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After the earthquake. Design processes for intervention on vernacular heritage in Central Italy

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Topic: T4.1. Conservation and restoration projects of vernacular architecture

Abstract
Every day, in Italy, an average of 45 seismic events is recorded (INGV 2020 data) and their impact on the built environment is intense and continuous. The most notable cases are only the tip of a widespread and systematic iceberg, especially in the Central Apennines Mountain range. The opportunity to operate on ancient and disrupted buildings, to observe materially mural stratigraphies, to interpret disconnected or hinted geometries represents the field of action of know-how that fluctuates between technological specialism and the transmission of ancient tacit knowledge, which is more evident in the vernacular heritage. Concepts like conservation, restoration and reconstruction have become crucial in the deep debate and rule formulation, in the context of the "Extraordinary Commissariat for Earthquake Reconstruction 2016". The contribution intends to investigate and describe the main features of these design procedures, focusing on the results, the perspective, dynamics, and objectives through which the reconstruction is taking place. More in detail, the paper suggests two case studies to examine the application of these ongoing procedures in relation to the enhancement and conservation of vernacular heritage in the Marche region. The two case studies are the village of Gabbiano (a small rural fabric close to Pieve Torina, Macerata) and the Shrine of Macereto (a monumental, isolated complex in Visso, Macerata). The differences in size, type and original use between the case studies offers the opportunity to compare two different interventions for either a complete reconstruction or a conservative restoration. The scope of the study is to explore the "rules of reconstruction" - applied to vernacular heritage sites - by observing how the projects and the proposed techniques represent an interpretation of the national legal framework built around the post-earthquake territories.

Keywords: *post-disaster reconstruction, Central Italy, earthquake, restoration practice.*

1. Introduction

Italian architectural heritage is composed of a great variety of artefacts, from monuments to vernacular buildings. Often, these objects are part of the so-called *fragile landscape*, conceived as a *lost landscape* "which denounces […] a wound and at the same time invite us to attempt a suture, a plausible mending" (Tarpino, 2016, p. 8). This suture is even more evident in the case of seismic damages in these vernacular contexts.

In 2020 16.597 seismic events have been recorded around the Italian territory with an average of 45 earthquakes per day, according to the report by INGV (Istituto Nazionale di Geofisica e Vulcanologia – *National Institute of Geophysics and Volcanology*) (INGV, 2020). These numbers

become even more significant if cross-referenced with the 60% of National territory considered as *Internal Areas*[1] commonly characterized by vernacular heritage and agricultural and forestry landscape. This heritage must face post-disaster dynamics with a need for reconstruction, restoration, and conservation interventions where "no action strategy can be universally appropriate and effective" (Morezzi, 2019, p. 27).

A particularly meaningful case is represented by the area of the Central Apennines Mountains which was affected by a series of intense earthquakes in 2016-2017. The regions of Marche, Umbria and Lazio have therefore ended up with a vast and varied set of artefacts and vernacular settlements bearing severe material damages and in completely irreversible conditions. "Besides the restoration of the best-known monuments, problems arise in relation to how to deal with minor architectural heritage, such as that of minor valleys, towns and villages" (Carbonara, 2018, preface). In this context, the "marginal" nature of territories and settlements corresponds to not well documented and difficult to reach – in other words *out of the spotlight* – sites.

From a strategic and normative point of view, this dramatic condition has requested the establishment of an *Extraordinary Commissariat for Earthquake Reconstruction 2016* in Central Italy – as happened in the previous years in other Italian regions[2]. It consists of a public organization with the main aim to speed up and optimize the reconstruction process in these areas.

The complex condition between vernacular areas and post-seismic emergency is underlined by the governmental guidelines for which "in the 2016 earthquake crater area, the issues of peripherality, typical of internal areas as identified by SNAI, overlap with those of marginality concerning ordinary national and regional policies, as they are mainly border areas" (Presidenza del Consiglio dei Ministri, 2020, p. 2).

The 2016 earthquake crater represents a specific field of study that interweaves the Apennines' vernacular zones with a post-seismic condition. Strategic guidelines and technical solutions regarding vernacular heritage conservation offer several ways of intervention and *good practices*, requiring a priority system between frameworks, aims and tools. As well as in the common design practice, during the post-seismic condition, the difficulty is to "distinguish the regulation systems (protection) from the purposes (the conservation)" (Romeo, 2021, p. 211) in the framework of an enhancement strategy.

1.1. Research context

The context of the present study is strictly linked to two main perspectives. The first one is the work by *Extraordinary Commissariat for Earthquake Reconstruction 2016* and its strategies and prescriptions[3] with a particular focus on the vernacular and marginal areas. The second one is the technical interpretation of these rules and guidelines and the design procedures.

Right after the stroke of an important earthquake, a complex technical and bureaucratic process starts. A special office, named USR (*Ufficio Speciale per la Ricostruzione* – Special Office for Reconstruction), is set up in every Region affected by the seismic event. The scope of this office is to organize the reconstruction process, starting from the estimate of the damage, led by trained technicians who report the state of things to the USR.

From a technical point of view, design procedures for this damaged heritage firstly require the understanding of the damaged buildings' history, their constructive aspects, and their damage

[1] Regarding the "Strategia Nazionale Aree Interne" – SNAI (National Strategy for Internal Areas), intending these areas as "fragile territories, far from the main centres of supply of essential services and too often left to their own devices" (SNAI, 2019).

[2] Chronologically close examples are the Regional Agency for Reconstruction and the Deputy Commissioner for Reconstruction after the 2012 earthquake in Emilia Romagna.

[3] A recommended deepening on the topic is the research work by Carlotta Latini and her focus on legislation and regulation in emergency and reconstruction management.

characteristics. After this cognitive phase, there are many different possible ways of intervention. The decisional process is deeply affected by the availability of economic opportunities since the reparation of the seismic damages is funded by the State. To raise the funds, both analysis and design must follow precise rules and procedures. In addition to the bureaucratic requirements, the owner's desires and the regulations set by the authorities have always to be fulfilled.

The design framework which emerges is very variable from one case to another. All the externalities produced by economic, normative, and social reasons converge in the project definition too. In this vernacular context, conservative restoration is not always the unique intervention strategy: memory and material motivations together with irreparable buildings open to various scenarios of reconstruction and transformation.

1.2. Research methodology

The research represents a survey on what (and how) is happening in a specific post-earthquake area of Central Italy, characterized by a great range of vernacular architectural models and types.

To do so, the ongoing reconstruction/restoration phenomena become a useful point of view, since they produce instant frameworks on which critically apply theoretical and practical considerations. The cooperation with a design company permits to fulfil *active research*, observing the change which is taking place. With the kind graphical and documentary support by ArchLivIng (design office mainly based in Ferrara and Torino), the survey can tap into drawings and technical reports referring to the selected case studies. The research is not, however, focused on one specific design practice, contextualizing it in a wider and well-documented reconstruction approach and bibliography. Through the lens of researchers and scholars and with the tools of technicians working in these territories, the study tries to open a wider and more *pragmatic* interpretation of both the vernacular architecture conservation and the post-earthquake intervention challenges.

2. Case studies

Two case studies of vernacular heritage in the Marche region are presented as post-earthquake projects. They differ in size, construction period and monumental characteristics. Both projects are in progress bringing into play complex networks of relationships between regulation and design in the conservation field.

The first case study is the Shrine of Macereto, a religious monumental complex in the southern area of Marche. It can be considered a vernacular case of undoubted monumental value where the conservation project assumes traditional peculiarities related to the philological and memorial aspects.

The second one is the village of Gabbiano, a small settlement that has been seriously damaged by the 2016 earthquake, where demolition and rebuilding represent the only possible intervention strategy. The settlement is poorly documented, but its cultural value is demonstrated by the uniformity of construction techniques and the *tangible* presence of artisanal and "material knowledge" (Schreurs, 2021, p. 56).

2.1. Shrine of Macereto

The Shrine of Macereto is a monumental complex located on a plateau at around 1000 meters above sea level, in the surroundings of the towns of Visso and Ussita (Macerata district)[4]. The complex is composed of one main building, the church, surrounded by four other constructions[5], connected by a covered walkaway. The walkaway is characterized by masonry pillars and a single pitch wooden roof and was partially demolished at the beginning of the XX century.

[4] The monumental complex was one of the so-called *guaite* around Visso, a territorial control system consisting of different clusters of buildings spread in the area.

[5] The construction of the church was probably started by the artist G. Battista Lucano in 1530. There is a tradition attesting that the original project was drawn by Donato Bramante.

The groundwork for the restoration process started after the earthquake consists of historical analysis and research. A heterogeneous bibliography underlines the value of the complex as a *vernacular monument*. Since the first years of the XX century, the Shrine has been published in trade magazines and books (Pirri, 1916; Venanzangeli, 1996; Fumi, 1901), sometimes referring to the documentation located in the historical archive of Visso and Ussita, that is included in SIUSA (*Sistema Informativo Unificato per le Soprintendenze Archivistiche* – Informative Unified System for the Archival Superintendencies). The archival research reveals – together with the physical evidence – a building complex of excellent value.

A local legend talks about the construction of the first church in 1359 after a miraculous event during the transportation of a Virgin Mary sculpture. the Sanctuary was built in 1528, around the original church and, from that moment on, the place became an important pilgrimage destination.

Besides the central plan church, characterized by square honed stones (ashlar masonry), the complex consists of four main buildings: *Palazzo delle Guaite* (Guardhouse) (Fig. 1), *Casa dei Pellegrini* (Pilgrims' house), *Casa dell'Armata* (Army house) and *Fontanile* (Fountain building).

Fig.1. View of "Palazzo delle Guaite" (Source: Cristiano Tosco, 2021)

All the buildings are nowadays characterized by natural cleft stone facades, even though some plaster traces are visible. Thanks to the absence of plaster, it is possible to read different textures in the natural stone, which suggest transformations and additions in the construction history.

The quality of the masonry is adequate since the walls are not built with sack masonry, nevertheless, the mortar has a poor quality.[6] These characteristics, combined with other factors (volumes, heights, seismic intensity, etc.), have led to several cracks and some localized collapses.

The first formal step of the restoration process is the so-called *Operational Level*, which aims to estimate the damage caused by the earthquake. It includes an accurate survey and structural observations. Based on the level attributed to each building, its square meters and potential special features, the USR calculates the economic contribution needed for the restoration process.

After this assessment, the technicians involved in the process and the owner of the building – that is, the Camerino's diocesan chancery (*Curia*) – work together to set the goals for the structural and architectural design. The main objectives of this work are seismic security and accessibility, modern hygienic standards, and fire prevention. Overall, the Shrine is an important local monument: this means that memory and image of the complex become important elements during the design phase (Fig. 2).

Fig. 2. The southern elevation of "Palazzo delle Guaite" (Source: Archliving, 2020)

Before the 2016 seismic events, the architectural complex was mainly used as a base for school camps and other social activities. Therefore, a strong focus on accessibility and fire protection is required in the planning. Italian laws admit exceptions in these fields for heritage buildings, but since structural intervention is needed due to seismic security, architectural standards are also to be followed. Commonly, this leads to complex negotiations between technicians, municipalities,

[6] According to the report of analysis (2019) developed by Meccano Spa, chemical professional office Doc. Enzo Corsi, and kindly provided by the firm Archliving.

and the authority for heritage protection called *Soprintendenza per i Beni Ambientali e Architettonici*. Once the project is shared with all the stakeholders, it must be submitted to the USR.

One of the main topics is the potential reintroduction of the plaster on the natural stone façade of *Palazzo delle Guaite*. Historic research, historical pictures (Fig. 3), and an accurate survey of the masonry stone suggest that the exterior aspect of that building was historically characterized by the presence of plaster. The reintroduction of plaster, in addition to FRCM (Fabric Reinforced Cementitious Matrix), would nowadays be a proper method to increase the mechanical resistance of the masonry and, concurrently, restore the historical appearance of the building.

Fig. 3. Photography from 1988 testifying the presence of plaster on the Shrine façades (Source: Archivio Impresa Alessandrini, 2019)

The historical accuracy of this solution could be proved by the documents conserved in the historical archive of the complex, which was, however, preserved inside another monumental complex severely damaged during the earthquake: the church complex of *Collegiata di Santa Maria*. Its content was transferred to a temporary location, inside the *Archivio di Stato* in Ancona. Today, the consultation of this material is unfortunately not possible, even though there are arrangements in progress with UNIVPM (*Università Politecnica delle Marche*).

Furthermore, the reintroduction of the plaster on the façade must be discussed and approved by *Soprintendenza* and Municipality, since the architectural complex is in an area characterized by particular landscape interest. Therefore, an intervention that changes the exterior aspect of the buildings must be accurately motivated[7].

Nowadays the project for the Shrine of Macereto is waiting for approval. If some interventions are not considered suitable, negotiations and design of new solutions will reoccur, in an iterative process that will finally lead to the approved design.

2.2. Gabbiano

Gabbiano is a small and rural settlement in the hamlet of Pieve Torina (Macerata district). Standing over a hill, the village is composed of eight buildings (with different private properties) and one church on a principal sinuous path axis (Fig. 4).

Fig. 4. Drone photography of Gabbiano and its landscape (Source: Archliving, 2021)

Although there is discrete historical documentation relating to the territory of Pieve Torina, Gabbiano appears in brief descriptive mentions about more important places such as Torricchio. For instance, Gabbiano was documented in 1859 in the *Topografia Statistica dello Stato Pontificio* as "hamlet of Torricchio with about 200 souls" (Palmieri, 1859, p. 156) and earlier in 1836 as "hamlet of Torricchio annexed to Pieve Torina [...] 149 souls" (AAVV, 1836, p. 109).

[7] Memorial aspects are crucial in these dynamics and the open and dense discussion with competent authorities becomes one of the necessary conditions to intervene.

Gabbiano represents an example of a vernacular settlement embedded in the river Chienti's lower valley. It is located at the border of the *Monti Sibillini* National Park, along the road connecting Pieve Torina and Visso.

This is a small settlement, historically a satellite of larger territorial centres, in a marginal documentary condition. However, the material data, characteristic of a building tradition and a "skills society" (Sennett, 2008, p. 22), plays a crucial role in the understanding of local culture.

Although there is a considerable variety of building techniques throughout the Chienti valley, "the regular sub-horizontal technique [...] seems to be the most representative of the general technical level of the whole area under consideration" (D'Ulizia, 2008, p. 74). In this sense, about the settlement, it is the very consistency of the places, today laid bare by the traumas and wounds of the 2016 earthquake, that allows grasping the cultural emergencies as data worthy of preservation, at least in their traces. The documentary value of the ornamental features of some wall details, cornices, openings and all the elements that distinguish the architecture of the place, is mainly to be found in the local workforce. In other words, "the presence of groups of local masons, each working in their community, who apply general models (probably transmitted by an itinerant specialist master) and readapt them to the particular case" (D'Ulizia, 2008, p. 74) represents a great value. This evidence calls into question experience and technique as culturally transmitted aspects. In Gabbiano this transmission is perhaps even more hybrid because it is the result of even more indirect knowledge transmission and therefore capable of producing an unexpected built heritage where "minor or not, the old buildings of the towns do exist, and it is important to preserve and convey them to future generations" (Gron, Detry, 2019, p. 10).

The renovation process carried out on the buildings following the earthquake of 1997, resulted in transformations to both the decorative and the structural apparatus of the buildings, sometimes using solutions that were not suited to the masonry characteristics and traditional conformation of the local architecture[8]. In particular, the extensive use of cement mortar and reinforced concrete elements has distorted certain architectural details and compromised the chemical and physical aspects of traditional materials, such as their natural perishability and breathability.

Vernacular architecture of Gabbiano is largely made of masonry load-bearing structures consisting mainly of rough, unworked stone, with irregularly shaped elements of various sizes. The last earthquake (2016) has resulted in an extended framework of intense damages, such as diagonal and diffuse cracks, displacement and tilting of walls by out-of-plane bending and large detachments. The result is an almost destroyed settlement where ruins are the material trace of both a tragedy and a will for reconstruction.

The above-mentioned frameworks depict a complex situation, the investigation of which has required a constant campaign of inspections to outline the characteristics of the building with the least possible approximation and to select the most significant aspects. Damage conditions required a project that must be oriented to complete demolition and reconstruction opening the widely debated topic of reconstruction "as it was, where it was" (Fig. 5). Technical principles of the ongoing project of reconstruction try to consider Gabbiano as a unique vernacular system, where guidelines are oriented to the repetition in volumes of buildings, to the location, size, and proportion maintenance of the openings, to the restoration or similar reconstruction of shading systems in wood and the removal of evident superfetations.

[8] An example is the poorly critical use of reinforced concrete top kerbs and architraves in incoherent materials and technologies.

2.3. Ongoing results

As already mentioned, the case studies are witnesses of an ongoing design and intervention process. For this reason, the research results are necessarily partial and susceptible to further developments.

Even if the differences between Macereto Shrine and Gabbiano are unequivocal, both the sites are representative of the same legal and operative framework of post-seismic intervention. While in the Macereto Shrine this framework emerges through the tools of restoration – working on buildings that *must* be saved in their structures and architectural elements –, in Gabbiano the reconstruction asks for demolition and *recomposition* of at least the historical image. Two opposite approaches that are coordinated by the same general strategy declined on different vernacular heritage.

Far from being comparable objects, the case studies interweave strong links with the contexts of references. These contexts are made both by real stakeholders (communities, owners, municipalities) and by cultural aspects (construction techniques, landscape impact, settlements principles), converging – in these cases – in a general will for an "as it was, where it was" approach.

3. Conclusions

The current regulations on reconstruction in Italy are the result of a process that began in the 1980s[9]. Since then, the layering of regulations has intensified. Structures and superstructures, regulations, laws, and norms have been established with the primary objective of acting quickly and effectively. The current situation involves a series of consolidated steps in succession, ranging from safety measures to actual reconstruction.

There are very different buildings and contexts. The differences within the "vernacular" label in the Marche region are broad and include typological variety (churches, palaces, rural settlements), different intensity of damage, geographical location, uses (private, public, church property, holiday houses, etc.) and period of construction (with a wide variety ranging from the IV to the XII century, but also a heritage ranging from the XIX to the XX century). These profound differences that characterize vernacular architecture inevitably bring the established normative infrastructure into a continually "forced" condition to accommodate the

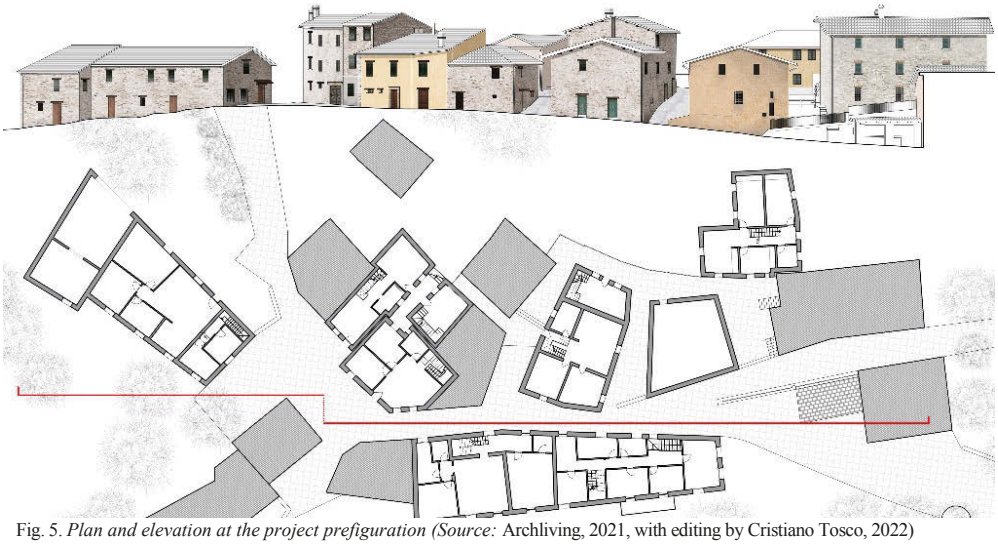

Fig. 5. *Plan and elevation at the project prefiguration (Source:* Archliving, 2021, with editing by Cristiano Tosco, 2022)

[9] Regarding the Irpinia earthquake of 1980.

diversity of cases. Therefore, a more shared and collective effort is required. A permanent discussion table should be set up to establish procedures on how to operate and how rebuild, during the non-seismic periods.

The presented experiences show widespread expertise among professionals that outlines shared knowledge on the topic. Looking to this breeding ground, research and studies on these ongoing procedures can be helpful in the definition of new approaches to post-seismic interventions. These new approaches should become a topic of discussion within the regulatory framework, trying to develop new tools for dealing with all the differences that a post-seismic condition in vernacular contexts could lead to, considering that there is one earthquake but many different reconstruction scenarios.

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