

TEMPORARY CULTURAL FACILITIES AS AN ELEMENT OF REBUILDING STRATEGIES FOR CITIES AFFECTED BY EARTHQUAKES

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ABSTRACT

The Apennine Peninsula is one of the most densely-populated and most seismically active regions of Europe, possessing a wealth of cultural heritage. Historical cities and buildings are a part of this heritage. The earthquake damage prevention programme implemented in Italy does not cover existing buildings, and reconstruction plans for damaged cities, because of the threat's specificity, are always prepared after a disaster. In the case of heritage buildings, particularly those of super-local significance, decisions involving a complete reconstruction of their original form are typically made, erasing all traces of the tragedy. Reconstruction can take years, during which society is left without cultural facilities that are key to good morale. Opportunities provided by the phase between a disaster and restoring the buildings are too often underappreciated, while the time spent making the decision what and how to rebuild should be spent on action.

Strategies involving temporary buildings allow to prevent the disappearance of public functions during the period preceding the reconstruction of major cultural facilities. These buildings should be designed as resilient, assuming a capacity to adapt to changing conditions and upholding or rapidly returning to a functional state after a disaster. They can enable the time between the disaster and making the decision about reconstruction to be used to identify and test new relations in the surroundings created through the loss of a section of substance. They provoke a debate about what must be rebuilt and at what cost, they facilitate understanding of the goals of a planned reconstruction. But most importantly, they sustain the genius loci, in order to affect the city's reconstruction process in its social, psychological and economic aspects.

By analysing temporary cultural facilities built in Italian cities damaged by earthquakes, the study discusses methods of building temporary public buildings and features an attempt at assessing interventions that precede reconstruction. Based on the experiences of the city of L'Aquila severely damaged in 2009 and drawing conclusions from mistakes made during the implementation of pre-reconstruction strategies in the town, the author developed a proposal of a temporary intervention for the Basilica of St. Benedict of Nursia, which collapsed on the 30th of October 2016 as an effect of the Amatrice-Visso-Norcia seismic sequence. The proposal stresses the preservation of the previous function of the complex at its original site. This is meant to maintain the occupancy of Norcia's centre by the Benedictine monks, whose tradition is strongly linked with the city and makes it a major pilgrimage destination that is important to Christians. As a consequence, it is meant

to prevent the depopulation of the centre of Norcia and causing its ruination as a place.

Keywords: *resilience, post-disaster recovery, post-disaster reconstruction, 2009 Abruzzo earthquake, 2016/2017 Amatrice-Visso-Norcia seismic sequence, Basilica of St. Benedict in Norcia*

INTRODUCTION

3751 natural disasters (situations or events that overwhelm local capacity to withstand them, requiring external assistance at the national or international level; an event caused by natural forces that results in a great deal of damage, destruction and human suffering [1]) that have affected 2 billion people in various ways have been recorded over the past decade [1]. It is estimated that the combined losses caused by these events in 141 countries amount to 1658 billion USD [2]. As many as 315 disasters that have caused the deaths of 11804 people and economic losses estimated at 131,7 billion USD were recorded in 2018 alone. Among all of the disasters of 2018, earthquakes were the most deadly, being responsible for 45 % of all deaths caused by natural disasters [1].

The problem of seismic activity in Europe predominantly concerns the countries of the Balkan and Apennine peninsulas, with the problem being particularly severe for the latter because of its greater population density and the immense significance of its cultural heritage. The earthquakes that repeatedly happen in Italy cause major damage to urban development, particularly to heritage buildings, often of super-local significance. The high seismic activity recorded across the Apennine Peninsula, particularly in the area of the Central Apennines, is a result of the outline of the border between the Eurasian and African tectonic plates. The force exerted by the African plate on the Eurasian plate causes it to be affected by its lithospheric wedge, with the rate of this process estimated at around 4–5 cm per year [3]. The release of the stresses that are created in this manner, felt in the form of earthquakes, is sudden, which is why it is difficult to accurately foresee their occurrence.

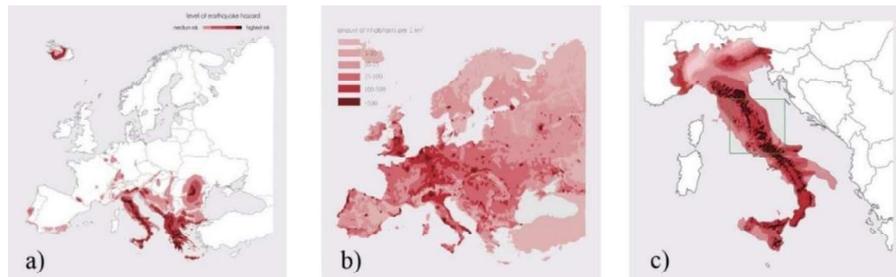


Fig. 1. a) seismic activity in Europe; b) population density in Europe c) seismic activity in Italy; Source: © A. Rogulska

The Amatrice-Visso-Norcia seismic sequence, which occurred between August 2016 and September 2017, struck an area of around 30 000 km² [4],

covering 11 provinces and 4 regions of Italy - Umbria, Lazio, Marche and Abruzzo. Because relief strategies are a part of regional planning, this generates additional difficulty in coordinating reconstruction efforts. Around 4000 Italian churches suffered to a varying degree as a result of the tremors [5]. Among others, all of the temples in the historical town centre of Norcia have collapsed, including the basilica of St. Benedict, which had been seen as an important symbol of Christianity and a local icon, a tourist and pilgrimage destination. Only its facade, along with fragments of the bell tower and apse have survived. The library adjacent to the temple, consecrated in 2003 by cardinal Joseph Ratzinger who would go on to become pope Benedict XVI, was also partially damaged.

Due to the symbolic dimension of the site of the birth and early life of Saint Benedict and Saint Scholastica, the need to lift up this exceptional temple and preserve the spirit of the place is mentioned very often in the discussion concerning Norcia's reconstruction. On the eve of the third anniversary of the basilica's collapse, a competition for the proposal of its reconstruction - which in itself can take several years - is still to be announced. The ruins of the building have been closed and fenced off; this raises concern about the continuity of public functions in the centre of Norcia until the reopening of the basilica and the loss of what we call *genius loci*.

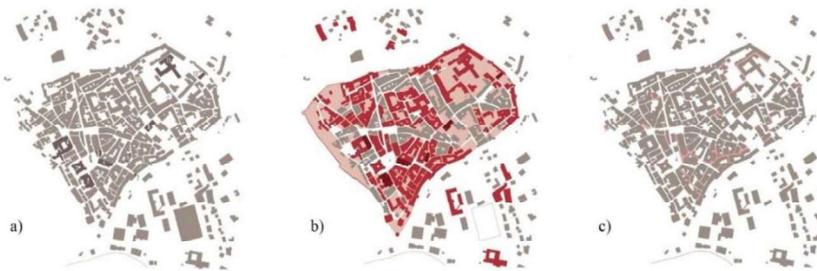


Fig. 2 a) structural plan of Norcia prior to 2016. Important public buildings have been marked using a darker colour; b) zona rossa—no access area—as of July 2017; damaged and closed buildings have been marked in red—important buildings that have collapsed have been marked in brown; c) zona rossa—no access area—as of July 2019; Source: © A. Rogulska

SHORT-TERM AND MID-TERM PRE-RECONSTRUCTION STRATEGIES

In Italy, post-earthquake reconstruction plans are always prepared after a disaster. This is dictated by the specificity of this threat - it is impossible to predict the magnitude of the tremors and the damage they will cause. Regulations concerning the securing of buildings for the event of an earthquake were introduced in 1981 [5]. However, they do not apply to heritage buildings. In the case of heritage sites, particularly those of super-local significance, the decision to rebuild their original form and erase the traces of a disaster is typically made. However, this can

take years, during which society is left without buildings that are key to maintaining the spirit of a place.

There is a specific system that societies use to react to disasters, called the emergency response cycle. It covers all the measures that are taken after a disastrous event, both immediately after it has taken place - in the form of rescue and relief operations - as well as long-term ones - recovery and reconstruction - in addition to efforts that are meant to prevent and alleviate the effects of these types of disasters in the future - preparedness [6].

The earthquake that affected Abruzzo on the 6th of April 2009 left the residents of L'Aquila both without a city in its physical sense, but also in the functional one. None of its numerous cultural buildings were fit for use. Expecting the reconstruction of the city to take years, it was decided to direct efforts towards upholding its musical traditions, trying to prevent the erosion of public functions. In a gesture of solidarity, the government of Japan gave the city a concert hall as a gift, with Shigeru Ban- an architect known for numerous projects built in places affected by natural disasters - invited to design it. Ban proposed a concert hall for 230 people, built from impregnated paper tubes, timber and steel. The building, which was opened on the 7th of May 2011, with an area of 700 square metres, fully temporary and easy to disassemble and relocate to a different site, was meant to facilitate the rapid resumption of music-related activity in the city [7].

Another important temporary cultural facility that was built so that public functions could be maintained in the city was the Auditorium del Parco by Renzo Piano, which was opened in 2012. Composed of three cube-like forms and able to accommodate 238 people, this temporary auditorium was erected on a seismic isolation platform, separated from the above-grade parts of its structural system using special dividers, which are meant to limit the transfer of vibrations to the upper parts of the building. The cube-like forms were built using a light skeleton structural scheme, while the facade was built from light timber elements, meant to facilitate acoustics on the one hand, and safety of use on the other [8].

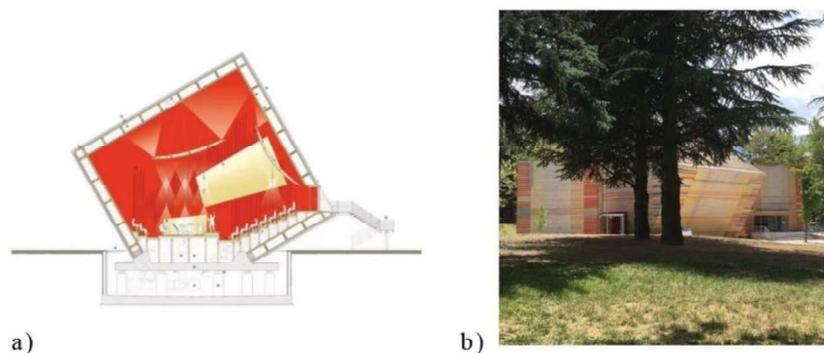


Fig. 3. a) cross-section through the Auditorium del Parco. ©Atelier Traldi. Source: <https://archdaily.com>; b) Auditorium del Parco, 2018. Source: ©Anna Porebska

The recovery-phase measures taken in L'Aquila have not avoided the mistakes of other interventions of this type [9]. Both the two concert halls and the C.A.S.E. and M.A.P. temporary housing programmes have been built at a significant distance from the historical town centre [9]. In the case of the housing programmes, the complexes also featured neither any form of public space, nor appropriate infrastructure and transport, resulting in the residents becoming isolated from the centre and causing it to remain one big construction site after as many as 10 years after the tragic events of the quake.

Insofar as rescue-phase measures should be focused on satisfying current needs, the relief and recovery-phase ones are far too rarely accompanied by any reflection on what must be rebuilt for whom and at what cost. Although it is not a simple matter, the time preceding reconstruction should be used to test out available reconstruction alternatives and assess their possible effects [10]. The opportunities provided by the phase between the disaster and restoring the building to life appear to be underappreciated.

In theory, the possibility of effectively utilising the phase preceding reconstruction to restore selected sequences of sites and establish temporary public buildings there does exist. It can provide users safety and to restore at least a portion of the public functions of the city. This type of strategy, although in a form that is not perfect, was applied using simple means after the 2009 earthquake in Bognara, Abruzzo [11]. This course of action, including through the use of newly-created spatial relationships, makes it possible to acknowledge the results of a disaster as an opportunity to Build Back Better [12].

Using this assumption as a starting point and drawing conclusions from the mistakes made during the reconstruction of L'Aquila, the author proposes a temporary intervention for the basilica of St. Benedict in Norcia that was destroyed in 2016 which is meant to serve the recovery phase of this historical Italian town.

BASILICA OF ST. BENEDICT IN NORCIA—CASE STUDY

The Basilica of St. Benedict in Norcia was built in the Gothic style in the twelfth century. However, it owes its contemporary massing to a later thirteenth-century extension. The building features a Latin-type cruciform plan with a single nave, covered with a gable roof supported by timber frames. Underneath the basilica there are original, three-aisle crypts with the ruins of a Roman house from the period of the Empire surviving inside; tradition claims it was the family home of St. Benedict and St. Scholastica, as well as their birthplace [13]. The monastery adjacent to the basilica had been the home of the Order of St. Benedict for centuries, as they were present there up to the beginning of the nineteenth century, when Napoleon closed numerous monasteries after taking Italy. For 200 years the post-Benedictine buildings stood empty until a community of the Order founded by Father Cassian Folsom relocated to Norcia in 2000 [13].

Over the centuries the basilica suffered damage multiple times because of earthquakes, e.g. in the years 1328, 1703, 1730 and 1859 [14], 1997 and lately in 2016, as a result of which a significant part of the building collapsed. Only the facade, elements of the bell tower, apse and crypt have survived. The matter of

reconstruction has stirred considerable emotion among Norcia's residents and Christians because of the high value of the building on many levels - on the one hand it includes its value as a heritage site, while on the other it is associated with the sacred and the location of the church atop the ruins of the home of Europe's patron saint. What is more, the church plays major role in the space of St. Benedict's Square - Norcia's central square - as well as that of the entire town.

The author's hypothesis assumes that introducing a temporary public building to the site of the ruins of the church of St. Benedict can aid in protecting the historical town centre from the erosion of public functions and can positively affect the long-term process of Norcia's reconstruction. Two elements should be stressed in particular: increasing accessibility and improving circulation within the cramped, historical urban layout, as well as structural safety. This type of intervention should take into consideration the need to clean up the plot and secure the ruins, particularly the church's facade, which is an indispensable element of St. Benedict's Square. In order to simultaneously increase the accessibility of the site, which is currently fenced off by standard security systems, modern parametric technologies should be employed that would allow the space around the basilica to be freed up. According to the concept of resilience, the structure to be introduced should be capable of adapting to changing conditions, as well as to either maintain or be able to quickly return to functionality after any disaster [11], [15], and in the case of suffering damage, it should not put human life and health at risk. This is why the design that illustrates the hypothesis features a light steel skeleton supported on a seismic isolation platform, with a facade finish composed of light timber elements. This form has been dictated by new visual and functional openings within St. Benedict's Square, its proportions, in turn, have been derived from individual elements of the narrow streets and buildings around the Square, thanks to which it will not be seen as controversial and can be positively received by Norcia's residents.

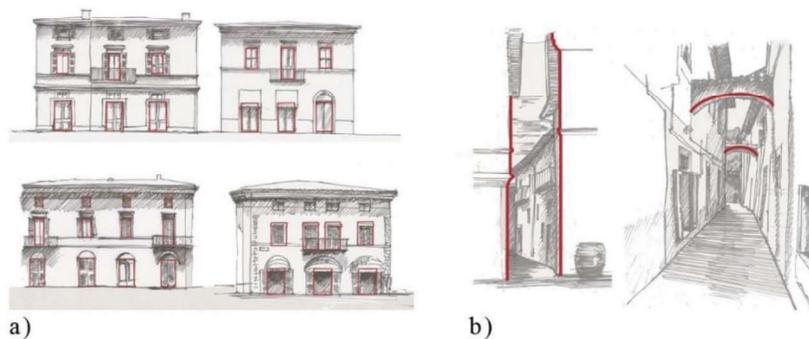


Fig. 4 Analysis of facade proportions and passage width within the tissue of the town. a) window opening sizes of the buildings around St. Benedict's Square, b) analysis of the proportions between the height of the buildings and the width of streets; Source: © A. Rogulska

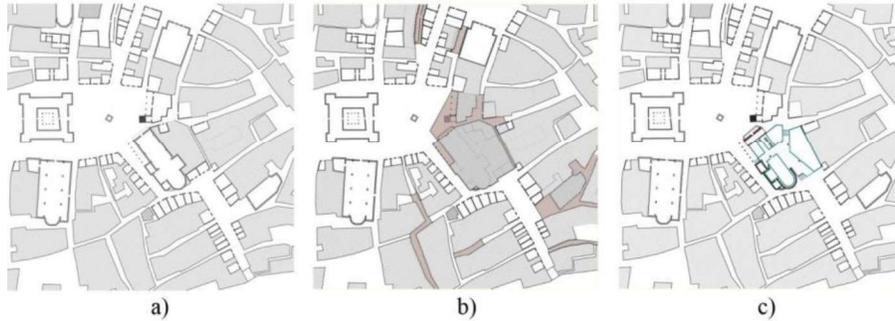


Fig. 5 Analysis of generally accessible spaces surrounding the basilica, inspired by Nolli's map of Rome from 1748; inaccessible spaces have been presented as solids. a) plan prior to the earthquake of 2016; b) plan after the earthquake, as seen in July 2019; c) estimated building accessibility after restoring the square; Source: © A. Rogulska

Acknowledging the activity of the Order of St. Benedict in the city as particularly significant to the genius loci, it was assumed that new massings should feature three forms of use associated with it: a library, a Benedictine brewery (providing the monks with a source of income and allowing them to collect funds to rebuild the monastery and the church), as well as a religious function, in addition to securing the entrance to the crypt. This can give us a chance to maintain public functions in the strict centre of Norcia until the church of St. Benedict can be rebuilt.

CONCLUSION

The introduction of a temporary public building to the site of the church of St. Benedict gives us an opportunity to maintain public functions and retain the presence of residents in the historical town centre until the time of its proper reconstruction. Placing a clear focus on safety of use, the design sets research on the path towards new, parametric, customized systems of securing heritage substance. As the example in question has proven, contextual architecture, one that draws on a reading of its surroundings, can be a model for measures to be taken during the reconstruction of a city after an earthquake, one of its undeniable advantages being that it is less controversial than attempts at creating new temporary icons in the place of old ones and is less anonymous than prefabricated containers. Contextual architecture, one that begins with reading the place and that utilises the proportions of its surroundings, existing axes, passage widths, the sizes of openings featured by surrounding buildings, gives the residents of the city - who have such strong emotional ties with the figure of St. Benedict and the historical church - a signal that a temporary building is not invasive and respects the extant context.

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