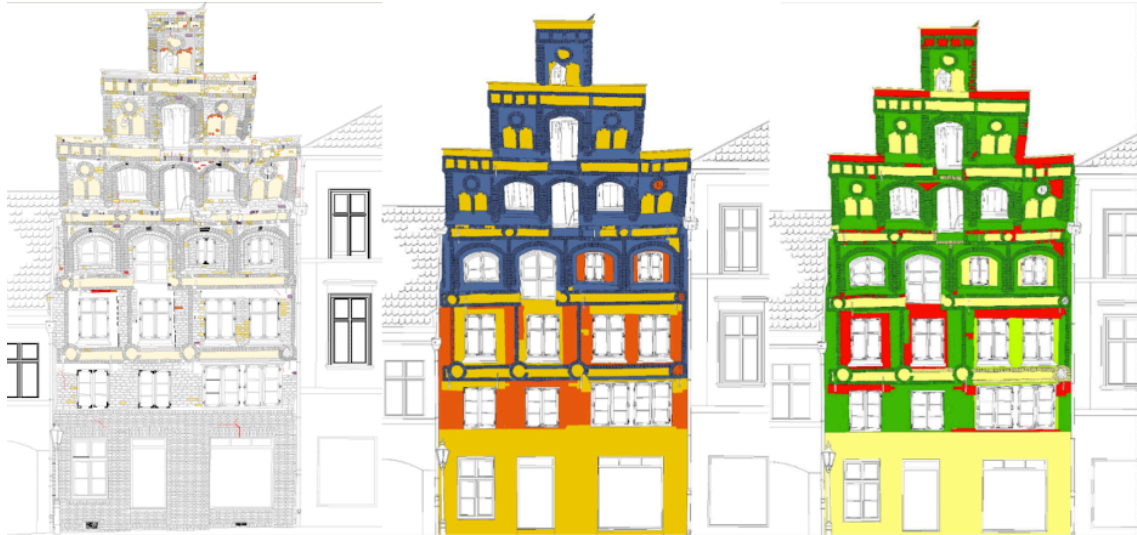
Repairing, Reusing and Upgrading

It was shown that interventions in historic buildings should follow established preservation principles. The main aim is to preserve authenticity by keeping as much original fabric as possible, including traces of ageing and elements from different periods. Priority should be given to maintenance, conservation, and repair rather than replacement.

Any intervention should be limited to what is necessary, use compatible materials and techniques, and remain distinguishable from the historic structure. Reconstructions are viewed critically and require reliable historical sources. The lecture also emphasized that modern building regulations cannot always be fully applied to monuments, so exemptions may be necessary and are always decided on a case-by-case basis.

Conclusion

The lecture provided a clear overview of the main steps involved in working with historic buildings. It showed that careful documentation, historical research, status detection, and status assessment are essential foundations for any preservation project. In addition, the discussion of repair, reuse, and upgrading emphasized the importance of authenticity, minimal intervention, and compatible materials. Overall, the lecture highlighted that successful monument preservation requires a systematic approach, interdisciplinary cooperation, and a careful balance between conservation and contemporary requirements.



Prof. Dr.-Ing. Frank Braun: bricks

Building Materials and Constructions

One important focus of this lecture was the production of bricks as a traditional building material. The lecture explained the individual steps of historic brick production and showed how strongly the process influenced both construction practice and the surrounding cultural landscape.

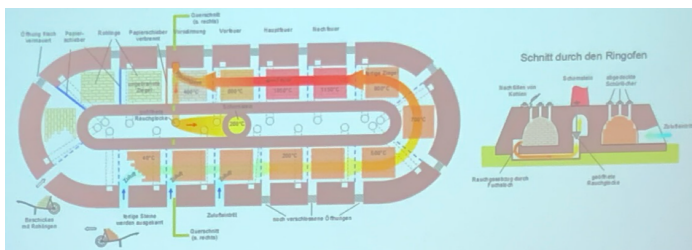
The first step was the extraction of clay as the raw material for brick production. The clay was collected, transported, and brought to the production site, in some cases by small railway systems. After extraction, the material had to be prepared carefully. This treatment process included storing and mixing the clay until it reached the correct consistency. The material was worked in several pits, and in traditional production methods horses were used to mix the clay thoroughly. Once the material was sufficiently prepared, it could be removed and processed further.

The next stage was brick moulding. At this point, achieving the correct water content was essential. The clay was placed into moulds and the freshly formed bricks were left to dry on wooden constructions for approximately four to eight weeks. During this drying phase, enough space had to be left between the bricks so that air could circulate properly. This was important not only for drying, but also for the later firing process.

After drying, the bricks were placed into the chambers of the ring kiln. The kiln had to be prepared carefully before firing. The chambers were filled with bricks and then sealed with plaster to make them as airtight as possible. Reusable fired bricks were also used in this process. These were bricks that had already been fired previously and could be used again for temporarily closing parts of the kiln.

The firing process itself was highly complex. The ring kiln functioned through a system of air tunnels that directed heat and air through the chambers, while all air flows ultimately led toward the chimney. Coal was used as the main fuel. Historically, brick production also had a strong impact on the landscape, since earlier firing processes required large quantities of wood. Exact temperature measurement was not yet possible, so the firing had to be controlled through practical experience. The airflow and intensity of the fire were regulated manually, for example with wooden and steel rods inserted from above into the tunnel system.

After firing, the kiln was opened and unloaded. The reusable fired bricks used for sealing were cleaned of mortar so that they could be used again in the next cycle. The newly fired bricks were then removed from the chambers and transported to building companies for construction purposes.



Repair of Brick Masonry

Another important topic was the repair and replacement of brick masonry. The lecture showed that material exchange must meet both monument preservation requirements and technical demands.

From a conservation perspective, replacement materials should match the existing masonry in brick format, colour, and masonry bond. The selection should not be based only on single bricks, but on the appearance of larger wall areas. Mortar and joints are also important, including their composition, aggregate, joint design, and colour. It must also be considered whether the repaired area should blend in with the historic masonry or remain visible as an intervention. If possible, old bricks can be reused for repair work.

At the same time, technical aspects must be considered. During construction, the stability of the building has to be ensured. Important properties of bricks include density, compressive strength, thermal conductivity, water absorption, and porosity. For mortar, the binder, mix proportions, and aggregate grading are relevant. The properties of bricks and mortar must be compatible in order to avoid damage. The lecture also explained that different repair strategies are possible. Bricks can be traditionally remanufactured or replaced with industrially produced ones, depending on technical and economic considerations. Mortar may either be mixed on site or used as a ready-made product with defined properties.

Climate-friendly upgrading

The final chapter focused on climate-friendly upgrading, especially the improvement of thermal insulation in existing and historic buildings. The lecture explained that, under German energy regulations, requirements for existing buildings mainly apply when individual building components are repaired or replaced. For outer walls, a low heat transfer value is required, while monuments are generally exempt from these obligations. At the same time, minimum thermal protection standards must always be respected. The discussion also showed that current approaches no longer focus only on energy savings during use, but increasingly consider the entire life cycle of materials and their carbon impact.

Different methods of interior insulation were presented. One option is insulation by panels, which requires a clean and even surface and the removal of non-permeable layers such as wallpapers or coatings. Suitable materials include mineral insulation panels, calcium silicate panels, light clay panels, and aerogel panels. A second method is insulation by malleable mixtures, which is especially useful for uneven surfaces and often suitable for half-timbered buildings. These systems are usually based on lime or clay and may include insulating plaster, insulating clay, or aerogel-based plaster. A third option is insulation by masonry, using lightweight insulating blocks such as heat-insulation bricks or aerated concrete blocks. This method may require a new foundation and must be carefully integrated into the existing structure.

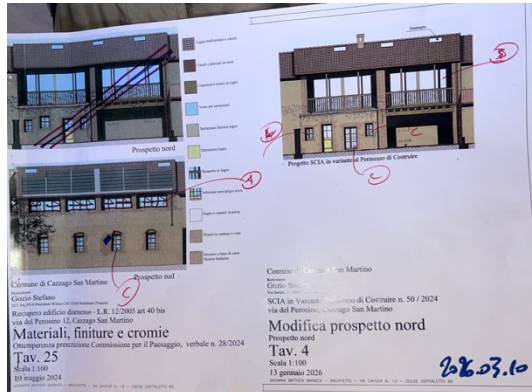
Conclusion

The lecture provided a clear overview of brick as both a historic building material and a key element in conservation practice. It explained the traditional production of bricks, the repair of brick masonry, and current approaches to thermal upgrading in existing and historic buildings.

Report Cazzago San Martino

Introduction

During our visit on the 19 March 2026, we examined a restoration project at Via del Perosino in Cazzago San Martino, Brescia, Italy. The building is an abandoned rural structure consisting of a barn and a stable, which had not been used for approximately fifty years. Its function is now being changed into a residential house.



The project aims to preserve the character of the original rural architecture while adapting the building to contemporary living standards. The intervention therefore combines conservation, reuse of traditional materials, and carefully selected new additions. A particular focus is placed on maintaining the original construction logic of the building, including the historic masonry and the traditional solai, meaning the horizontal floor structures between the different levels.

Restoration Concept and Exterior Appearance

A central principle of the project is the preservation of the existing architectural identity. As much of the original structure as possible is retained, while new elements are introduced in a way that remains compatible with the historic building fabric. Reinforced concrete appears only in the ground slab. The wooden beams are left unfinished, which reinforces the raw and authentic character of the building.

In the next picture, the wall on the left is the original historic wall that is intended to be preserved, while the wall on the right is the new masonry wall.



The next picture shows the south façade of the house from the outside. The lower part still consists of the original masonry, while the upper part is made of lighter new masonry. However, this upper section was not constructed with new industrial bricks, but with reused and consolidated bricks. Roof tiles were also incorporated into the wall, which further emphasizes the reuse of traditional materials and elements.



The exterior surface receives a hydraulic-lime finish, shown in the next picture. This is a traditional type of finishing that is particularly suitable for historic masonry because it remains breathable and compatible with the old structure. In this project, the finish is intentionally not fully opaque. The masonry structure underneath should still remain visible. This idea is described by the expression “vedo / non vedo” – “I see / I do not see.” It means that the surface treatment should not completely cover the wall, but instead allow the texture and structure beneath to remain partly visible.



During the masonry work, the two-head technique was used to arrange the bricks. This refers to a wall thickness of approximately one full brick length, creating a more solid and stable construction. It reflects a traditional masonry technique and contributes to the structural continuity of the restored building.

Original Building Features and Technical Upgrading

Several original functional characteristics of the rural building are still clearly visible. The windows on the first floor are larger because this level was originally used as a hay storage area. On the west side of the building, no windows were added. In addition, the roof does not project beyond the wall as is common in many modern houses. This preserves the compact and simple form of the original rural volume.

At the same time, the building has been upgraded technically. Photovoltaic panels were installed on the roof, and there is no longer any methane supply. This makes the house operationally emission-free and shows how a traditional building can be combined with contemporary energy strategies.

The following picture compares the old and the new chimney. The new chimney is significantly taller and has larger openings at the top, where the smoke escapes. These large openings make it easier for rainwater to enter. The old chimney, by contrast, has a more refined shape. It is formed with concave roof tiles and has a more pointed design, which offers less surface for rain penetration and allows water to drain away more easily. In addition, the old chimney appears architecturally more elegant. This comparison shows that traditional construction often solved practical problems in a more integrated and carefully designed way.



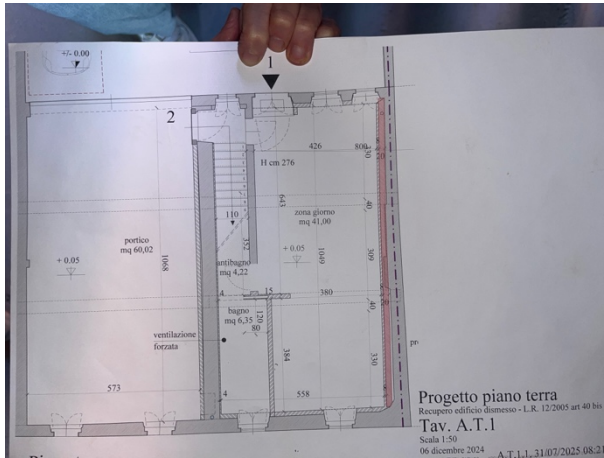
Interior Renovation and Spatial Reorganisation

In the second part of the visit, we were shown the main renovation measures inside the building. New window glazing has been installed, and a balcony was added on the first floor. The opening of the main entrance was enlarged from 180 cm to 205 cm.

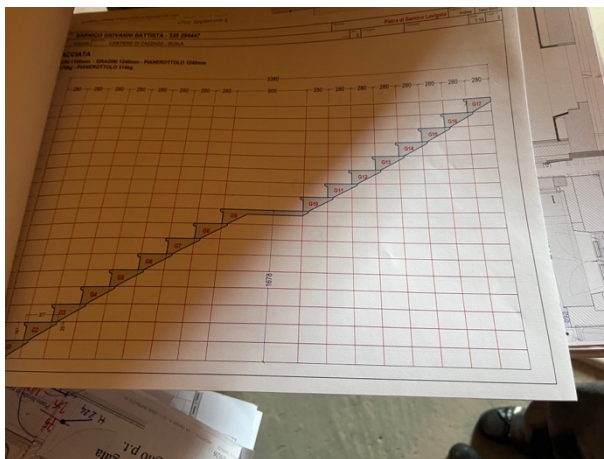


Report Architectural Restoration and Conservation
Philipp Schönfeld

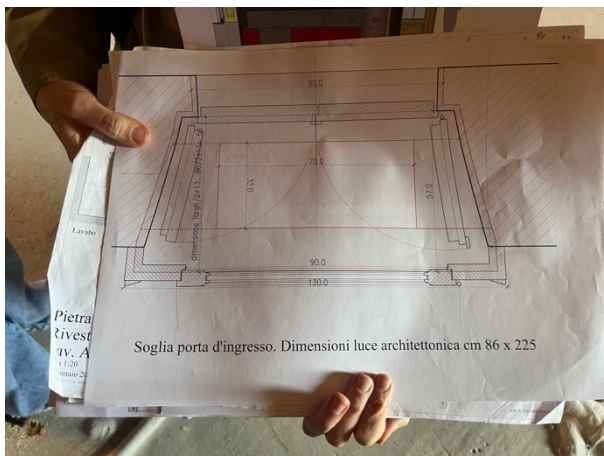
On the east side, a new wall was built for insulation. For this purpose, special bricks with insulating material integrated into their cavities were used.



The staircase from the ground floor to the first floor is made of stone. Each tread consists of an individual stone element anchored into the walls, while the space between the treads is only constructively closed.



The main entrance is organised as a double-door system. Two doors are positioned one behind the other, which improves thermal insulation.



Originally, the first floor had no internal subdivision. All masonry partition walls were inserted only later during the renovation process. This new room organisation also made it possible to install a heating system. In addition, a wooden staircase was added on the first floor to connect it to the second floor.



Timber Structure, Solai, and Conclusion

The roof structure, as well as the load-bearing floor structure of the first floor, is made of timber beams. In this context, the Italian term “solai” refers to the horizontal structural systems that separate one floor from another. These floor structures are an important part of the building’s traditional construction and were preserved or integrated wherever possible during the renovation.

The beams used in the project correspond to the traditional “uso Fiume” type, which is typical for rural buildings. These beams are made from a tree trunk and worked into a regularised form while still preserving much of the natural character of the wood. This gives them a traditional appearance and makes them particularly suitable for historic rural architecture.



Two other common traditional beam types were also discussed. “Uso Trieste” follows the natural taper of the trunk more closely, so the section changes slightly from one end to the other. “Quattro fili”, by contrast, is more regular and geometric, with straighter sides and a more processed appearance. These different beam types are characteristic of traditional timber construction and contribute significantly to the historical identity of the building.

Overall, the project demonstrates a careful balance between preservation and transformation. The original rural structure is respected in its material character, proportions and construction methods, while new interventions adapt the building for residential use. The project therefore represents a convincing example of how historic architecture can be conserved while at the same time being made suitable for contemporary living.

Report on Degradation Phenomena in Brescia

Introduction

On 7 May, we visited the historic centre of Brescia in order to analyse various degradation phenomena affecting buildings and stone surfaces throughout the city.

Stone Loss and Efflorescence

The first building we examined was the Church of Sant'Agata, where several different types of degradation could be observed.



On the exterior of the church, we identified stone loss and efflorescence. Stone loss refers to the partial or complete absence of material or architectural details. It is generally caused by external factors such as weathering, mechanical impact, or long-term exposure to environmental conditions.

In the photograph on the left above, reddish staining caused by the oxidation of iron nails embedded in the stone can also be observed. When water flows over the corroded metal elements, it transports iron oxides across the stone surface, leaving red stains. If these stains need to be removed using aggressive chemical products, a very small amount of the original stone surface may also be affected or damaged.



On the same wall, we also observed efflorescence, or salt deposits. This phenomenon occurs when water containing dissolved salts moves through the stone and evaporates at the surface. After the water has evaporated, the salts remain visible as a whitish deposit.

Black Crust

The external wall next to the entrance of the church displayed several forms of degradation, including black crust.

Black crusts are generally caused by air pollution and chemical reactions between atmospheric pollutants and the stone surface. They often develop in sheltered areas that are protected from direct rainfall, as pollutants can accumulate there over a long period of time.



As shown in the photograph below, one section of the wall is directly exposed to sunlight and rain and therefore appears lighter, while the adjacent, more protected section appears black due to the accumulation of pollutants.



In the same photograph, surface erosion of the lighter stone on the left can also be observed. This erosion may be linked to the effects of rainwater and atmospheric pollution on the stone surface.

Lacuna

Another degradation phenomenon that we observed was the lacuna. A lacuna is a missing area, or a two-dimensional loss of material, within a surface or structure. It can be caused by long-term exposure to rainfall, mechanical damage, human intervention, or previous deterioration processes.



Examples of lacunae were visible both on the exterior of the church and inside the building.



Scaling and Spalling

The external walls of the church also showed signs of scaling and spalling. These phenomena occur when layers or larger fragments of material detach from the original surface. They are often associated with moisture penetration, salt crystallisation, weathering, or changes in temperature.



Biological Crust

We also identified biological crust on parts of the stone surfaces. Biological crust is formed by microorganisms such as algae, moss, or lichens growing on the surface of the material.

This form of degradation generally develops in areas characterised by high humidity, limited sunlight, and the presence of stagnant water. In addition to altering the appearance of the stone, biological growth can contribute to its chemical and physical deterioration over time.



Staining

The final phenomenon observed on the exterior of the church was staining. In this case, the staining was caused by water leaking from a copper pipe. As the water came into contact with the copper, it transported corrosion products onto the wall, producing the characteristic green colour visible on the stone surface.



Inside the church, we identified further types of degradation, including chromatic alteration. Chromatic alteration refers to a change in the original colour of a material's surface and may be caused by pollution, moisture, aging, or chemical reactions.

In this particular case, the alteration was related to glue applied to the stones. When first applied, the glue was white; however, over time, contact with the air caused it to darken and develop a brownish appearance.

Patina

The following photographs show the presence of patina. Patina is a thin layer that naturally develops on a surface as a result of aging and interactions between the stone, air, moisture, and pollutants.



Unlike many other degradation phenomena, patina may have a protective effect, as it can form a relatively smooth and stable layer on the surface of the stone.

Dust

Inside the church, we also examined the accumulation of dust, which had caused the visible darkening of one of the columns.



Dust deposits mainly affect the appearance of the surface, although they may also retain moisture and pollutants. Depending on the condition of the material, dust can be removed using either dry or wet cleaning methods.

Alveolisation

Another phenomenon observed was alveolisation, also known as honeycomb decay. This type of deterioration is characterised by the formation of small cavities or honeycomb-like holes in natural stone.



Alveolisation is often associated with the action of salts, moisture, wind, and repeated cycles of evaporation and crystallisation within the stone.

Surface Staining Caused by Running Water

As we continued through the historic centre on our way to Piazza Duomo, we observed several surfaces affected by staining caused by running water.

Flowing water can create dark streaks or stains on façades and stone surfaces because it carries dirt particles, minerals, pollutants, and biological matter along its path. Over time, repeated water flow can make these stains more visible and may also contribute to further surface deterioration.



Cracks

Cracks were another frequently observed phenomenon during our visit. Cracks can develop for a variety of reasons, including structural stress, temperature fluctuations, settlement, mechanical movement, or the presence of moisture.



Their appearance and extent may provide important information about the condition and stability of the building material or structure.

Exfoliation

The photograph below illustrates exfoliation on an external wall. Exfoliation occurs when thin layers of material detach from the surface in the form of flakes or scales.

Moisture infiltration and salt contamination are common causes of this phenomenon, as both can weaken the surface layers of the material and eventually lead to their detachment.



Surface Erosion in the Duomo Vecchio

A further example of surface erosion was found inside the Duomo Vecchio. In this case, the erosion was caused by the repeated movement of visitors walking across the stone flooring every day.

Over time, this continuous use gradually wears away the surface of the stone, resulting in a smoother, lowered, and visibly altered walking surface.



Detachment

Another degradation phenomenon was detachment. Detachment refers to the separation of a surface layer from the underlying material, even when the detached part has not yet completely fallen away. It may affect plaster, render, mortar, painted layers, or thin sections of stone.



This phenomenon is often caused by moisture infiltration, salt crystallisation, temperature changes, poor adhesion between different materials, or the aging of previous repair layers. Water can penetrate behind the surface and weaken the bond with the substrate. Over time, this may lead to hollow areas, bulging surfaces, cracks, and eventually the complete loss of material.

Report on the “UNESCO Chair Thematic week” in Mantua

Introduction

On May 21st, 2026, we attended a conference session at the Casa del Mantegna in Mantua. The session was entitled *Planning and Economics: Scenarios Related to Climate Change*. It focused on the influence of climate change on historic cities, cultural heritage, tourism and emergency planning.

During the session, we listened to four presentations. Although the speakers approached the topic from different perspectives, all lectures showed that cultural heritage is increasingly affected by environmental risks. Climate change does not only lead to visible damage on historic buildings, but also influences the way cities must be planned, protected and managed in the future.

Scenario Planning in Fragile Territories

The first presentation was given by Elena Solero from the Politecnico di Milano. Her lecture concerned scenario planning in fragile territories and was based on the research project TRIALS, which stands for *Transformative Resilience for Inner Areas and Local Communities*. The project focuses on areas in Central Italy affected by the earthquake of 2016, especially the towns of Camerino and Norcia.

The project examines not only the physical vulnerability of these places, but also their social and economic fragilities. Its aim is to develop planning guidelines for post-disaster recovery according to the principle of “building back better”. This means that damaged territories should not simply be reconstructed as they were before, but should become more resilient and better prepared for future risks.

An important aspect of the project is the involvement of local communities. The researchers used exploratory walks, interviews with stakeholders, weekly meetings and workshops in order to understand how inhabitants experience their territory. Through these activities, they created community biographies and community maps. These tools help to identify important places, local values, problems and possible future developments.

I found this approach particularly interesting because it showed that planning after a disaster is not only a technical task. It is also necessary to consider the memories, needs and opinions of the people who live in the affected area. For the conservation of cultural heritage, this is important because historic places have not only architectural value, but also emotional and social meaning for local communities.

Climate-Sensitive Historic Environments and Urban Resilience

The second lecture was presented by Dimitra Babalis from the University of Florence. Her presentation was entitled *Climate-sensitive Historic Environments and Urban Resilience* and focused on the question of how historic urban areas can be protected while adapting to climate change.

A climate-sensitive historic environment includes buildings, monuments, historic urban landscapes, cultural landscapes, gardens, coastal heritage and industrial heritage that are vulnerable to changing climatic conditions. These places can be affected by rising sea levels, coastal erosion, flooding, flash rainfall, heatwaves, storms and strong winds.

Historic environments are often particularly vulnerable because their materials and urban structures were not designed for present climate conditions. Traditional buildings may have passive cooling and heating systems, while dense historic centres may lack ecological infrastructure and sufficient green spaces. Climate change can therefore damage building materials, alter heritage settings and threaten the identity and authenticity of historic places.

The lecture also explained the concept of urban resilience. Urban resilience means that a city is able to prepare for risks, react to them and recover afterwards. In historic cities, this must include the protection of cultural heritage. Cultural heritage should not only be considered as something at risk, but also as a resource for climate action and sustainable urban development.

Several possible strategies were presented. Blue-green infrastructure, such as green corridors, green streets, trees, parks, green roofs and planted walls, can help reduce urban temperatures, manage rainwater and improve the quality of public space. Furthermore, active travel strategies, including pedestrian paths, bicycle routes and mobility hubs, can contribute to more sustainable and liveable historic environments.

This lecture was closely connected to architectural restoration. Restoration is not limited to repairing damaged façades or materials. It also includes the adaptation of historic areas to future environmental conditions without destroying their historical value.

Tourism Dynamics and Climate Change in Heritage Cities

The third lecture was presented by Silvia Cerisola from the Politecnico di Milano. Her presentation examined climate change and the climate sensitivity of tourism demand in four Italian heritage cities: Venice, Florence, Rome and Bologna.

The presentation began by explaining that cultural heritage is an important resource for local economic development. Historic cities attract tourists because of their monuments, urban spaces and cultural identity. However, tourism can also create pressure through congestion, overcrowding, higher costs and increased stress on local infrastructure.

Climate change creates an additional challenge for heritage tourism. Rising temperatures, heatwaves, heavy rainfall and extreme weather events can change when and how people visit historic cities. Very hot summer temperatures may make city visits less attractive, while flooding and severe rain events can make cultural sites difficult or unsafe to access. Climate change can also increase maintenance costs and reduce the economic value connected with heritage tourism.

The analysis used tourism and climate data from the period between 2000 and 2025. In Venice, maximum summer temperatures increased over time, while tourist arrivals also increased. However, the number of visitors in July and August appeared to decrease slightly in recent years. Similar tendencies were presented for Florence, Rome and Bologna. Tourist arrivals generally recovered after the COVID-19 period, but the distribution of visitors throughout the year is beginning to change.

One important conclusion was that tourists appear to be adapting to increasingly uncomfortable climatic conditions by avoiding the hottest months. This may result in a gradual shift of tourism flows from July and August to other periods of the year. Such a development could influence local economies, visitor management and the conservation of heritage sites.

The lecture demonstrated that sustainable tourism in heritage cities must include climate adaptation. Cities should not only protect monuments, but also create comfortable public spaces, reduce environmental stress and manage tourism in a way that benefits both visitors and local residents.

Emergency Response to Pluvial Flooding in Historic Cities

The final lecture was given by Ioannis Adamos and Argyris Balatsoukas from the Aristotle University of Thessaloniki. It focused on emergency response to pluvial flooding in historic cities and on the integration of cultural heritage into disaster risk management.

Pluvial flooding occurs when intense rainfall exceeds the capacity of urban drainage systems and water accumulates in streets, buildings and public spaces. In historic cities, this type of flooding can cause severe damage because heritage buildings, museums, archives and historic infrastructure are often situated within vulnerable urban areas.

The speakers explained that cultural heritage is frequently treated as something to be protected only after a disaster has already happened. Their research argued that heritage should instead be included in emergency planning and civil protection systems from the beginning.

Two case studies were presented. The first concerned Storm Daniel in Volos, Greece, in September 2023. Extremely heavy rainfall caused severe flooding and major disruption to infrastructure, transport, electricity, healthcare and water supply. The Tsalapatas Complex, a historic former roof tile and brickworks factory that had been converted into a cultural centre, was flooded. Its underground exhibition areas were covered with mud and contaminated water, while historic mechanical equipment, electrical systems, collections and archival materials were damaged.

The second case study concerned the flooding of Genoa in October 2014. Intense rainfall caused the Bisagno river and smaller streams to overflow, flooding streets, transport infrastructure, buildings and cultural institutions. Important cultural sites, including museums, libraries and historic buildings, were affected. The Museo Civico di Storia Naturale suffered particularly serious damage, as underground rooms and laboratories were flooded.

The comparison of the two case studies showed that emergency responses mainly prioritised human safety, transport, electricity, water supply and other essential infrastructure. Although cultural heritage was recognised as valuable, it was not always systematically integrated into preparedness and immediate response planning. Heritage became more visible during damage assessment and recovery than during the first emergency operations.

This presentation was especially relevant to restoration because water is one of the major causes of deterioration in historic buildings. Flooding can lead to erosion, material loss, moisture penetration, salt crystallisation, biological growth, detachment of plaster and damage to interiors and collections. Therefore, preventive planning and rapid emergency response are essential for protecting cultural heritage.

Connection to Mantua and Architectural Restoration

Mantua was an appropriate location for this conference because it is itself a historic city with an important architectural and cultural identity. The lectures made clear that heritage cities cannot be considered separately from climate change. Their buildings, public spaces, cultural institutions and tourism economies are all affected by environmental transformation.

For architectural restoration, this means that the work of conservation specialists is becoming broader. It is no longer sufficient to restore damage after it appears. Historic buildings and urban areas must also be monitored, protected through preventive strategies and included in wider climate adaptation and emergency planning.

The session also showed that preservation cannot be achieved through technical solutions alone. Cooperation between architects, planners, emergency services, public administrations, researchers and local communities is necessary in order to protect historic cities effectively.

Personal Reflection

The conference in Mantua helped me understand the connection between climate change and architectural restoration more clearly. Before attending the presentations, I mainly associated restoration with visible degradation phenomena, such as cracks, stone loss, efflorescence, black crust or detached plaster. However, the lectures showed that such damage is often connected to much larger processes, including flooding, rising temperatures, urban planning, tourism pressure and insufficient emergency preparation.

I found the presentation about flooding in Volos and Genoa particularly interesting because it showed how quickly cultural heritage can be damaged during an extreme event. Water can affect not only the building structure, but also interiors, collections, archives and historic machinery. Once these objects are damaged, their original cultural value can be difficult or impossible to recover.

The presentations on resilience and scenario planning were also important because they emphasized prevention. Cultural heritage should not only be repaired after a disaster. It should already be included in planning processes, climate adaptation strategies and emergency systems before damage occurs.

Conclusion

In conclusion, the conference session at the Casa del Mantegna provided an important insight into the challenges that climate change creates for historic cities and cultural heritage. The four presentations addressed different but connected topics: post-disaster planning in fragile territories, urban resilience in historic environments, tourism dynamics in heritage cities and emergency response to flooding.

Together, the lectures showed that the conservation of cultural heritage must become increasingly forward-looking. Historic cities need strategies that combine restoration, sustainable planning, community involvement, climate adaptation and emergency preparedness. The visit was therefore highly relevant to the study of architectural restoration, because it demonstrated that protecting the past also requires preparing for the environmental challenges of the future.

Report Aosta

Roman Wall in Aosta

The first stop of the two-day field trip in Aosta was the Roman Wall. This structure was particularly interesting because it showed several conservation problems as well as an ongoing restoration intervention. The work on the wall had started in November, but the intervention had been delayed because official authorization was needed before the restoration process could begin.



At the beginning of the work, the surface of the wall was cleaned with very fine sand, also described as micro-sand. Water was avoided during the cleaning process because the stone could absorb too much moisture. In a cold climate, this would be especially problematic, since absorbed water can freeze, expand and lead to cracks in the stone. Therefore, a dry and controlled cleaning method was chosen. On the scaffolding, the cleaning tools could also be observed, including brushes, small saws, pliers and trowels. Red, very fine sand was used for the cleaning of the masonry surface.

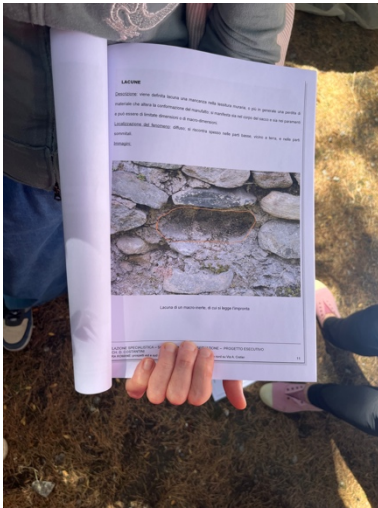


A second important step was the removal of vegetation. A liquid herbicide or biocidal product, referred to as “diserbante”, was applied to the plants growing on and inside the wall. After approximately one to two weeks, the vegetation dies and the roots also decay. This is important because roots can penetrate the joints and cavities of the masonry, widening existing gaps and increasing the risk of detachment or loss of material.

The wall showed several types of degradation. One of the most visible problems was the presence of detachments, especially at the base of the wall. Detached elements are parts of mortar, stone or masonry that have lost adhesion to the support. They can still be in place, but they are no longer properly connected to the wall structure. In this case, the exact reason for the many detached and missing stones was not completely clear. However, the intervention

was necessary because the loss of material and the instability of the lower parts could become dangerous and might eventually lead to partial collapse.

The conservation report shown during the visit documented different damage phenomena, such as foreign bodies, detached elements and lacunae. “Lacunae” describe missing parts in the masonry texture or losses of material. They appeared both in the lower areas close to the ground and in higher parts of the wall. The report also indicated previous interventions and planned restoration actions, such as the removal of degraded mortar and the controlled treatment of the masonry surface.



The wall construction was also discussed in relation to its internal and external structure. The inner part of the wall is called “sacco”, which refers to the internal rubble core of the masonry. This core gives mass to the wall and connects the two external faces. The outer visible part of the wall consists of travertine stones, called “travertino”. These stones form the external masonry surface and protect the inner core. In some areas, the travertine stones become narrower towards the top and were arranged in a way that created a stronger connection with the sacco. This connection between the external stone faces and the internal core is important for the stability of the whole wall.



The stone arrangement was also partly described as similar to a herringbone pattern. The masonry showed irregular openings or gaps between stones, which are typical for this kind of historical wall construction and may have been intentional in some parts. The wall was therefore not only analysed as a damaged structure, but also as an example of historical construction technique.

Another structural element mentioned during the visit was the use of a “Contraforte”. A “Contraforte”, or buttress-like reinforcement, is used to support and stabilize a wall. It helps resist lateral forces and prevents the masonry from moving or collapsing outward. This was especially relevant because the Roman Wall had already required structural stabilization in the past. In 1920, an intervention had already been carried out to prevent the wall from falling.



The wall also showed black crust, especially visible from the scaffolding. Black crust usually forms on stone surfaces exposed to air pollution and moisture. It creates dark deposits on the surface and can accelerate degradation, especially when it traps pollutants and moisture close to the stone.

The mortar was another important aspect of the analysis. It consists mainly of water, sand and lime. Laboratory analysis can help identify the composition of the mortar and recognize specific degradation phenomena. This is important because compatible repair materials must be chosen carefully. In this restoration, the wall was repaired with stones similar to the original ones. This differs from the restoration of the Tour de Pailleron, where other stones had been used.



Overall, the Roman Wall in Aosta demonstrated how complex the conservation of archaeological masonry can be. The intervention had to address surface cleaning, vegetation, detached elements, lacunae, unstable areas and previous restoration traces. The visit showed that restoration is not only about replacing missing material, but also about understanding the wall's construction, documenting the state of conservation and choosing compatible materials and methods.

Laboratory Presentation: Diagnostics and Material Analysis

The second part of the field trip took place in the laboratory, where we attended a presentation about diagnostics in the conservation of cultural heritage. The main question of the lecture was: "Which diagnostic to preserve the cultural heritage?" The focus was on understanding what a monument needs before defining a conservation or restoration project.

At the beginning, the importance of international standards was explained. According to EN 15898, conservation includes preventive conservation, remedial conservation and restoration. These standards help to describe alteration phenomena clearly and consistently.

The presentation also discussed the nature of alteration. Any alteration means a change in the material, and this change becomes part of the material and its history. Therefore, conservation is always a compromise between many different parameters, such as the condition of the object, the materials, the environment and the intended intervention.

Several factors that can generate alteration were presented. These include environmental conditions such as temperature, humidity, wind and rain, but also the geometry of the monument. Flat surfaces, corners, edges, window sills, kerbs, brackets and gutters can influence how water moves across a surface. Examples shown in the lecture included leaching, rising damp, beating, flakes, pulverisation, oxidation of iron inside the rock and different absorption behaviour of stones. A distinction was also made between black deposit and black crust, showing the importance of using correct terminology.

A systematic approach to conservation was presented as necessary. This includes alteration mapping, material study, the study of the relationship between the monument and its environment, the definition of a restoration project and future maintenance. Mapping can also be done with a geo-referenced database, such as GIS. In this system, each block can be documented with information about the rock type, its conservation state, analyses carried out and restoration interventions.

Material characterisation was another important topic. The laboratory can investigate petrographic characteristics, the behaviour of water in liquid and vapour form, porosity, protective treatments, consolidations, freezing temperatures inside pores, colour variations and cleaning methods. These analyses help to understand the material before choosing an intervention.

The relationship between climate and monument was also discussed. The presentation showed that temperature, humidity, surface temperature, pollutants, material composition, porosity and water behaviour all influence degradation. Measurement campaigns and temperature graphs demonstrated that exposure and climate conditions can change the behaviour of materials over time.

After the presentation, we had a short guided tour through the laboratory. We were shown different instruments used for material investigation and diagnostic analysis. This showed that conservation is not only based on visual observation, but also on documentation, measurements, mapping and laboratory testing.

Overall, the presentation made clear that diagnostics are essential for conservation. Before restoration work begins, the monument, its materials and its environmental context must be studied carefully in order to define a suitable conservation project and plan future maintenance.

Roman Theatre in Aosta

After the laboratory presentation, we visited the Roman Theatre in Aosta. The monument is a Roman building that was built before Christ and is located inside the ancient city. This is interesting because Roman theatres were usually placed outside the city, while this theatre is situated within the urban area.



The theatre had been closed for a long time, but it is now part of a larger restoration and museum project. New technologies and new architectural solutions are being used to make the monument accessible and usable as a museum space. One of the interventions is the addition of a lift and stairs outside the northern tower. On another tower, only the wall itself is being restored, and the scaffolding is planned to be removed in June.

Another important part of the project is the renewal of the visitor paths inside the monument. These paths are planned everywhere on the site. The aim is to make the monument accessible to different groups of visitors, including wheelchair users and blind people. Some paths are designed to allow visitors to listen and touch, so that the monument can be experienced in different ways.

However, the design of these paths created several difficulties. Protection and safety measures were necessary, but ramps with handrails were not fully accepted by the supervisors. The problem was to find a solution that respects both the monument and the needs of visitors. Engineers often proposed concrete solutions, while freelance architects suggested different alternatives. The commission then had to choose the most suitable solution.

During the visit, Nathalie, the director of architectural and archaeological monuments in the Superintendence, explained the difficulty of translating a restoration project into reality. One conflict concerned the architect's original project. The architect did not want to change his design, while the Superintendence questioned whether some elements were sensitive enough to the monument. Safety was one of the main arguments, because protective elements were necessary and responsibility for visitors was also an important issue.

The handrails were another point of discussion. They were placed in areas where visitors are not allowed to touch the monument directly. The intention was to protect both visitors and the archaeological structure, but the solution was criticised because it did not fully represent the sensitivity of the monument. This showed how difficult it can be to balance accessibility, safety, conservation and the visual impact of new additions.

The material choice for the ramp covering was also discussed. The cover of the installed ramp is planned to be made of wood, described as Scandinavian and certified for 50 years. However, there was still a question of whether this material should really be used in the monument. This

again showed the difficulty of choosing materials that are durable, compatible and respectful of the historical context.



We also discussed earlier reconstructions and protective interventions. A reconstruction was carried out in the second half of the last year. The large stones are original, while the smaller stones were added only to protect the top of the wall. These smaller protective stones were added in the 19th century. Today, other solutions are being considered, such as protection with mortar instead of stones or resin.

The financial aspect of the restoration was also mentioned. The project is supported with 2 million euros from FESR/FESER funding and another 2 million euros from the region. This shows that the restoration of such an important monument requires not only technical and architectural decisions, but also a significant financial framework.

Overall, the visit to the Roman Theatre showed how complex the restoration and reuse of an archaeological monument can be. The project does not only involve repairing ancient walls, but also creating accessibility, visitor paths, safety systems and museum functions. At the same time, every new intervention has to respect the historical material and the sensitivity of the monument.

Criptoportico Forense

On the second day of the field trip, we visited the Criptoportico Forense in Aosta. The introductory panels explained that Augusta Praetoria was founded in 25 BC during the reign of Emperor Augustus and was located on an important Roman route towards Gaul. The forum area was part of the planned Roman city, organised around the *cardo maximus* and the *decumanus maximus*.

The Criptoportico Forense surrounded the sacred area of the forum. It was an underground gallery structure covered by barrel vaults and connected to the difference in ground level. The panels also showed that the interior was originally plastered and lit by narrow openings. Over time, the monument was reused and transformed, while later structures such as the *domus ecclesiae* and the Early Christian cathedral became connected to this area.

One interesting aspect during the visit was the difference between the Roman level and the present level of the city. The Roman level was much deeper, with a change of approximately 2.5 metres. This showed how much the urban level changed over time and how the ancient structures are now partly below the modern city.



Inside the museum, different structural and restoration aspects were discussed. We saw one pillar where it was explained that, during an earthquake, the pillar could move. For this reason, it can be better to connect the pillar with the upper part of the structure in order to create a safer structural connection.



It was also explained that during the medieval period the Criptoportico was used in a different way, almost like a cave. Some former entrances or openings are still visible today. In the wall,

divided holes or separated openings could be recognised, which show later transformations of the ancient structure.

Another topic was the visibility of restoration processes. In some areas, openings in the wall had been closed during restoration. Different textures and different blocks were used so that the restored parts can be recognised and distinguished from the original material. This approach makes the restoration process visible instead of hiding it completely. It also raises the question of how integrity should be understood in restoration.



Another restoration solution was the addition of pillars to support a specific part of the structure. Through this intervention, the internal core, or sacco, remains visible. This showed that support can be added without completely covering the historical construction. (5)

At another point, we could see original mortar and plaster. It was explained that the interior of the Criptoportico had originally been covered with plaster, approximately 2 cm thick. This was important because the visible stone surface today does not completely represent the original appearance of the interior.



In another area, we saw a different support. This support carried a high load, so it did not need to be connected to the part above in the same way. The explanation was that the support was already strongly compressed by the weight above.



In another part of the visit, we could see a pillar that had been tied or strapped in order to improve its stability. This intervention was used to secure the pillar and prevent further movement or damage.



It was also explained that the Roman complex had originally been much larger. Today, mainly the galleries remain. Many of the stones that are missing today were reused in the construction of surrounding houses. This shows how the ancient monument was transformed and partly dismantled over time.

The concept of the visitor route was also discussed positively. Visitors can walk along a gallery and look at the monument from above. This makes it possible to understand the space and the structure of the Criptoportico without directly touching sensitive parts of the archaeological remains.

Overall, the visit to the Criptoportico Forense showed how a Roman structure can be reused, transformed, restored and integrated into the modern city. The visit was especially interesting because it combined archaeological history, structural safety, visible restoration methods and a carefully planned visitor route.

Roman Gate

After visiting the Criptoportico Forense, we continued to the Roman Gate. At this monument, several material and structural aspects were discussed, especially in relation to stone decay and the correct use of stone in construction.

One visible degradation phenomenon was stone spalling caused by iron oxidation. In some areas, iron elements inside or close to the stone had corroded. When iron oxidises, it increases in volume and creates pressure on the surrounding stone. This pressure can lead to cracks and finally to the detachment or breaking off of parts of the stone surface.

The pillars of the gate were made of marble. During the visit, it was explained that stones used for structural elements should generally be placed horizontally. This is important because many natural stones are formed in layers. If the stone is placed in the same direction as its natural bedding, the load can be distributed more safely. The stone can then use its internal structure in a more stable way.

For load-bearing elements, the orientation of the stone is therefore very important. If a layered stone is placed incorrectly, the pressure can act against the natural structure of the material. This can make the stone more vulnerable to cracking, splitting or detachment along its layers. In architectural restoration, understanding the original material and its internal structure is therefore essential before replacing or repairing structural elements.

The situation is different when stones are used only for visual or decorative purposes. If a stone is not carrying a structural load, it can also be placed vertically, because its load-bearing capacity is less important. In this case, the aesthetic effect, the visible texture or the design of the surface may be more relevant than the structural behaviour.



Early Church of San Lorenzo

After visiting the Roman Gate, we visited the Early Church of San Lorenzo. The site is connected to the early Christian development of Aosta and forms part of an important ecclesiastical complex together with Sant'Orso. The panels explained that new Christian centres appeared in the area from Late Antiquity onwards, including the cathedral, baptisteries and funerary churches near the necropolis.

The church of San Lorenzo was built near the eastern gate of Augusta Praetoria, along the road coming from Eporedia, today Ivrea. This area had already been used as an important necropolis during Roman times and even earlier, during the Iron Age. With the arrival of Christianity, the funerary function of the area continued. In the first half of the 5th century, a funerary church was built there to contain the tombs of the first bishops of Aosta.

The early building had a Latin-cross plan and was about 36 metres long and 32.5 metres wide. It had apses on the east-west axis and a liturgical area with a semi-circular bench, the synthronon, in front of the apse. In the centre of the church there was a solea, a liturgical passage surrounded by a stone balustrade. The sarcophagus of bishop Agnellus, who died in 528, was found beside this enclosure.

Many tombs were discovered under the whole surface of the church. Large masonry tombs, called formae, were covered with marble slabs and also served as pavement. Burials continued until the middle of the 8th century, when the building was destroyed by a major fire. Later, the site was also affected by flooding from the Buthier river, which left alluvial layers over the remains.



In the 9th century, San Lorenzo was rebuilt in a smaller form, with a single nave and a semicircular apse. In the 11th century, the church was rebuilt again and extended. The façade was moved further west, and the southern aisle of the early Christian church was transformed into a crypt. Further changes continued in later centuries, especially in 1642, when the church was rebuilt in a form closer to its current appearance.

The panels also explained the material evidence of the structure. The foundations were mostly built with river stones, while many blocks of local travertine from abandoned Roman buildings were reused in the walls. Other reused materials, such as inscriptions, column drums and even sarcophagi, were also found on the site.



The museum presentation showed how the archaeological remains were made accessible to visitors. San Lorenzo is described as one of the early examples in Italy of a systematic excavation on an early Christian site. The visitor route connects the present level of the church with the lower archaeological level, allowing visitors to understand both the “living” level above and the “dead” level below.

Arch of Augustus

After visiting the Early Church of San Lorenzo, we visited the Arch of Augustus. The monument is an honorary arch and is connected to the Roman urban structure of Aosta. There is a clear linear relationship between the arch and the Roman Gate we had visited before. This axis shows the importance of the entrance situation and the representation of Augustus as emperor.

A main topic was the effect of wind on the monument. Because the wind can come from two different directions and passes through the reduced opening of the arch, its speed increases. This stronger air movement can intensify erosion on the stone surfaces. The impact of wind is not the same everywhere, because the angle of exposure changes depending on the position on the arch.



Humidity also plays an important role. Together with carbonic acid, it can affect the stone material and contribute to decay. In some areas, the stone can become hollow inside. This can be detected by knocking on the stone: a hollow sound indicates that the internal structure is damaged or detached. In such cases, the hollow areas can be filled with mortar to stabilise the stone again.

Rainwater was another important factor. Water entering from above damages especially the stones in the middle part of the arch. During winter, water and ice can accumulate in this area. When the water freezes, it expands and creates pressure inside cracks and pores. This process can lead to spalling and the detachment of stone fragments.

The different effects of light, wind and water were also discussed. Because these factors reach the arch from different directions and angles, they do not affect all parts of the monument equally. The stones in the central area of the arch are more exposed to rainwater and freeze-thaw damage, while some exterior stones are better protected by the upper structures.

Overall, the Arch of Augustus showed how environmental factors directly influence the degradation of stone monuments. Wind, humidity, rain, ice and exposure all interact with the material and create different patterns of decay. The visit demonstrated the importance of understanding both the architectural form and the environmental conditions when analysing the conservation state of a monument.

Pont-d'Ael

As the last stop, we visited Pont-d'Ael in the village of Pondel/Aymavilles. It is a Roman aqueduct bridge from the Augustan period and was built above the Grand Eyvia stream. The bridge had two functions: the upper part worked as a water conduit, while the lower part could be used as a passage for people and animals. The monument was later restored and made accessible for visitors as part of a conservation and valorisation project.



During the visit, we discussed the construction and the different types of stone used in the bridge. The internal passage is divided by several transverse masonry walls, which create hollow chambers. This construction made the bridge stable, but also reduced the amount of material needed. We also looked at the connection between the two bridge walls. In some areas, the connectors were directly linked with the walls, and cracks were visible. In other areas, they acted more like intermediate pieces, where no cracks could be seen. This showed that different structural solutions can behave differently over time.



Another important point was the modern glass walkway inside the bridge. It was mainly added for visual and didactic reasons, because it allows visitors to see the internal structure of the monument. However, this solution also creates conservation challenges: constant ventilation is necessary, otherwise humidity could become a problem inside the enclosed space.



Overall, Pont-d'Ael showed how restoration can combine structural conservation, archaeological research and visitor access. The bridge was preserved not only as a Roman technical structure, but also presented in a way that makes its construction and history understandable today.

Conclusion

The two days showed very clearly that conservation is not only about repairing old buildings, but about understanding the monument, its materials, its history and its environment before any intervention is made. In the laboratory lecture, the importance of diagnosis became clear: temperature, humidity, rain, wind, pollution, material properties and the position of the stone can all influence deterioration. Especially with stone materials, processes such as leaching, flaking, rising damp, black deposits or iron oxidation have to be observed and documented carefully before a restoration project can be planned.

During the visits to the Roman Theatre, the Criptoportico forense, the Roman Gate, the Arch of Augustus, San Lorenzo and Pont-d'Ael, these theoretical aspects became visible in real monuments. Each site showed different problems and different restoration approaches. Some interventions focused on structural safety, for example the stabilization of pillars or walls. Others focused on accessibility, such as paths, ramps, stairs or glass walkways. At the same time, it became clear that modern additions must be chosen very carefully, because they can change the appearance and the perception of a monument.

A recurring topic was the balance between conservation, safety, accessibility and authenticity. The restorations often had to respect the original material while also making the monument understandable and usable for visitors. Different textures, added materials or visible repairs were used to show which parts are original and which parts belong to later restoration phases. This helped to make the history of the monument readable instead of hiding the intervention.

Overall, the excursion demonstrated that restoration is a complex and sensitive process. It requires collaboration between architects, engineers, conservators, archaeologists and authorities. The most important lesson was that every monument needs an individual approach: the material condition, historical value, structural behaviour and visitor use all have to be considered together. The two days therefore gave a practical insight into how architectural heritage can be preserved, studied and presented for future generations.

Difference Significance of words

Restoration – Restauration – Restauro



English: *Restoration*

- Returning a structure to a documented earlier state
- Defined in the Venice Charter (1964)
- Must respect original material and avoid conjecture
- Evidence-based and methodologically controlled



German: *Restauration*

- Similar meaning: reinstating a historical condition
- Sometimes applied more flexibly in practice.
- May include reconstructive additions



Italian: *Restauro*

- Theoretically grounded (Cesare Brandi, *Teoria del Restauro*)
- Aims at recovering the "potential unity" (*unità potenziale*) of the artwork
- Balances aesthetic and historical dimensions
- Interventions should be distinguishable and reversible

Key Difference:

Italian *restauro* is philosophically elaborated; English *restoration* is normatively regulated; German *Restauration* lies between practical and theoretical usage.

Authenticity – Authentizität – Autenticità



English: *Authenticity*

- Core UNESCO concept (Nara Document, 1994).
- Multidimensional: material, design, workmanship, function, setting.
- Used as an evaluative criterion.



German: *Authentizität*

- Often strongly linked to original material substance.
- Less formally codified outside UNESCO context



Italian: *Autenticità*

- Closely tied to material originality
- Also informed by aesthetic-historical theory

Key Difference:

English usage is formally structured in international heritage law; German emphasizes materiality; Italian integrates aesthetic philosophy.

Conservation – Konservierung – Conservazione



English: Conservation

- Umbrella term
- Includes restoration, preservation, repair, and management
- Central disciplinary framework in Anglo-American contexts



German: Konservierung

- *Konservierung* = technical stabilization.
- *Denkmalpflege* = broader heritage protection system.
- No exact single equivalent for "conservation."



Italian: Conservazione

- Core conceptual category
- Includes *restauro*, maintenance (*manutenzione*), and protection (*tutela*)
- Theoretically grounded in restoration philosophy

Key Difference:

English uses *conservation* as a comprehensive umbrella term.

German terminology is divided administratively.

Italian discourse is theoretically cohesive around *conservazione* and *restauro*.

Monument – Denkmal – Monumento



English: Monument

- Often implies representational or symbolic significance.
- Legal terminology in the UK often uses "listed building."



German: Denkmal

- Legal heritage category.
- Includes vernacular and industrial structures.
- Broader than the English "monument."



Italian: Monumento

- Typically refers to architecturally or historically significant structures.
- Broader legal term is *bene culturale* (cultural property).

Key Difference:

German *Denkmal* is legally broader; Italian distinguishes between symbolic monuments and general cultural assets.

Present Restoration Example Germany



Historical Background

- Built between **1843–1855**
- Architect: **Friedrich August Stüler**
- Commissioned by **Frederick William IV of Prussia**
- Located on **Museum Island** in Berlin
- Designed to house **Egyptian and archaeological collections**
- Severely damaged during **World War II**
- Remained a **ruin for several decades after the war**
- Restoration project started in the **late 1990s**
- Museum Island designated **UNESCO World Heritage Site** in 1999



Restoration Strategy

- **Architects**
 - David Chipperfield
 - Julian Harrap
- **Main Principles**
 - **Preservation of the remaining historic fabric** and original fragments
 - **War damage intentionally preserved** as part of the building's history
 - **Minimal intervention** to protect authenticity
 - **Clear distinction between historic and new elements**
 - Missing structures reconstructed using **contemporary architectural design**
- **Materials and Construction**
 - Use of modern materials such as **concrete, brick, and steel**
 - New elements designed to **complement but not imitate** the original architecture
- **Conservation Framework**
 - Approach based on principles of the **Venice Charter**
 - Aim: maintain **authenticity, legibility of historical layers, and functional reuse**



Key Restored Spaces

- **Neues Treppenhaus**
 - Original staircase **completely destroyed during World War II**
 - **Reconstruction of the original spatial geometry**
 - **Contemporary interpretation** of the historic form
 - **Minimalist design** without historicist decoration
 - Makes the **historic spatial structure legible** without creating *"fake history"*
- **Egyptian Courtyard and Galleries**
 - **Fragments of wall paintings carefully conserved**
 - Missing areas **completed with neutral materials**
 - **Original brickwork intentionally left visible**
 - Restoration reveals the **different historical layers of the building**



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Kolumba Museum- Cologne

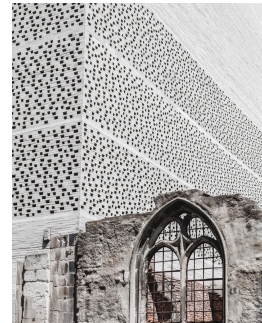
Historical Background

- Located in **Cologne**, Germany
- Built on the ruins of the medieval **St. Kolumba Church**
- The church was destroyed during **World War II**
- The ruins and archaeological remains were **preserved on the site**
- In 1949 a small chapel, **Madonna in den Trümmern Chapel**, was built within the ruins
- Archaeological excavations revealed **Roman, medieval, and modern remains**
- The site therefore contains **multiple historical layers spanning nearly 2000 years**



Architectural Concept

- **Architect**
 - **Peter Zumthor**
 - Completed **2007**
- **Main Idea**
 - A new museum building **constructed around and above the archaeological ruins** of **St. Kolumba Church**
 - Historical remains **preserved and integrated into the exhibition spaces**
 - Architecture creates a **continuous spatial dialogue between past and present**
 - The building acts as a **protective structure for the archaeological site**
- **Materials and Design**
 - Facade built with **specially developed light-grey bricks**
 - **Perforated brick walls** allow filtered natural light and ventilation
 - Minimal material palette emphasizing **atmosphere, texture, and silence**

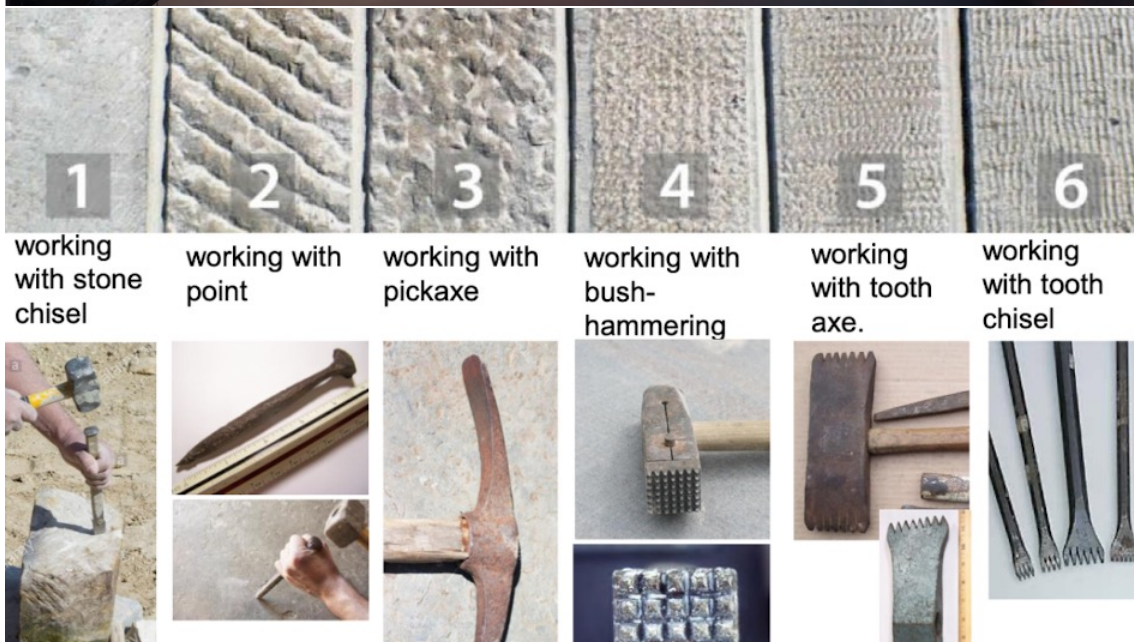


Transformation

- **Transformation of the Site**
 - The former ruins of **St. Kolumba Church** were transformed into a **contemporary museum**
 - The ruins are **not concealed but deliberately integrated** into the architecture
 - The project preserves the destruction caused by **World War II** as part of the site's history
 - Visitors experience **archaeology, historical ruins, and modern architecture simultaneously**
- **Key Spatial Elements**
 - **Archaeological excavation hall** displaying Roman and medieval foundations
 - Integration of the **Madonna in den Trümmern Chapel** within the museum structure
 - Large quiet exhibition spaces built **above the ruins**
- **Key Concept**
 - **Integration of historical ruins within a contemporary architectural structure**
 - Architecture functions as a **protective shell and spatial interpretation of the site's history**



Stone Surfaces Brescia



Report Architectural Restoration and Conservation
Philipp Schönfeld







