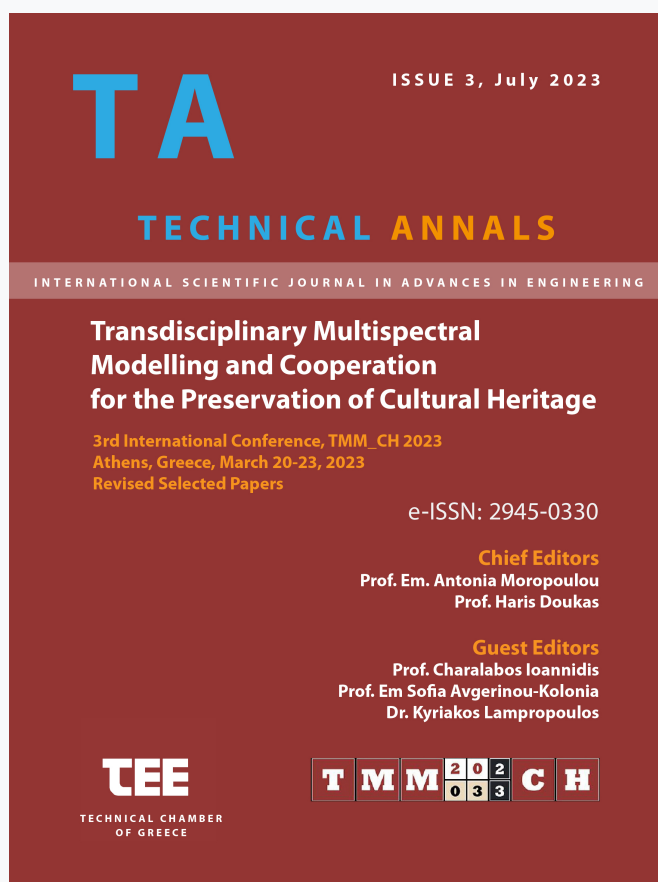


Technical Annals

Vol 1, No 3 (2023)

Technical Annals



Protection and enhancement of the historical and architectural heritage in times of peace on apparently distant war wounds. Some cases in Cagliari (Italy) between restorations, current problems and future prospects

Maria Dessi, Emanuela Fara, Piervanna Piredda

doi: [10.12681/ta.34860](https://doi.org/10.12681/ta.34860)

Copyright © 2023, Maria Dessi, Emanuela Fara, Piervanna Piredda



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0](https://creativecommons.org/licenses/by-nc-sa/4.0/).

To cite this article:

Dessi, M., Fara, E., & Piredda, P. (2023). Protection and enhancement of the historical and architectural heritage in times of peace on apparently distant war wounds. Some cases in Cagliari (Italy) between restorations, current problems and future prospects. *Technical Annals*, 1(3). <https://doi.org/10.12681/ta.34860>

Protection and enhancement of the historical and architectural heritage in times of peace on apparently distant war wounds. Some cases in Cagliari (Italy) between restorations, current problems and future prospects

Maria Dessi¹[0000-1111-2222-3333], Emanuela Fara²[1111-2222-3333-4444],
Piervanna Piredda³[2222-3333-4444-5555]

Laboratory of Analysis and Conservation of Cultural Heritage (LACHE) –
Department of Architecture, Design and Urban Planning of Alghero - University of Sassari;
Palazzo del Pou Salit, Piazza Duomo, 6 - 07041 Alghero (SS), Italia,
mdessi@uniss.it¹, faramanu@hotmail.it²,
piervannap@gmail.com³

Abstract. The most recent conflicts in the European territory have focused the attention on the question of the protection of heritage after the war event, which now not appears in Italy as a distant problem, both temporally and geographically. The study here proposed examines the case of the city of Cagliari, the regional capital of Sardinia (Italy), which is centrally located in the Mediterranean. The city appears to be an interesting and complete model due to the variety of cases that can be found here. It seems interesting how the typology of property has (or has not) often led to a reconstruction method.

Historical cartography and images was compared with the current state; it is possible to observe the results of the buildings reconstruction (or part of the building) or urban void generated, to identify the main unsolved problems.

The problems generated by the Second World War bombings, were examined eighty years after the end of the conflict. We therefore want to understand what the approach to reconstruction in relation to the different intended uses of the assets and their architectural quality was, in the various decades, from the post-war period until today.

Furthermore, it is interesting to examine whether the interventions were carried out in accordance with the regulations and / or with cultural indications that have followed, by comparing the local issue with the national one. This occasion appears to be useful to reflect on the results of the damages of the city, where they remain severely compensable.

Keywords: restoration, damage, war.

1 Introduction

The overcoming of the "scientific restoration" with the transition to the "critical restoration" was a result for concrete operational needs after the traumatic event of the Second World War. The criteria of scientific restoration were inadequate towards the innumerable damages and vast gaps of parts of the architecture in the city during World War II, and everywhere in Italy there was a necessity of reconstruction in a very complex scenario. More specifically, the aspects developed "in times of peace" contained in the Athens Restoration Charter (1931), such as the anastylosis, permitted in archaeological contexts the contribution of new technologies on consolidation. In particular, the reinforced concrete masks these interventions to maintain the historical aspect of the architecture, with pays more attention in the "most picturesque" areas of the city, and a rare minimum integration in the buildings, to avoid "artistic forgeries" or "historical forgeries".

The debates and the approaches for reconstruction essentially follow two main strands: the reconstruction to totally delete the trauma that occurred, or the reconstruction to return to a prior state of the event getting back the lost assets. In other words, the reconstruction often takes place through two different approaches and "a perfect reconstruction of a historic building in its pre-war condition and, conversely, the complete destruction of the ruin almost always appear out of place and out of time" [1]. A further solution is the one of not-reconstruction. It is known that towards war destruction, the reconstruction of the monument "hic et nunc" is recurrent, by using historical images making this operation presupposed anastylosis, although the reintegrated material was often conspicuous (an operation that Giovannoni himself approved, considering the circumstances). Obviously, this is justifiable by the emotionality that characterizes the community, upset by the traumatic event [2]. Throughout Italy, the reconstruction in civil architecture is accompanied by a widespread phenomenon of building speculation in the logic of maximum profit, followed by the highly interesting debates that intellectuals develop on the case of the most important monuments. Despite the relative simplicity of the architecture of Cagliari, the example examined here reflects, as we'll show, what happens throughout Italy. The reconstruction plan, minimally implemented, will try to find a balance between the economy of the intervention and innovative solutions for the city, in order to restore and modernize the most damaged areas, but avoiding the loss of numerous historic architectures, previously planned to be demolished and rebuilt.

Referring to the classification of De Angelis d'Ossat [3] damaged buildings can belong to three different categories depending on whether the damage suffered is: minor, major, seriously damaged or destroyed (similar classification can be individuated in the historical cartography made immediately of the end of Second World War). This different intensity of damage should give rise to different attitudes. It is interesting to see how the damage estimated as slight will not always involve the minimum intervention and often the choices adopted do not depend on the feasibility of safeguarding the architectural heritage.

2 The city of Cagliari: historical background and general overview of the events during World War II

Due to its central location within the Mediterranean, the city of Cagliari has always been an active protagonist of trade, economic and consequently war interests. Undoubtedly a strategic site, as evidenced by the presence of Phoenician-Punic settlements, the notable necropolis of Tuvixeddu, which followed the Roman domination which defined the road structure that still characterizes the organization of the contemporary city [4]. The genesis of the city, according to specialists, can be referred to the Marina district due to its proximity to the port [5]. The current urban conformation takes shape (obviously taking into account the changes that have occurred over time) in the medieval period, when Sardinia was divided into four Giudicati, one of which was that of Kalaris. According to the literature, the presence of a Castro Calari was already documented in the year 1002, referable to the presence of a fortified castle [6]. It would be the Castello district. The Stampace district, which stands at the base of the Castle, is described as an adjacent area, at the service of the Castle itself, inhabited by craftsmen and workers, also surrounded by walls and towers [6]. Its shape remained almost unchanged until the beginning of the 19th century when the widespread desire was to tear down the walls that defined its perimeter, and the need to be part of a new modern post-industrial culture was strong enough to influence changes in the urban layout of the district, the result of which is a complex reading of its architectural vicissitudes, between the dense historical agglomeration, the nineteenth-century expansion, the railway and its appurtenances [5]. With the construction of the convent of San Domenico, surrounded by orchards and gardens, the last of the historic districts of the city was created, precisely Villanova, developed starting from scattered cores with a peasant vocation, whose perimeter was defined by the fortification of the Pisans.

Its road and architectural structure is distinguished from other cities due to the unique arrangement in an irregular checkerboard pattern [6]. Its expansion is the most consistent due to the early demolition of parts of the walls that bordered this historic district, which took place between the 15th and 16th centuries (Fig. 1) [7].

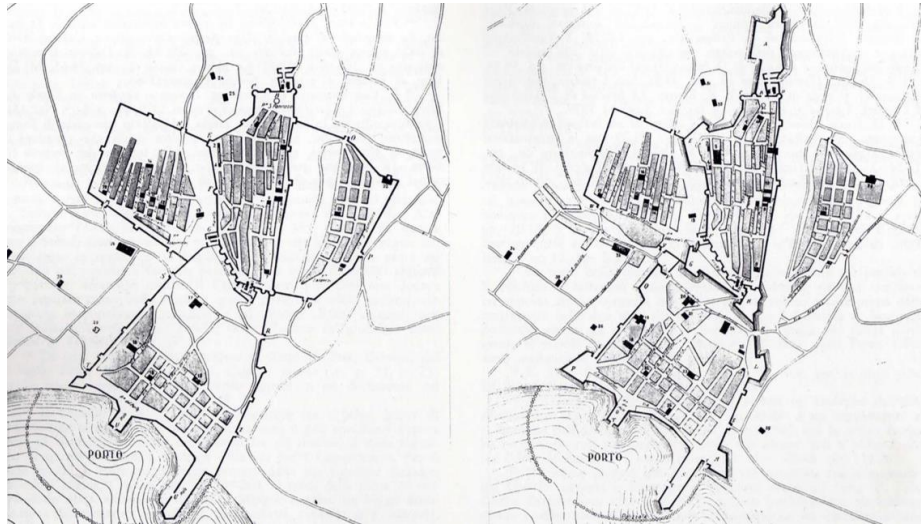


Fig. 1. Cagliari in XIV-XV century (left) and XVI century (right) [6].

The urban conformation of Castello district is defined and fossilized within the perimeter of the fortification walls (which here were not demolished even after the unification of Italy) which therefore, limited its expansion and guaranteed the conservation of the historical fabric. The bombings of 1943 changed this balance, given that many of the representative buildings, such as the town hall, were also moved to the lower part of the city between the districts of Stampace and Marina [5]. The latter, in the same period, progressively increases its expansion and, by the end of the seventeenth century, it will reach the consistency that it will maintain until the modern era [6].

Due to war strategies, the city of Cagliari finds itself playing a central role in the Italian panorama. In the aftermath of the outbreak of the Second World War, air and naval defense outposts were set up in Sardinia in order to intercept the Allies transits (and who had consolidated their presence in North Africa) through the Mediterranean Sea. The initial enthusiasm vanished as the months went by and the bombing intensified [8]. The first test took place on 16th of June 1940 when French planes bombed the Elmas airport [9]. When the British bombed the city of Cagliari twice in June 1942, there was still a widespread belief that the war would have spared Sardinia. However, in February 1943, in the frame of twelve days, the city and neighboring towns were shaken by heavy bombings with the consequent loss of hundreds of citizens and the devastation of a huge number of buildings. On 7th of February the Elmas airport was hit first; on the 17th of February the bombs exploded between via Nuoro, viale Bonaria, viale Diaz, the church of San Michele a Stampace, Castello, and the railway station, where there was a real massacre. The goal was to isolate the city from the rest of the island. On February 26th, 50 tons of bombs were dropped on the city of Cagliari on Castello, Stampace, and Bonaria (a district bordering Villanova). The scenario described following the attacks on the central districts of the city on 28th of February includes gutted buildings, compromised road, railway and port infrastructures, churches and convents reduced to

ruddle. After the bombings of other emblematic buildings, such as the civic market, the town hall, Palazzo Villamarina, the headquarters of the police station and again the railway station in via Roma were hit. On March 31st, the largest formation ever seen up to that moment was deployed on the Mediterranean Sea [10], in order to attack the port of Cagliari and the nearby airports of Monserrato, Decimomannu and Villacidro. The bombs also hit numerous houses in the Marina district, the Piazza del Carmine and the respective church. Following definitive massacre that took place on May 13th, the city was reduced to a pile of rubble, after the districts of Stampace, Castello, Marina and Villanova, the convent and church of San Domenico, Santa Caterina, Santa Lucia were heavily hit.

By the end of May, 75% of the buildings had been destroyed [8]. Presumably, the attacks were targeted on buildings of a significant and monumental nature, both civil and religious, such as the churches of San Giuseppe, Sant'Anna, the Bastion of San Remy, Palazzo Valdès, Vivanet, the Civic Theatre [11]. The heavy attacks on the city of Cagliari were part of the strategy designed by the Allies to mislead Hitler and the German state, convincing him that the imminent ground invasion would take place in Sardinia after the fall of the bases in North Africa. The British army produced a series of false documents which ended up in Axis hands. The strategy was successful and, the Fuhrer was convinced that the attacks would be against Sardinia and the Peloponnese and this allowed the Allies to land in Sicily without hindrance [12]. The census of war damage to the urban layout, particularly in the districts of Marina, Castello and Stampace, returned the image of the devastation of the bombings. Damage affected the 36% of the buildings, out of which 862 were destroyed, 574 were heavily damaged, and 1073 slightly affected. In addition to that, roads and infrastructure were impacted [13]. The damage was so intense that some authors consider it to be among the most bombed cities in Italy during the Second World War [14].

3 Post-war reconstruction in Cagliari: operational approaches adopted

The events described in the previous paragraph illustrate the violence of the assaults against Cagliari in 1943: after the conflict, the city returned to the citizens deeply changed and in some cases mutilated. The destruction of the urban center required an immediate action which led to various outcomes.

In a preventative perspective, starting from the months immediately before the outbreak of war, new directives in the field of heritage protection had been issued, on a national scale, in order to limit the disastrous consequences of bombardments on built heritage. [15]

This activity required a significant commitment in terms of financial and human resources, directing huge funds for the record of heritage through surveys, cataloging and photographic collection of the existing monuments. The material produced during these activities could have represented a very relevant image of the original state of the places, even in the interest of a restoration process that often assumed a less rigorous nature. The reconstruction process started before the end of the war, according to an

emergency approach aimed at healing the psychological and material wounds inflicted by the conflict: the citizens themselves were engaged in clearing the rubble that remained of their city, determined to re-appropriate the urban spaces of everyday life. It should be noted that only a similar circumstance could have allowed the reconstruction of the city in such a short time.

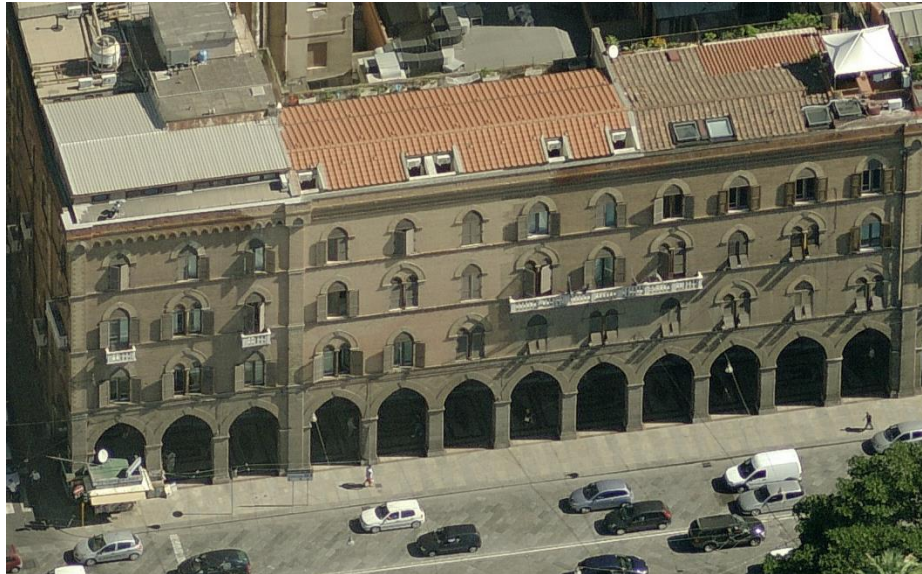


Fig. 2. Palazzo Vivanet [www.sardegnaeoportale.it]



Fig. 3. Scuola Satta [www.sardegnaeoportale.it]

The need to restore the essential services led to restoration activities often carried out by non - specialized personnel and without a preventive specialist evaluation of the

reconstruction criteria, just as the debate on the theory of restoration spread among the specialists of the sector on a national level. Even in the island context, the reconstructive issue is proposed in all its complexity, although the damage was less relevant compared to the other national realities.

Only in a few cases we can see an interesting attention for restoration: for example the intervention on "Palazzo Vivanet" and the "Scuola Satta", on the facades of these buildings the reconstruction of damaged parts using different materials is clearly visible, in full compliance with the criterion of recognizability of the intervention.

On the contrary, the monumental nature of the building would have suggested the stylistic restoration of the symbolic element of Saint Remy Bastion, subjected to an operation that still today makes it difficult to identify the additions. [16]

In Cagliari, the most important legislation about reconstruction was the "Piano di Ricostruzione", approved in 1947 and written in continuity with the instructions derived by the previous urban plan (1941) and the "Piano Costa" (1891). The explicit goal of the plan was to take advantage of military destruction in order to improve the services, the viability and hygienic conditions of the city and, in particular, of the historical districts. In fact, the intervention often started from speculative intentions related to the possibility of obtaining a greater income from the edification of the urban voids resulting from bombardments [13].

The war events carried aftermath overall the districts of the historic center of Cagliari, however the violence of the bombings has defined different situations.

Private buildings were often abandoned after the destruction and replaced by demolitions or contemporary architecture; even in via Roma itself, the institutional headquarters of Cagliari, the facades were scarred by the devastations of the bombs.

Beyond the damages on monuments, some major scars affected the urban tissue of all the four historical districts of the city (Villanova, Stampace, Castello and Marina).

In particular, in the Castello district some open wounds in the consolidated city have never found a solution suitable for Cagliari [17]. For instance, the monumental ruin of Palazzo Aymerich and the near Portico Laconi, between via La Marmora and via dei Genovesi, were destroyed by the bombs in 1943 and pending a musealization project since then.

Piazza Palazzo represents another unresolved area of the historical city center, a proper urban void, whose current configuration comes from the violence of bombardments: the main square in Castello district, already headquarters of the Palazzo di Città, and known for its valuable architecture, such as Palazzo Reale, Palazzo Arcivescovile and the Cathedral of Cagliari. The area is bordered to the north by the massive buttresses of the destroyed buildings, configuring an area almost crystallized in time and used as a parking because of immediate need rather than a defined planning idea [18]. Not even the religious buildings (although protected by specific symbols and preventive security measures [19]) survived the attacks of Second World War undamaged. Immediately after the bombardments, the superintendent Raffaello Delogu had to undertake a hard reconstruction process, dealing with the lack of human and economic resources available, as well as with the opposing opinions of the authorities. Delogu's proposals had to compare with the opinion of Sottocommissione Ministeriale, often chaired by eminent personalities like Roberto Pane [20].

Although the documentation stored in the archives about reconstructive operations appears to have shortcomings and gaps because of the emergential nature of actions, are known some works carried out by Raffaello Delogu. These works were led in order to guarantee the air defence of monuments (1940 - 1941) and the first interventions (1943 - 1946) and were carried out with workers and funds from the Genio Civile.

Interventions related to the clearing of rubble, recovery and consolidation involved the churches devoted to San Domenico, Santa Caterina, Sant'Anna, Sant'Eulalia, Sant'Agostino, San Saturnino, San Giuseppe and the Carmine church; several restoration works interested Palazzo del Governo, Bastione di Santa Croce, the church of San Michele, the church of Sant'Anna, the church of Sant'Agostino, the church of Sant'Eulalia and the Carmine church [21].

Of the church dedicated to Sant'Anna in Stampace only the facade and the bell towers remained, so Delogu used the photographic documents to establish a constructive dialogue with the Ministry, identifying the war damage as a chance to clear the building from the incongruous decorative motifs, according to the latest restoration theories [20].

The restoration of the Carmine church was characterized by a contrasting position of the Ministry. After the collapse, Delogu suggested a reconstruction of the building using the material present in situ. The Direzione Generale impeded both the reconstruction of the building and the replacement of the surviving elements, directing the project towards a modern construction [21].

Even the church of San Domenico, in the Villanova district, was affected by the bombings: the theme of the reconstruction opened a heated debate in the community, divided between a truthful reconstruction and an ex novo construction.

Despite an initial propensity to settle the surviving ruins in a garden area and to construct the church elsewhere, the church still lies in the same site, characterized by the features determined by the architect Raffaello Fagnoni in 1952.

A different approach was adopted towards the Santi Giorgio e Caterina church, initially located in Marina district and subsequently rebuilt, with different forms and styles, in Monte Urpinu.

The "how it was and where it was" reconstruction was not practical because of the damage severity, so the project was directed to a new construction, different from the old one. The religious emblem from the original church, the only element saved from destruction, is preserved and visible on the new façade [21].

In other cases the protection has left some open issues within the urban space, where some religious ruins remain, such as the ruins of Santa Chiara monastery, the Santa Lucia church in Marina district and the San Francesco cloister. The monastery of Santa Chiara was damaged so much that only the perimeter walls and part of the arches of the cloister were preserved, and the destruction is still perfectly visible to all the visitors [22].

However, the Santa Lucia church in Marina district represents an emblematic case of ruin mistakenly attributed to the outcome of bombardments, which actually hit very slightly the building, but deriving from a demolition project already assumed in the Piano Cima and carried out only in 1947 [13]. The referred project included the construction of a never realized square. Similarly, in the Stampace district the San Francesco church was demolished by the Municipality's decision in order to ensure some

unbuilt areas to be used for construction [23]. In recently years, the site and its evocative ruins have been involved in several valorization projects soon abandoned.

4 A reinterpretation of the largest war wounds of the city's architecture: some indirect damage of World War II after seventy years

The city of Cagliari, as previously mentioned, suffered considerable damages overall, so many that it is often considered as one of the most damaged among Italian cities. [24] Going into the detail of the deficiencies that the bombings generated in the city, we can generally point out not only a large amount of affected areas -for which a design solution for the reconstruction should have been found- but also the intensity of the damage.

Wounds that were never totally healed: *"the bombings of World War II caused gaps and stretch marks in the urban fabric, ancient and modern, increasing the number of "wounds" in the body of the city, and opening the long period of a difficult reconstruction, still unfinished"* [25]. And it is interesting to observe how such damages have generated critical situations in the architecture, which lead to various phenomena of vulnerability of the buildings, as indirect war damages, that can be observed after almost 70 years.

In the analysis here presented, some emblematic situations of current criticality in the architecture of the city have been investigated, by relating the critical areas currently encountered to the estimated damages in the post-war period and reported in the historical cartography *"Census of the destruction caused by war events"* [26], by identifying current critical issues or resolved situations, and by focusing in particular on the areas surveyed as the most damaged.

The cartography shows, with different colors, various gradations of damage and the buildings are classified as follows:

1. buildings damaged for a percentage between 76% and 100%;
2. buildings damaged for a percentage between 26% and 75%;
3. buildings damaged for a percentage between 1% and 25%.

For a need of synthesis, the investigated area corresponds to the historical center of the city, thus the expansion areas are excluded. Each of the three categories corresponds to a damage that we will define:

- high damage (corresponding to the previous point 1);
- medium damage (corresponding to point 2);
- slight damage (corresponding to point 3).

The attention was mainly focused on the areas with high damage.

To these three categories is added a white area, where the damage was zero. In this regard, the data reported here may be inaccurate in estimating the undamaged areas (due to the complexity of certain assessments of existing buildings and urban voids, during the war time). However, in general, we can estimate that from a total area of the historic center of approximately 650,000 m², approximately 43% of the buildings was

undamaged, while the remaining 57% was variously damaged: 18% had suffered from serious damage, the 14% medium damage and 25% light damage.

The nearest neighbourhood to the port (Marina) appears to be the part of the city with the lowest number of undamaged buildings; moreover, here we find the highest percentage of the “buildings with high damage” category. It must be said that, beyond the statistics, the scars and the outcomes of the transformations of the historic fabric are visible throughout the historic residential buildings of the city. It should be noted that the city however covered a limited area if compared to other Italian cities: we are talking about a town which at that time covered an area of about 2 km² with its built-up area, to give an idea, less than ¼ of the surface of Palermo. In other words, the whole town was close to one of the military targets, for example, of the port. The damage does not seem to focus on specific areas, but rather widespread and punctual because of the armaments used. The reconstruction responds to functional and economic needs, rather than adequate cultural approaches and planned operations, with rare exceptions. To simplify, we have examined each quartier and their main wounds -directly or indirectly connected to the war event- that the city still retains in its historical buildings.

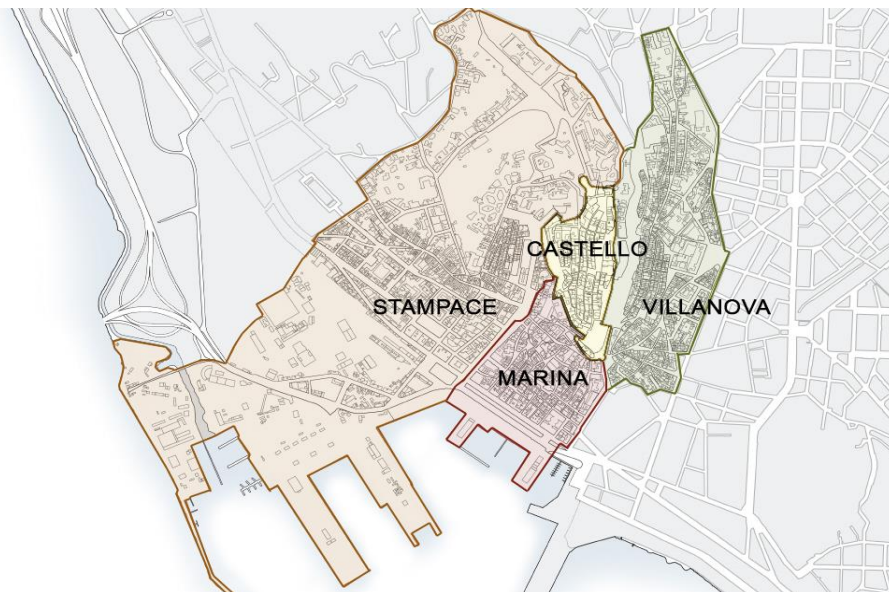


Fig. 4. The historical neighborhoods in Cagliari [LACHE Archive]

4.1 The neighborhood of Marina

In the neighborhood of Marina, the census of the damage done after the world conflict end records: only on the 29% of the built area, there were buildings not affected by damage; so, the bill was high, given that 71% of the surface of the city blocks had buildings that had suffered damage of varying intensity [27], as reported in the table below.

Table 1. Intensity of damage in the neighborhood of Marina.

intensity of the damage	square meters of surface	Percentage of the area damage versus the area of neighborhood
High	25'347,1	22%
Medium	18'227,5	16%
Slight	37'348,3	33%
Zero	33'272,9	29%

Starting from this analysis, comparing with the areas that are identified as public spaces in the Masterplan of the historical center of the city in force today [28], we can find a few areas in which there seems to be a correlation between the high level of damage suffered and the generation of spaces that have not been rebuilt.

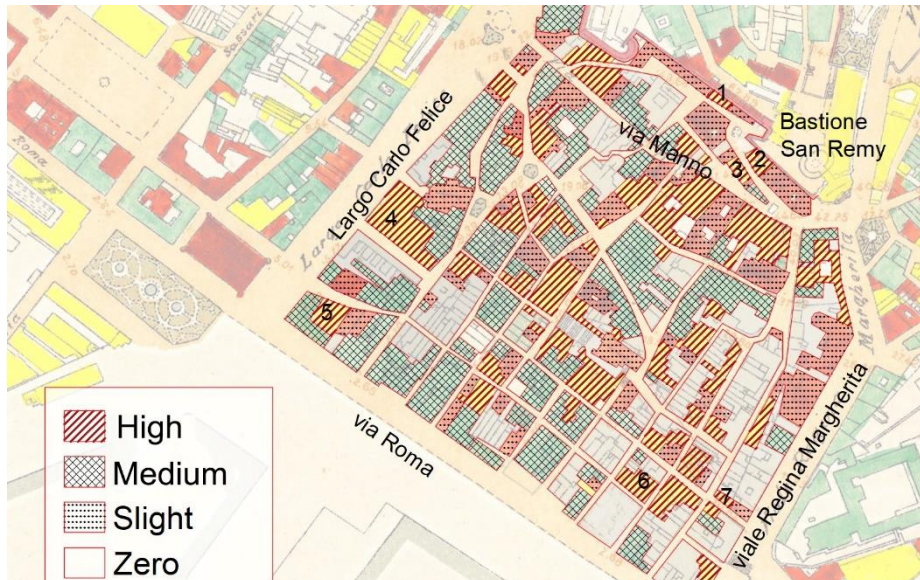


Fig. 5. The II war damage in the neighborhood of Marina (synthesis of historical cartography)

Starting from this analysis, comparing with the areas identified as public spaces, we can find a few areas in which there seems to be a similarity between the sustained high damage and the generation of spaces that have not been rebuilt. Later, it is examined how the reconstruction of some heavily damaged buildings was made.

For example, we notice that areas adjacent to the Bastion San Remy (classified with high damage), remain empty, and are now used for public parking. In the case of the urban void, in Via Spano (fig.5, n.1), the result of the bombing is visible in the stratigraphy of the walls, as the signs are visible both on the ramparts and in the adjacent houses: wall thickenings, buttresses, spurs, but also walled windows, reparations walls,

partial reconstructions of masonry and discontinuity of the molded frame of the bastion, are well observable features that report what happened.

The result is the presence of an urban emptiness, a vulnerability for other buildings, which has not found a total resolution with the adopted measures: it is observed in fact that the buttress appears here not to be sufficient to ensure the balance to the architectural building that was not thought to constitute the head of the block. Obviously, there is a correlation between the fissuring framework that is present today and the damage caused by the bombings occurred 80 years ago: we can call this the “indirect damage”. The buttress in the facade in front of the urban void has a lower height than the building itself, and this generates a particular criticality on the upper floor, where clearly there is a disconnection of the joints with hinge on the interfloor. It is not a coincidence that the lintel of the upper door, close to the cantonal, is propped up while, with further distance from the cantonal, the instability appears to be less and less worrying. (fig. 6)



Fig. 6. A building in front of empty urban

Similarly to this case, there are other occasions where the high damage of the building results in the maintenance of an urban void to give space to a parking area: for example, this is true for the area on Via S. Eulalia, in front of the steps leading to the homonymous church. Next to his staircase, a further urban void now hosts a small sports field.

On “Manno street” (via Manno), the gap is filled by a new single-level building (fig.5, n.3), which responds to the needs of the street and its mainly commercial use. In this road there are lots of buildings that replace the destroyed ones, both if the damage was considered of high or medium intensity. But the whole neighborhood appears to be dotted with new architectures, which simply respond to housing and functional needs, often with poor architectural quality and rarely interacting with the historic building style.

On other occasions the need for particular public buildings will make it necessary to operate in such a way that both the areas with highly damaged buildings and the less

damaged ones are sacrificed: this is, for example, the case of the “Regional Palace” (“Palazzo della Regione”), built in this area because was partly affected by urban voids caused by the bombs (Fig.5, n.6 and Fig. 7). In 1963 the process for the rebuilding began, and its first solution was rejected by the municipality due to the limitation the view of the Castle, until the end of the 1988, when the present building was inaugurated. The block behind, also affected by damage classified partially as high and medium, will give space to a volume which, once again, hosts parking spaces.

Reconstruction solutions often do not guarantee the safeguarding of the heritage that could still exist: new buildings often do not relate to the historical context, but instead, as mentioned before, they seem to respond to purely functional needs, even where there is the presence of monumental buildings, not simply residential ones.



Fig. 7. Palazzo della Regione (www.sardegnageoportale.it)

This is the case, for example, of the “Banca d'Italia” building, in “Largo Carlo Felice”, which was built on a highly damaged area, but which does not consider either the presence of the near church of Sant'Agostino [29], nor what re-emerged in the area from archaeological excavations [30] (Fig.5, n.4).

Similar assessments can be made about the building in front of it, which, even worse, doesn't appear to have been a reconstruction needed for the high level of post-war damage.

But the list of new buildings that struggle to relate to the historic fabric could be longer: the gap created on via Sardegna, next to the “Rinascente building” (built in the late 1920s, in a neo-mannerist style, with elegant marble cladding) is just one emblematic example (Fig.5, n.5).

Generally, we can observe how the post-war reconstruction has therefore paid less attention to the historical fabric, although what was planned in the reconstruction plan in this area and not implemented if not minimally, could have create a bigger loss of the historical architecture, particularly in the area mentioned here, where various blocks had to be totally removed to make space for new public housing buildings. [31]

4.2 The neighborhood of Castello

In the neighborhood of Castello, the census of the damage of the world conflict records as reported in the table below:

Table 2. Intensity of damage in the neighborhood of Castello.

intensity of the damage	square meters of surface	Percentage of the area damage versus the area of neighborhood
High	11'310,2	12%
Medium	18'117,6	19%
Slight	20'114,9	22%
Zero	43'374,4	47%

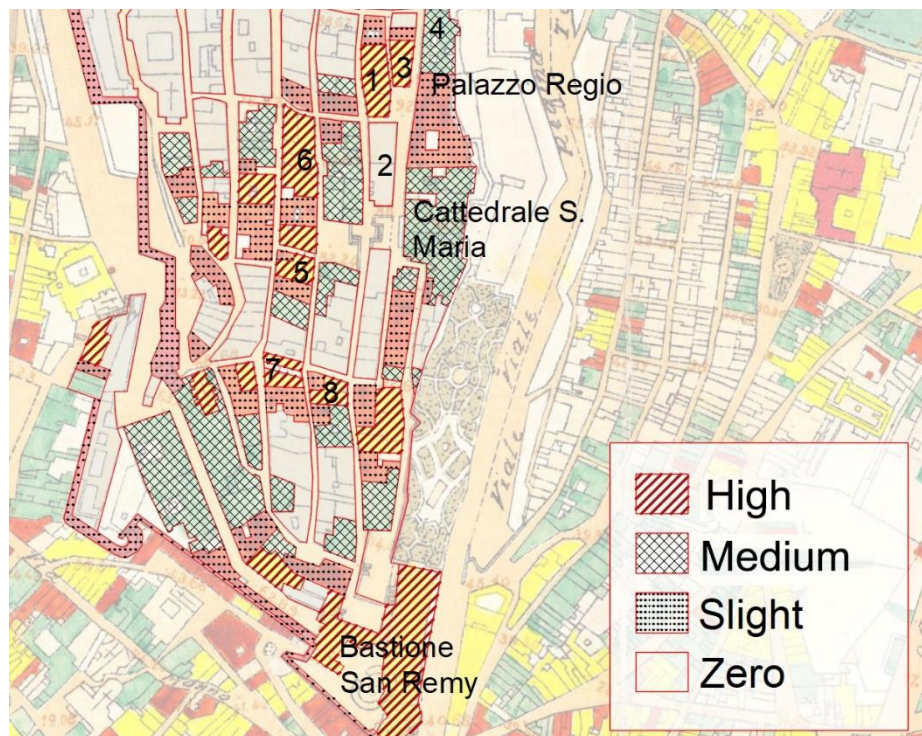


Fig. 8. The II war damage in the neighborhood of Castello (synthesis of historical cartography)

The case of Bastioni San Remy (fig.9) is emblematic, considering the monumentality of this architecture. The structure, built between 1896 and 1902, was classified as highly damaged by war bombing. Observing the historical images, the main elevation on Viale Regina Margherita was affected by a partial collapse: we can see the total loss of the central arch and part of the stairs on its right side. After the inevitable debate on the method of reconstruction, the gap was compensated, and without any distinction, the missing part was rebuilt in the years 1946-1948.



Fig. 9. Bastioni San Remy: before 1943, after damage, today (1st photo by <https://www.sardegnaigitallibrary.it/> and 2th by <http://www.sardegnaotterranea.org/>)

In this area the current problems do not derive directly from war damages: there are no static instabilities. However, there is a lack of a general strategy for the redevelopment of the center, now less and less inhabited and, consequently habitable: it is an area of marginality, where it is impossible to overcome the problem of continuous vandalism. Architecture often not valuable, creates uncomfortable situations whose consequences are also reflected in the architecture of value.

In other situations, the generated gaps are the occasion to create parking spaces (e.g. fig.8, n.1-3-6), a need that causes demolitions for the expansion on blocks without damage in other areas (e.g. fig.8, n.2) where buildings for public use and of great importance, such as the cathedral or Palazzo Regio, need to be reached by vehicles. Among these monuments are not lacking of attention to restoration, we find situations that are far from be resolved, such as buildings in a state of ruin like some of the constructions in the parking area on the north side (fig. 8) or, not far from the Cathedral, other buildings in a partial state of ruins and with a few parking lots (e.g. fig.8, nbs. 6, 7, 8); among them there are also buildings of a certain value, such as Palazzo Aymerich (Fig.8, n.7), the noble residence of a wealthy family of the city, which covers an area of approximately 670 m². Another one, Palazzo Asquer (Fig.8 front of n.5) was partly rebuilt, and its instability can be traced back to these two phases.

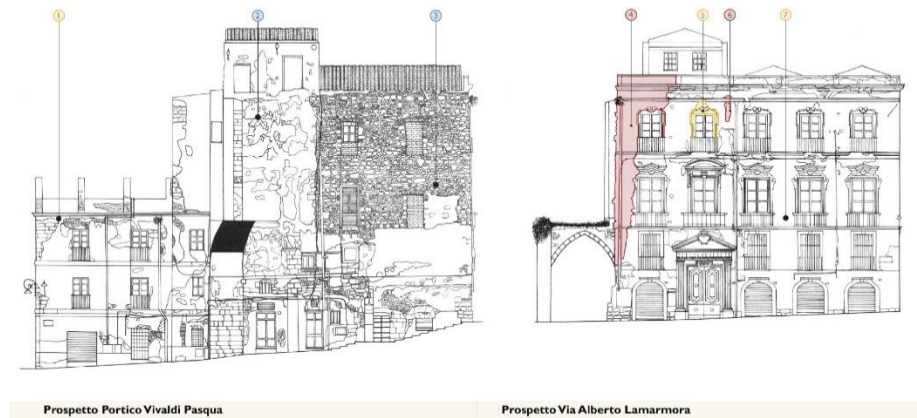


Fig. 10. Geometric survey of Palazzo Asquer [LACHE Archive]

Beyond the numerous cases that it could be mentioned, it is interesting to observe how overall the building transformation here seems to be more limited with the introduction of new dissonant architectures, probably due to the different needs of the neighborhood (where parking areas and squares are more needed than houses).

4.3 The neighborhood of Villanova

In the neighborhood of Villanova, during the II World War, the buildings were damaged as reported on the table below. The situation in the Villanova district (an example of which is shown in figure 11) appears to be not very dissimilar from the adjacent district, although the number of highly damaged buildings is slightly higher, and the figure relating to average damage is lower.

The historical images give back the complete picture of the damage which seems sometimes to have been overcome by erasing traces and reconstructing both the structure and the finishes in every detail. This is the case, for example, of Palazzo Valdes (on the map, fig.11, n.1 and Fig. 12), a prestigious building, built in two phases, first in 1894 and enlarged in 1905 [32]. We observe how the gap generated by the collapses affected a large portion of the building, particularly interesting for its geometry, with a curvilinear solution to connect the main and side elevations, in the decorative pattern attributable for the most part to the Art Nouveau style.

Table 3. Intensity of damage in the neighborhood of Villanova.

intensity of the damage	square meters of surface	Percentage of the area damage versus the area of neighborhood
High	49'967,7	20%
Medium	20'964,8	9%
Slight	56'010,3	23%
Zero	117'562,3	48%

There was no desire to denounce the rebuilt part, but today everything is unique and damaged by disfiguring writings on the base: this is the result of a failure to overcome the overall redevelopment of the city, which is also reflected in the most prestigious buildings. Another example of war damage in valuable architecture partially rebuilt is the convent of San Domenico (fig.11, n.2). The blocks near it or near the other church present here, the Church of San Vincenzo de' Paoli, are almost all highly damaged (fig.11, nn.3 -4). They are most of all unbuilt spaces, private courtyards, parking lots and small green areas, according to the needs of the church building complex. Not far from there (n.2) a new building was built, for the nursery school (fig.11, n.5).

For needs of synthesis, in general it can be observed throughout the district, where the housing need is a priority, the recurrence of complete replacements of the historic architecture with new buildings, and even here, they do not seek any integration with the historic fabric. Reference is made to the buildings on via Garibaldi and all around, even more because the real estate value is increased by the intended use of the ground floors in this commercial street. The situation on via XX Settembre is comparable, probably encouraged for being a border area, near the less compact city of expansion.

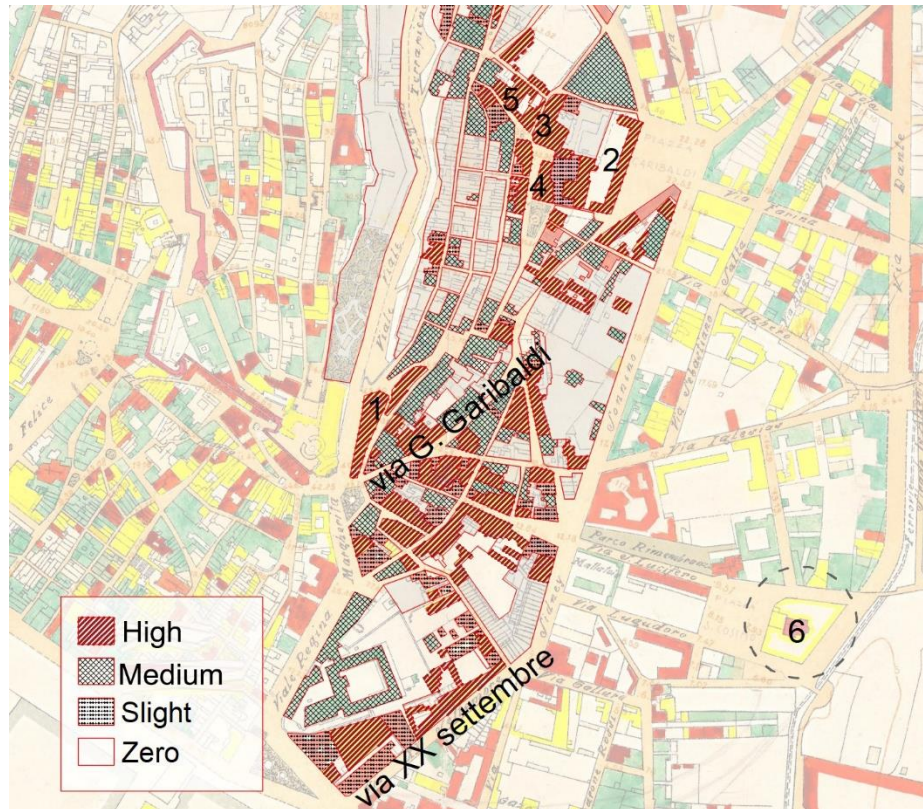


Fig. 11. The II war damage in the neighborhood of Villanova
(synthesis of historical cartography)

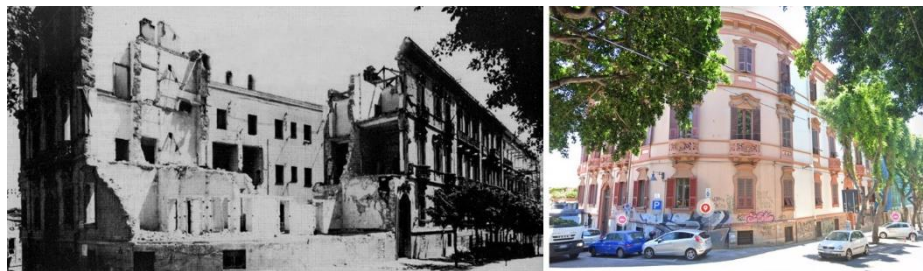


Fig. 12. Palazzo Valdes, Image after the 1943 bombing [<https://www.cagliariperimmagini.it/>]
and the building today [google maps] images consultation date 05.01.2022

Finally, the Basilica of San Saturnino, of Byzantine foundation, dating back to the 5th/6th century (fig.11, n.6) and located near this district, is worthy of mention. Already incorporated into the historic city since the beginning of the twentieth century, it suffered some war damages, and since then, a whole series of restorations have taken place, leaving many critical unresolved issues. Although we could discuss a lot about

this, it is interesting to observe how it underwent several collapses, despite the implementation of precautions to point out the damages (the collapse interested the barrel vault of the main nave, the large arch between the apse semi-dome and the central nave, and part of the side naves, except for the masonry). This was the opportunity not only to rebuild what had been lost, but a whole series of interventions led to the demolition of the eighteenth-century walls that blocked the large arches. From here arose a whole series of interventions that concentrated between the 70s and 90s, to find a solution for closing these large arches. The result is the positioning of large windows, which later will become the main cause of the vulnerability of the factory, generating degradation linked to excessive temperature and incorrect internal solar radiation, an issue still unresolved [33].

4.4 The neighborhood of Stampace

In the neighborhood of Stampace, during the II Word War conflict, the buildings was damage as reported on the table below.

Table 4. Intensity of damage in the neighborhood of Stampace.

intensity of the damage	square meters of surface	Percentage of the area damage versus the area of neighborhood
High	29'262,7	16%
Medium	33'125,4	18%
Slight	47'152,9	25%
Zero	77'278,8	41%

The Church of Sant'Anna [34] (fig.13, n.1) was highly damaged, as well as the block facing its right side: the church was restored while, in the other block, historical buildings were totally eliminated, and about in 1/3 of the surface new palaces without any architectural value were built. The remaining area has urban voids, where we find spontaneous green, with no serviceability, and also extended to the part of the block on which the structures surveyed as free of damage. The entire northern part of the district is characterized by new buildings (architectures which can be dated from the second half of the last century), which do not attempt to harmonize with the context, but only respond to functional needs. A different synthesis must be made for monumental buildings, such as the Post Office, in Piazza del Carmine (n.2) [35]. The building, built between 1926 and 1932, reveals no sign of this page of history. On the contrary, Palazzo Vivanet (fig.2 paragraph 3) clearly demonstrates the compensation for the gap. This last example, therefore, shows generally missing sensitivity that appears during any intervention of reconstruction carried out in the city.

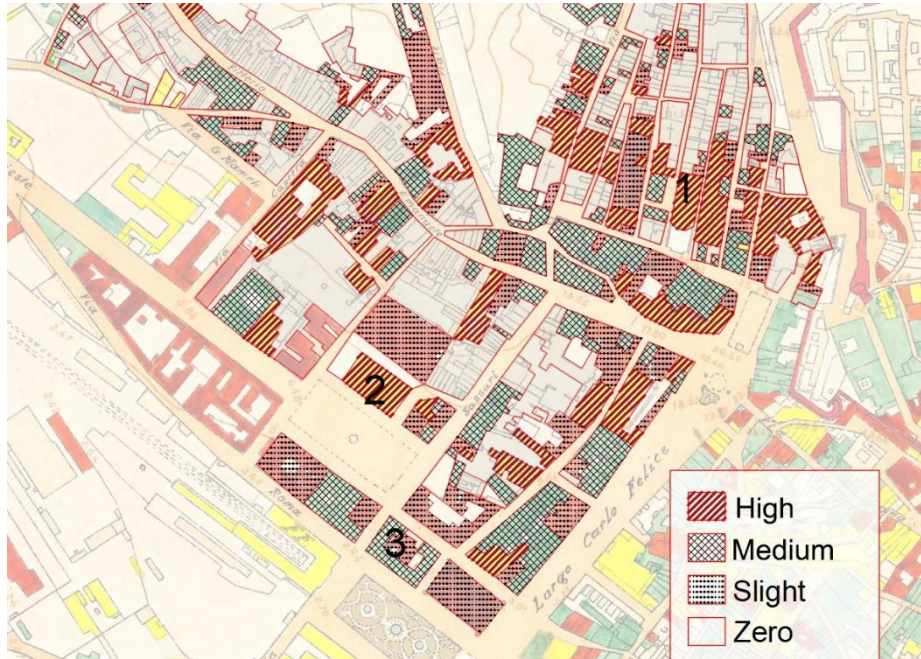


Fig. 13. The II war damage in the neighborhood of Stampace
(synthesis of historical cartography)

5 Conclusions

The study reported here has allowed us to observe some problems of the city examined, which can be connected to the war fought 70 years ago.

The problems encountered are linked to aspects concerning both qualitative features of the architecture and spaces, and structural questions of buildings close to some urban voids. These are the result of gaps directly or indirectly connected to the bombs, as their presence constituted a pretext for the abandonment of the historic architecture which resulted either in a collapse without restoration, or in new architecture, but rarely ended up in high quality improvements in a panorama of redemption and better rebirth for the city that was emerging from the war conflict.

The problems that can still be found today in the historic center of the city reflect the difficulties that were already present before the war, and which worsened during the conflict, such as the lack of infrastructure or the lack of resources. Just think of the threshold of the 80s, when there were still 60% of residential buildings without architectural features, considered habitable according to Italian legislation but that were houses often with precarious hygienic-sanitary conditions. [13]

On the other hand, there is a cultural aspect, which denotes incompatibility between interventions and the use of architecture: the newly built or the "unbuilt" are solutions that often do not meet the criteria of conservation and enhancement of the historic city. The recurrence of the problems generated by the devastation of war, Restoring or

Abandoning [36], along with their social consequences, is still reflected in the current difficulties of a non-redeveloped historical center with high housing standards and services. A better strategy of redevelopment of the historic center, would perhaps make it possible to reverse the trend of depopulation of areas, by making them be more attractive.

Based on this initial analysis, it appears necessary to find design solutions on various aspects, such as:

- for urban voids there is a necessity to important integrations to solve the structural problems in some buildings;
- it appears necessary to encourage good practices in life also for residents (such as stopping the use of the car inside the historic center), and to integrate services to solve the parking problem for everyone, also for potential future residents;
- to improve the historic architecture, preserving what is still valuable and reducing, as far as possible, the negative aspects of the buildings (both historic and recent);
- to think about various categories of inhabitants that can generate a real and sustainable economy for the city;
- to think about the needs of the inhabitants and design spaces for useful services for the residents, to get a good quality of life (do not use the center as a container for consumption).

Acknowledgements

This text is the result of a joint research between the authors, however the 1th, 4th and 5th paragraphs were written by M. Dessì, the 2th paragraph by E. Fara, the 3th paragraph by P. Piredda. The drawings referring to the thesis are marked with the acronym “LACHE Archive”: L. Marras thesis “War damage in Cagliari: restoration, reconstruction and abandonment”, Supervisor Prof. Arch. Bruno Billeci, University of Sassari, Department of Architecture, Design and Urban Planning of Alghero, A.A. 2017/2018

References

1. Miano, P.: Ruins of War and Project: A Comparison to be Renewed, in Architectural Restoration Notebooks (8-10). Comparisons, Restoration in the territories of conflict, pag. 48. Politecnica Publisher, Naples (2019) (In Italian)
2. The bibliography on post-war reconstruction in the national context is very vast, we mention, for example La Regina, F.: Like a hot iron. Culture and practice of architectural restoration. Cean, Naples (1995) (In Italian)
3. De Angelis d'Ossat, G.: Uncertainties and errors in the building reconstruction work. In: The new city, I, 3, pp. 13-28, Goerlich Publisher. Milan (1948) (In Italian)

4. Colavitti, A.M.: From the study of the ancient city to the safeguarding and redevelopment of the historic center of Cagliari, analysis and techniques for recovery. Pietro Valdès typography, Cagliari (2000). (In Italian)
5. Kirova T., Masala F., Pintus M.: Cagliari: the historical neighborhoods. Voll. 1 - 4. Editorial Silvana. Milan (1996). (In Italian)
6. Principe, I.: The cities in the history of Italy. Cagliari. Laterza publishers, Bari (1981). (In Italian)
7. Fiorino, D.: The cases investigated. Historical profile. In: ancient wounds and new meanings. Cagliari and the historic city. Gangemi publisher, Rome (2009). (In Italian)
8. Floris, F.: Sardinia of the twentieth century. Demos Editore, Cagliari (1997). (In Italian)
9. Melis, G.: The first day of war. In Brigaglia M., Podda G. (edited by): Sardinia 1940-1945. war, bombs, freedom, p. 31. Tema Publishing, Cagliari (1994). (In Italian)
10. Tognotti E.: A storm of fire. In Brigaglia M., Podda G. (edited by): Sardinia 1940-1945. war, bombs, freedom, p. 49. Tema Publishing, Cagliari (1994). (In Italian)
11. De Magistris P.: Life pulsed weak. In Brigaglia M., Podda G. (edited by) Sardinia 1940-1945. war, bombs, freedom, p. 64. Tema Publishing. Cagliari (1994). (In Italian)
12. Dessi G.: A spring day. In Brigaglia M., Podda G. (edited by) Sardinia 1940-1945. war, bombs, freedom, pp. 53-54. Tema Publisher. Cagliari (1994). (In Italian)
13. Santucciu, G.: The post-war history of Cagliari between urban planning processes and social conflicts, Giovanni Michelucci Foundation, Fiesole (2020).
[<https://www.michelucci.it/wp-content/uploads/2020/05/Santucciu-2020p.pdf>] (In Italian)
14. Fuggetta F.: Bombs on Cagliari: chronology of a massacre on (2009), <https://www.comunecagliarinews.it/> (in Italian)
15. Cajano, E.: The protection of built heritage before conflicts. The case of Rome in the 1940s. In: Architectural restoration papers 8 - 10. Compare. Restoration in conflict territories, p.56. Polytechnic Publishing, Naples (2020). (In Italian)
16. Kirova, T.: Absences and presences in the historic city. The case of Cagliari. In: Giannattasio, C., (edited by) Ancient wounds and new meanings. Stays and transformations in the historic city. p. 194. Gangemi Editore, Rome (2009). (In Italian)
17. Fiorino, D., Giannattasio, C., Scarpellini, P.: Suture of the urban gap. Unsolved problems in Cagliari. In: Esposito, D., Montinari, V. (edited by) Papers of the Institute of the History of Architecture, n.s. 73 - 74, 2021, Reality of architecture between matter and image. For Giovanni Carbonara: studies and research, Bretschneider's ERMA, Rome (2021). (In Italian)
18. Delogu, M.: The war emergency (1940 - 1945) - Measures for the protection of cultural heritage. In: Casagrande, M., Montinari, S., Passeroni, M. (edited by): Cagliari Fragile images, pp. 79 - 80, Gangemi Editore, Rome (2018). (In Italian)
19. Manzo, A.: The mutilations of bombs. The churches of Sant'Anna and of Saints Giorgio and Caterina. In: Casagrande, M., Montinari, S., Passeroni, M. (edited by): Cagliari Fragile Images, p.93, Gangemi Editore, Rome (2018). (In Italian)
20. Ingegno, A.: History of the restoration of monuments in Sardinia from 1892 to 1953. p. 339, Publisher S'Alvure, Oristano (1993). (In Italian)
21. Manzo, A.: The mutilations of bombs. The churches of Sant'Anna and of Saints Giorgio and Caterina. In: Casagrande, M., Montinari, S., Passeroni, M. (edited by) Cagliari Fragile Images, pp.92 - 93, Gangemi Editore, Rome (2018). (In Italian).
22. Margaritella, P.: Restoration project of the former convent of Santa Chiara in Cagliari. In: Giannattasio, C., (edited by) Ancient wounds and new meanings. Stays and transformations in the historic city. p. 393. Gangemi Publisher, Rome (2009). (In Italian)

23. Tramontin, A.: Possible transformations of use in historical-monumental areas: the convent complex of San Francesco in Stampace in Cagliari. In: Giannattasio, C., (edited by) *Ancient wounds and new meanings. Stays and transformations in the historic city*, p. 392. Gangemi Editore, Rome (2009). (In Italian)
24. Reference is made, for example, to the documentaries that were made on the centrality of the city, during the national strategy, for example see the documentary aired on the national channel RAI 3 (<https://www.youtube.com/watch?v=nL3hlbDSgDA>) [consultation date 01/12/2022].
25. Scarpellini P.: Wounds and breaks in the urban scene., in C. Giannattasio (edited by) *Ancient wounds and new meanings. Stays and transformations in the historic city*, Gangemi Publisher, pp. 60-61, Rome (2009). (In Italian)
26. Cartography kept in the Municipal Archive of Cagliari; published on the website: https://www.comune.cagliari.it/portale/page/it/1945__censimento_dei_danni_bellici?contentId=DOC141264I [consultation date 03.12.2022]
27. <https://www.comune.cagliari.it/portale/page/it/ppcs>. Reference is made to the classification reported in the previous paragraph, namely: high damage (there is a percentage of damage affecting from 100% to 76% of the building) - medium damage (between 75% and 26%) - slight damage (between 75% and 1%)
28. <https://www.comune.cagliari.it/portale/page/it/ppcs> [consultation date 01/12/2022]
29. For further information: <http://vincoliinrete.beniculturali.it>, ID. 189032 [consultation date 01/12/2022]
30. <http://vincoliinrete.beniculturali.it>, ID. 20716 [consultation date 01/12/2022]
31. Please refer to the Reconstruction Plan of the Municipality of Cagliari: https://www.comune.cagliari.it/portale/page/it/1945__piano_di_ricostruzione?contentId=DOC125746I [consultation date 10/12/2022]
32. For further information, please refer to the websites: <http://vincoliinrete.beniculturali.it/> e <https://catalogo.beniculturali.it> [consultation date 10/12/2022]; book: Masala F.: *Architecture from the Unification of Italy to the end of the 20th century*, series "History of art in Sardinia, number tab 34, Ilisso, Nuoro (2001). (In Italian)
33. Reference is made to the archival documents kept at the Superintendence of Cagliari. Degree thesis by D. Figus, *The early Christian basilica of San Saturnino: Historiographical and constructive investigation of the monument*. Supervisor: Prof. Arch. Bruno Billeci, Co-supervisor Arch. Maria Dessì, Arch. Alessandro Sitzia, Department of Architecture, Design and Urban Planning of Alghero, University of Sassari (Italy) A.A. 2019/2020 (In Italian)
34. Naitza S.: *Architecture from the late 1600s to purist classicism*. Ilisso Publisher, Nuoro (1992). (In Italian)
35. Masala F.: *Architecture from the Unification of Italy to the end of the 20th century*, series "History of art in Sardinia", Nuoro (Italy), number tab 62 Ilisso Publisher (2001). (In Italian)
36. The bibliography on this issue is extensive, a book is cited only as an example: Racheli M.A.: *Restoration and disasters. Countering the anamnestic forgetting*, Gangemi Publisher, Rome (2009). (In Italian)