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Different Approaches in Post-seismic Rebuilding of Urban Fabric: Venzone, S. Angelo dei Lombardi, Gibellina

ABSTRACT

Considering different approaches to the reconstruction of cities after earthquakes in recent years, we can outline different degrees of preservation and reconstruction: reconstruction of monuments; reconstruction of the network of public spaces; reconstruction of facades; reconstruction of urban fabric, consolidating and updating typological and constructive characters; provisional reconstruction in another site; ultimate reconstruction in a different site; reconstruction of the landscape or reconstruction of the visible aspects of man-made artifacts in the landscape. After the tragic Italian earthquake in Abruzzo in 2009 there has been a long *querelle* on how to rebuild L'Aquila: should a new town be built elsewhere, or the old city of L'Aquila be rebuilt on the same site using its own ruins? There are several intermediate solutions between these two extremes. in the case of Venzone different approaches were graded case by case with considerable success. Anastylosis was adopted for main monuments and some facades, the reconstruction of urban fabric using updated building types was accomplished, resulting in the reconstruction of the network of streets and squares "as it was and where it was". The system of public spaces isn't the material expression of a single manufacturer, but the highest material and symbolic human collective expression. Today the city of L'Aquila is looking forward to an answer to the debate on its reconstruction. The recent history presents an important example of city reconstruction following a an earthquake, a example well-known in the world but that in Italy seems to be forgotten. Can we find a better model than Venzone for the reconstruction of L'Aquila ?

KEYWORDS: post-seismic, reconstruction, urban morphology, architecture, urban design, earthquake, memory, public space

"He looketh on the earth, and it trembleth.
He toucheth the hills, and they smoke"
Psalms, 104, 32.

1 THEORETICAL PREMISE: THE ANCIENT MATERIAL CULTURE

The analysis of the evolution of seismic culture since ancient times reveals an interesting double track: on one hand the religious culture and on the other the material culture. The religious culture of Pagans, Jews, Muslims and Christians interpreted the earthquake substantially as a divine sign for an offense against the gods, or a punishment for human sins, a sign that could be answered to only in a mystical-religious key, with sacrifices or through penances for forgiveness. There was also a material culture that, since ancient times, designed elements to improve the seismic response of buildings. While the official culture did not yet know how to interpret the seismic phenomenon, the working culture of builders seemed to understand earthquakes and gradually introduced solutions to mitigate their effects using constructive devices to respond to horizontal and vertical accelerations occuring during an earhquake. The ancient predilection for architectures with a symmetrical plan is derived from the empirical observation that symmetrical buildings to better withstand earthquakes, a fact that is reflected in the modern equivalent static analysis: we would say today that the coincidence between the center of stiffness and the center of masses, in case of horizontal accelerations, does not produce torques in its own

plan. But if we examine closely the diachronic evolution of architecture in the ancient world we will notice several other examples: the progressive reduction in height of the specific weights of building materials, such as in the Pantheon and in the Colosseum (Giuffrè, 1988), the use of metal connections between stones in Roman times, the complex connections between segments in the vaults of the Mausoleum of Theodoric, the arch with variable section –rounded intrados and pointed extrados– widespread during the fourteenth century in the Apennine area (Tuscany, Marche and Umbria), the vertical progression of the size of openings, from single to multi-light, to lighten bell towes, or the consolidation of monumental structures with stone cladding, increasing resistant sections and introducing counterweights that spread throughout the Renaissance.

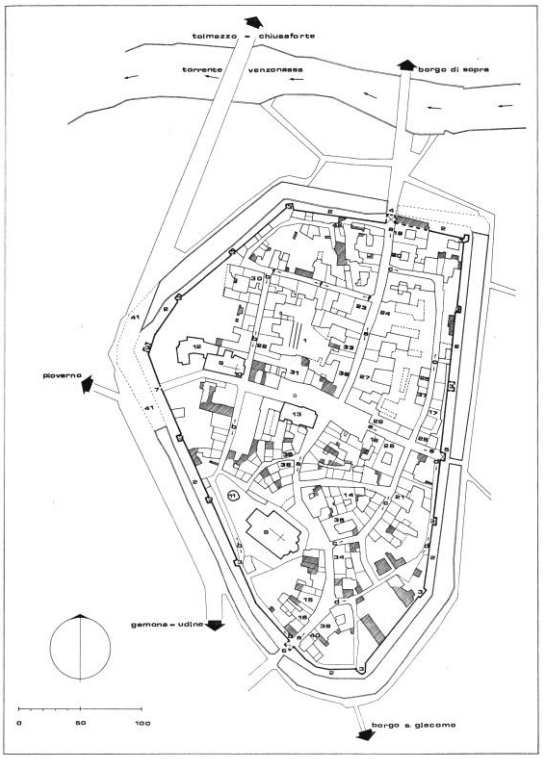

Figure 1: Plan of the city of Venzone (Michele, Sartogo, 1976)

Maybe on the basis of a literature on mechanics (Giuffrè, 1986) or maybe mostly empirically conceived, these devices bear witness to the ancient knowledge of seismic phenomena. In fact, the invention of empirical constructive responses to the earthquake was largely due to observation reasoning about the effects of the earthquake, following the experience of reconstruction (Guidoni, 1997) repair and restoration, a task that in pre-capitalist employed workers much more than in rebuilding anew.

2 RECONSTRUCTING URBAN FABRIC PROCESSUALY: VENZONE (1976)

The city of Venzone, documented since 932 AD, is in the Friuli region of Italy, next to the bridge of the *Via Julia Augusta* over the river Venzonassa. The town was founded during the patriarchate of Aquileia, perhaps on a Roman settlement, and for the strategic position it grew significantly becoming municipality in 1247. In this comunal phase the municipal market was built, and a defense system was coiceived by Glizoio of Mels in 1258, consisting of a double city wall course and a deep ditch. Venzone, *Albiciones* in medieval documents, is one of the few examples of fortified medieval villages in Friuli, indeed a unique material historical document, and it was declared a national monument of great historical interest in 1965. Unfortunately the city was completely destroyed by the tragic earthquake that struck the Friuli region on May 6th 1976.

Figure 2: Master plan for the reconstruction of Venzone (Sartogo, 2008)

The epicentre was between Gemona, Venzone and Bordano, and the shakes of magnitude 6.4 (corresponding to the X degree on the Mercalli scale) resulted in the destruction of the city centre, of the cathedral and of the ancient walls. On September 11th 1976 a second series of shocks caused further damage, and on September 15th strong aftershocks caused the collapse of the few walls still standing, with the complete destruction of the old town, townships and villages, resulting in a total of 52 deaths. After the first aids coordinated by Giuseppe Zamberletti –Special Commissioner for the Italian Government– in Venzone, the initiative of grassroots committees immediately brought the desire to rebuild the city following the slogan "where it was and how it was". The inhabitants, fearing not to be quickly accommodated and mindful of the controversy against Samonà's plan for the reconstruction of Longarone after the Vajont landslide of 1963, affirmed the idea of a full reconstruction, opposing it to academical ideas about linear new-towns in Friuli. The perseverance of these people resulted in the Regional Law n. 546 of August 8th 197 , which allocated 300 billion lire in 5 years for the reconstruction and subsequently in the vote of the National Council of Cultural Heritage on December 1977, confirming this orientation. The Ministry of Cultural and Environmental Heritage, the Archaeological Superintendence of Trieste and the ICOMOS assigned to a team of architects a "critical-historical research for the reconstruction and restoration of historical Venzone ". The team consisted of Francesca Sartogo and Gianfranco Caniggia, the follower of a school of urban studies who developed a method to read and design urban fabric. The group worked with other collaborators for a census of the built heritage of Venzone, drawing plans and elevations of each building as a documentation for the complete reconstruction of the city. The working hypothesis welcomed the participation of citizens who were extracting from the ruins architectural fragments of stone, columns, doors and windows.

Figure: 3 Venzone before the earthquake

Figure 4: Venzone after the earthquake

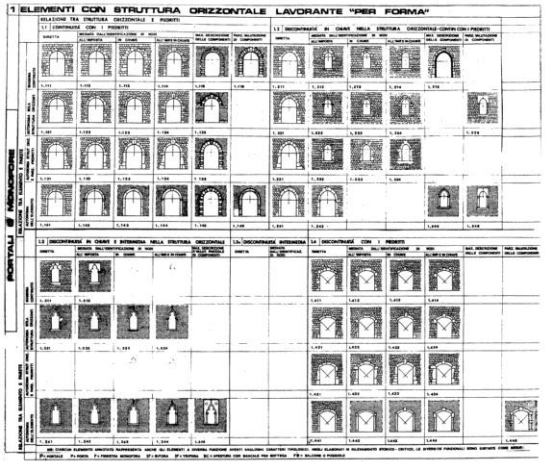

Figure 5: Horizontal structural elements resisting by form (Sartogo, 2008)

The design method was based on the analysis of building types and urban fabric to identify the parameters necessary for the reconstruction. The complete documentation on the evolution of building types and urban fabric was the premise to conceive the reconstruction as the continuation of an ongoing

transformation. The study of different building types and architectural elements, with the indication of bearing building types and their synchronic and diachronic variants, was the tool used by the research group to identify the principles of aggregation and the formation phases of the urban fabric. It was possible to reconstruct the exact state of the city before the earthquake using the photogrammetric surveys conducted by prof. Forammitti and his students, together with photographic cartographic and documentation, and with ancient documents when available, producing a detailed description for each building. Finally, the project was represented by a series of drawings [figure 2, 5,6] with indications for the reconstruction of the urban fabric and urban districts, specifying the eligible and non-eligible actions, with indications on the number of storeys, the position of stairs and the distributive pattern. In some cases directions were given on the reconstruction of facades using the original stone fragments. The necessity to follow new seismic criteria required a specific study of local building techniques: in Friuli walls are often made of rounded pebbles, and thus are easily fragmented. The updating of traditional building techniques according to seismic criteria was studied by Enrico Baroni and Salvatore Di Pasquale. The reconstruction plan was based on a grading of interventions: for the reconstruction of main monuments, such as the cathedral, the other churches, the town hall, the city walls, towers and gates, the anastylosis was used, numbering original stones; the reconstruction of urban fabric with updated compatible technologies and building types was done using only some of the original fragments. The system of public spaces, streets and squares was rebuilt exactly "as it was and where it was". The system of common spaces of a city constitutes a material document of great historical importance, it is not the expression of a single builder, but the result of subsequent amendments made by different actors through centuries.

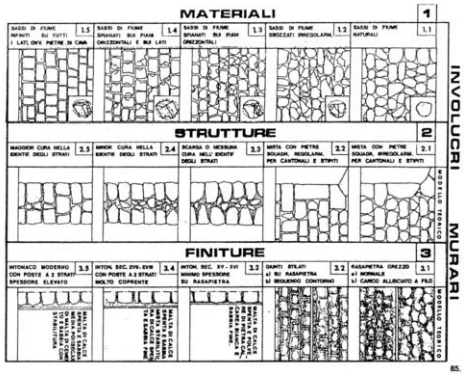

Figure 6: Morphological classification of stone masonry (Sartogo, 2008)

Streets and squares are fundamental for the city identity and their conservation upholds a social and historial importance. The project for Venzone was then set on a number of strategies: the "careful reconstruction of the formation process" (Sartogo, 2008, p. 121) of the city, so to re-establish the urban organism. Each building was not reconstructed exactly "where it was and how it was", but redefined as for a critical edition of an ancient palimpsest, leaving some free initiative to each owner, in a context of strong typological standardization. These indications unfortunately were used only for one part of the reconstruction, in the district of Via Alberto Sordi del Collefino, until the detailed plan of the historic center by Romeo Ballardini and his team was approved in 1980. Today, however, the city, its walls, the cathedral, the bell tower and other monumental buildings, were completely rebuilt and in 1991 and the European Community declared Venzone the "Ideal Village of Italy". Which better model can we find for the reconstruction of L'Aquila: Venzone received the Gold Medal for Civil Merit in 2002 and was required for inclusion in the UNESCO World Heritage List.

Figure 7: Venzone today: the bell tower (photo Adb, July 2009)

3 COMPARISON WITH OTHER RECONSTRUCTIONS

Following the examination, with a comparative approach, of methods adopted in the reconstruction of individual cities after earthquakes in recent years, we can outline several degrees of conservation and reconstruction: the reconstruction of monuments; the reconstruction of the network of public spaces, streets and squares; the reconstruction of the facades of buildings; the reconstruction of urban fabric, consolidating and updating typological and constructive technologies; urban provisional reconstruction in another site; ultimate urban reconstruction in another site; landscape reconstruction in its visible aspects with man-made artifacts. For the reconstruction of Gibellina, following the earthquake of Belice in Sicily (1968), it was decided to rebuild the city elsewhere. In our opinion, this choice has created major problems in the identification of the people with the new place. The art in Gibellina, [figure 9] was used to monumentalize the corpse of the abandoned city.

Figure 8: S. Angelo dei Lombardi (photo A. Camiz 2013).

Sant'Angelo dei Lombardi, fully destroyed in 1980, was the city with the highest number of deaths (482) after the Irpinia earthquake The reconstruction has largely retained the urban structure and the ancient road network: [fig. 8] the urban fabric was mainly rebuilt using new building types, modern technologies and contemporary materials, in the absence of any typological indication as in Venzone. The rebuilt city shows very few references to the old one, except the cathedral and the castle restored using original fragments. The result is certainly more convincing than the case of Gibellina, but the effect is alienating, it seems another city rebuilt in place of the old one. The reconstruction after the earthquake of Umbria in 1997 gave very advanced results if compared to the issue of reconstruction and restoration of masonry

and stone buildings (Angeletti, 2007). Very interesting is the role played by temporary structures built for emergency housing after the reconstruction (De Cesaris, 2008). In L'Aquila instead is not possible to carry out the comparison: the historical centre has not been rebuilt yet and there isn't a line to follow for its reconstruction. "Temporary housing" was built, a name itself revealing the provisional nature of the solution, but still we don't have an indication on what should be done in the city centre.

Figure 9: Alberto Burri, *Grande cretto*, Gibellina (1968).

Table 1 Comparative table of recent big earthquakes in Italy in the last 50 years.

Earthquake	Date	Magnitudo Moment, MMS	Epicentral Intensity, Io	N. of deaths	Reconstruction costs
Belice	15/1/1968	6,46	10	370	n.a.
Friuli	6/5/1976	6,46	9-10	989	9 bilions €
Irpinia	20/11/1980	6,89	10	2914	8 bilions €
Marche	26/9/1997	6,01	8-9	11	n.a.
L'Aquila	6/4/2009	6,3	9-10	308	2,9 bilions €
Emilia Romagna	20/5/2012	5,86	7-8	20	n.a.

4 BUILDING PUBLIC SPACE FOR COLLECTIVE MEMORY

The city is a collective and diachronic work of art recording overlapping traces of different ages and the memories of different regimes. In a way the earthquake is part of history, and therefore its trace shouldn't be deleted completely. Yet in historical centres, the need to rebuild the public spaces and the whole city, requires a proper operation of urban restoration calibrated case by case (Carbonara, 1976). No individual artwork can play a substitution role if compared to an entire city, every attempt to reduce the city to an object, in our opinion, is an expression of the *reification* of inhabitants and therefore should be rejected. The different role of basic building types for the definition of public spaces in the historic town and the modern city should be noted. In historical cities urban fabric and basic building types define the borders of public spaces, in the modern city, instead, the relationship between urban public space and urban fabric is generally paratactic, therefore the public spaces ar not bounded by buildings but rather defined by a function. The public space in the modern city is not related directly to private space and therefore the reconstruction of urban fabric is not fundamental for the reconstruction of public spaces. The need to rebuild public spaces in historical cities requires that urban scenes surrounding public spaces are rebuilt, and therefore the entire urban fabric needs to be preserved. The facades of buildings overlooking into public spaces, because of the *ius prospiciendi*, belong to the community, thus the reconstruction is prescribed in order to restore the urban landscape, with criteria to be calibrated case by case. In the process of rebuilding a city the prioritu do is to restore the agibility of urban roads, streets and squares, this work is usually done with a large turnout and thus the collective space is reborn immediately. This is the main reason why roads and squares are so important in the reconstruction of the identity of a place,

they are therefore an integral part of the recostruction project, one of the success factors within the reconstruction of the community after the shock of an earthquake (Mortola, 2003).

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