

IF SAFETY IS NOT ENOUGH. A MULTIDISCIPLINARY RESEARCH ON SEISMIC PREVENTION OF MUSEUM COLLECTIONS: THE MUSEOGRAPHICAL ANALYSIS.

Giada Cerri¹ and Francesco Collotti¹

¹ Department of Architecture (DIDA), University of Florence

Via della Mattonaia, 8 - 50121 Florence

giada.cerri@unifi.it, francesco.collotti@unifi.it

Abstract

The paper presents part of a work-in-progress research on earthquake damage mitigation for museum collections, focusing on the museographical aspects. The essay is part of the research project RESIMUS - Resilience Museums, developed by a group of researchers of DIDA of the University of Florence. We present two fundamental museographical tools: the drawing as an instrument of study, and the study of coherent museographical references. The paper tries to merge the literature on proper devices for the seismic reliability of artifacts and the updated museographical literature, in order to develop a framework where the seismic prevention comprehends the entire exhibition design.

Keywords: Museography; Exhibition design; Seismic assessment; Museum collection; seismic vulnerability

1. INTRODUCTION

As beauty as fragile, Italy is continuously chasing urgent situations and fixing damages provoked by natural disasters. The almost perpetual state of emergency had at least one “positive” effect: building a strong know-know in the management of the emergencies. Unfortunately, this did not activated strategic intervention programs to prevent such damages [1]. The aftermaths of the recent Italian earthquakes (Amatrice, Emilia, L’Aquila) have as a common denominator the huge damages occurred to the cultural heritage. Besides the destruction and harms to the historical buildings, impressive damages to collections and works of art were registered; losses that, according to ICCROM [2], may have consequences on communities. Other seismic countries and regions around the world present similarities, like Turkey, Greece, New Zealand, Japan, and California, to mention some. Museum institutions, research centers, and academics started studying mechanism of prevention to be applied to museum collections (on show and in the storages), and the sensibility about the fragility of the cultural heritage raised [3,4,5,6]. Unfortunately, there is a lack of quantitative and qualitative instruments allowing the seismic assessment of museum collections.

The paper presents part of a work-in-progress research on earthquake damage mitigation for museum collections, focusing on some museographical aspects. In section 2, it introduces the general knowledge about the seismic assessment of the movable museum collections. In section 3, we present the research project RESIMUS, RESilience MUSEums, of DIDA, Department of Architecture of the University of Florence. After a panoramic introduction about the RESIMUS methodology and the case study of the National Museum of Bargello of Florence, the article focuses on one of the employed tools: the drawing. We illustrate as the act of sketching is a primary resource to understand the architectural space and the museum setups, and how the drawing is used inside the RESIMUS research. In section 3.5, we underline the necessity of studying and comparing existing setups before proceeding with the design of new museum settings. We present some examples of museum exhibitions that have been built inside historical museum architectures, showing the importance of the study of the references. The article concludes with general remarks and outlines the future developments of the research.

2. SEISMIC MITIGATION OF MUSEUM COLLECTIONS: AN OVERVIEW

In 1983, the J. Paul Getty Museum in Los Angeles starts investing on the seismic mitigation of its collections. After the building analysis commissioned to Lindvall, Richter, and Associates [7], Aghabian, Masri, and Nigbor [8] begin testing the behavior of art objects in case of seismic events. They inaugurate a field of research, continued both internally at the Getty [9] and externally by other scholars [10]. In these years of testings, the dialogue between academic research and museum practice produces interesting results. Augusti and Ciampoli develop a method to index and rank the vulnerability of museum objects in case of seismic events. So far, the limit of this significant research is in its application and in the lack of quantitative instruments [11]. The studies concentrate on the mitigation of damages on singular artifacts (i.e. Prigioni by Michelangelo - [12, 13], Riace Bronzes, [14]) without considering neither the presence of close elements (works of art, objects, lighting, etc.) nor the whole setting. In his book [15], Podany sums up twenty years of findings and experiences on this matter. He draws the attention on the lack of a general analysis about the whole museum set-

ting, on the need of sharing knowledge among institutions worldwide, and on the necessity of close collaborations among academia, institutions, and professionals. Since the 90's, the Getty Museum starts applying upstanding anti-seismic procedures with remarkable results. The museum team successfully realizes some safety devices then installed in the museum galleries. The safety solutions change from object to object: big statues, for example, are arranged on isolator unit [16], medium vases are anchored to the bases with clips (small points of contact that constrain the movement without support), interfaces are used in case an object has an uneven base or a small point of contact (it requires a custom interface to distribute the load and a fastener to be secured to the base), and contour mounts are applied to objects with specific shapes. Other museums follow the Getty example starting installed anti-seismic devices, for example: the Archaeological Museum of Olympia installs a four friction pendulum system for the statues of Hermes by Praxiteles, the Tokyo National Museum displays ancient potteries on a large isolator base, while, in Italy the Michelangelo's Prigioni and the Riace Bronzes have isolators units. In New Zealand, the Christchurch Art Gallery Te Pan o Waiwhetu operates directly isolating the entire museum. The MUNDA - Museo Nazionale d'Abruzzo (National Museum of Abruzzo) collects the works of art recovered after the quake of 2009. This renovated building embeds the most recent and sophisticated anti-seismic solutions and the permanent setup is realized using anti-seismic devices.

The safety of collections concerns both temporary and permanent exhibitions. According to Podany, temporary exhibitions are the most exposed setups. With the exception of big exhibition events, temporary exhibitions struggle with low budgets and few resources, forgetting about the seismic safety. In general, it might be sufficient applying simple precautions [17], for example by inserting weights inside the vases and fixing the objects to the bases. Little but effective actions would prevent significant damages. On the other side, the awareness about the mitigation of the seismic risk of museum collection is lacking, although it should be considered as important as the anti-theft systems.

3. THE RESIMUS RESEARCH PROJECT: THE MUSEOGRAPHICAL ANALYSIS

3.1. The RESIMUS research project

In general, the systematic application of anti-seismic devices on exhibitions come after the seismic event, highlighting that, as said, a shared culture on protection of the movable heritage is missing. RESIMUS - (RESilience MUSEums) is a multidisciplinary ongoing research developed by scholars at DIDA - Department of Architecture of the University of Florence. The research efforts focus on the preservation of the cultural heritage and on raising awareness about the seismic hazard for museum collections and museums. To do so, we provide innovative responses to vulnerability. We try to understand the fragilities of museum collections and exhibitions, and last, we propose solutions that integrate both coherent museographical design and anti-seismic devices. One of the RESIMUS' goals is the progressive improvement of the museum display settings (updating the existing setups or replacing them), just like anti-seismic solutions are applied to buildings [18].

Although the presence of anti-seismic devices is not new in museums, their wide and wise application is missing. In the book *When Galleries Shake*, Podany highlights the lack of a document of analysis that allows a univocal interpretation of the various museum settings. He also reports the low level of coordination among institutions and research centers about seis-

mic assessment in museum. The research tries to fulfill these lacks and contributes to the general topic on seismic assessment and resilience of the ‘museum system’. The RESIMUS key strengths are the multidisciplinary approach and the close collaboration with museum institutions, one for all the National Museum of Bargello in Florence, Italy.

3.2. The RESIMUS approach

Within RESIMUS, we are developing a multidisciplinary methodology to analyze and rate the seismic vulnerability of museum collections and their setups. Such methodology is composed by several steps. First, we built up a form: a reasoned combination of pre-existing classifications, Augusti and Ciampoli, Ertürk and Sungay [19], Podany, and the one developed by RESIMUS. The goal is to test a universal simple tool allowing every institution to analyze its museum setting and to rank the seismic vulnerability of its exhibitions. The form is composed by three parts: 1) General report of the building and of the museum context; 2) Room form: a qualitative report for one room of the museum; 3) Object form: a qualitative report for one object and its display kept in the previous analyzed room (Room form). The sum of the Object forms of each room determine the level of vulnerability of that room.

In each museum, the spaces, the displays, and objects on view are different. Given the infinite variables we might encounter, we are customizing the form-filled qualitative approach in order to release a single universal form of analyses. At the National Museum of Bargello, we tested this system of analyses (form) on the Donatello room [20]. Following the principle of “learning by doing,” such application was a trial test and subsequent upgradings of the original form has been made.

What do the form tell us? Likely, the results will show the safest and the riskiest objects on show and the vulnerability of both the exhibition typologies and the rooms. Such results should make aware the museum of the level of vulnerability of its collections. The museum might use these results in a strategic way. For example, if it plans a refurbishment of one wing of the museum or to proceed with some restorations, it might start from the most vulnerable room or exhibition display. Lastly, we are improving a tool (form) that can be used to classify the level of safety of the museum collections and that can help in planning future decisions. Assuming the correct use of the form by a consistent group of museums, from Florence for example, with the sum of these results we can trace and rank the vulnerability of the museums of Florentine area.

The second step is the numerical analyses applied to significant artworks [21]. We started from the most vulnerable, or the most significant from geometrical or masses point of view. The seismic analyses bases on the rigid block with Finite Element (FEM) procedures and are applied on 3D models acquired during 3D scanning campaigns [22]. This phase comprehends also mechanical tests on materials [23].

Given the data and the findings acquired in these phases, the third step consists in improving existing exhibition setups or in designing from scratch new museum settings. The design is a combination of both anti-seismic solutions and museographical coherent design.

3.3. The preliminary phase: the drawing as an instrument of study

As anticipated, a fundamental aspect of the research is the study of the museum spaces and their setups. Following the analysis pattern, from general (the containers: the museum space)

3.4. The designing phase

The results coming from the analysis are functional to the third phase of the project: the re-design of an exhibition rooms (or the design of temporary exhibition). The multidisciplinary work tries to address further questions: can museum display be both safe and coherent, according to updated exhibiting criteria? Can museography integrate with seismic prevention and museum policies? How? We can answer to these questions through the design and realization of exhibition projects holding together: consistent curatorial program, anti-seismic devices, and coherent museographical project.

About the anti-seismic devices, in section 2 we saw some successful experience adopted by some museums (isolator base, clips, interfaces, contour mounts, etc.). We already stressed the fact that every object, collection, and museum is different and therefore, even if we use the same safety device, this has to be declined according to its site specific context. Moreover, our goal is to consider the whole collection of the rooms instead of one single object or exhibition device. It is necessary developing a museographical projects holding together all the aspects of an exhibition design.

Curators, architects and museographers, restorers, engineers, etc. are all involved and work as a team. Prior the designing phase, there is a further preparation step consisting in a review of the literature, prepared by each discipline and then shared among the group. Even when academics and professionals speak the same idiom, they could not “understand” each other because they use their specific vocabulary. Therefore, it is necessary building up a shared basic knowledge and establishing a common vocabulary.

3.5. Architecture and museography: the relevance of the references

As architects and museographers, our contribution is presenting outstanding examples to share with colleagues. In learning from the past and looking up to the future, we seek for some remarkable case studies, provide critical analyses of museum references, and study anti-seismic museum solutions.

Speaking of exhibitions, we start from the principle of displaying. The act of showing is apparently simple, but, as stated by Newhouse [24], is a powerful gesture. A display project is, or should be, made by carefully and pondered decisions. The art of displaying starts before the birth of museums. Let think about the rise to the Acropolis with the position of statues and of the architectures [25], the debate about the arrangement of the Michelangelo’s David into the Signoria square [26], the interior layout of the Renaissance *Studioli*, like the one of Francesco I de Medici in Florence, or, still in Florence, the setup of the Uffizi Tribuna. Both public and private spaces contains messages to be indirectly communicate to an audience. The way of arranging statues and paintings in the spaces changes during the centuries, according to the transformation of taste and social context; following this path we follow also the history of museum. Although before the birth of museums the position of the objects (we do not speak of works of art yet) followed political or personal basis, with the opening of the public museums the display starts following curatorial principles. Therefore, positioning the artifacts in the space requires a careful study and can not be an improvised act

In Italy, architects confront themselves with pre-existences and operate often inside historical architectures. The acknowledged capacity of some of them is link, beyond their specific skills, to the capacity of reading the sites, proposing measured solutions, and working closely with the curators. It is not by chance that the most successful display projects of the half of the XX century come from the collaborations between curators and architects [27]. Scarpa and Magagnato at Castelveccchio in Verona, Albini and Marcenaro at Palazzo Bianco and Palazzo Rosso in Genoa, BBPR and Baroni at Castello Sforzesco in Milan, Scarpa and Vigni at Palazzo Abatellis in Palermo are some famous examples. The refurbishment of the mentioned museums coincides with the Italian economic boom. In those years, temporary exhibitions became places of experimentation. New technological devices are tested and then commercialized, thanks also to the support of enlighten businessmen. Some prototypes become shops and home furniture; it is the case of the bookcase LB7 designed by Albini for the temporary exhibition *Scipione e il bianco e il nero* in 1940. The modular bookcase is used inside the Olivetti stores and then produced by Poggi and Cassina. Scarpa's projects are tailored examples. They enhance the hand-crafted abilities of the workers, express the respect to both site and art-pieces, and state his "obsession" for the details. If several Scarpa's remarkable solutions might be taken as references, other audacious outcomes are not suitable for anti-seismic setups. As an example, the sequence of the rooms that in Palazzo Abatellis conducts to the bust of Eleonora d'Aragona. Such sequence is a little lesson of museography: the position of the pieces in the space, the combination and choice of materials and colors, the arrangement of the objects in relation to the light sources, etc. Scarpa places the statues on tall and thin bases (concrete pillars, wooden columns, metallic wire) that, excluding the bust, are the extrusion of the bottom of the statues. Speaking of seismic vulnerability, by an external analysis, these configurations are weak from the geometric point of view: high center of the mass and slender forms. Obviously, to define the solidity of the display system we should investigate the kind of connection between object and base and the intrinsic features of the latter. To be precise, we should apply the study we pursue on the Ammannati's fountain at the Bargello [28].



Figure 2: C. Scarpa, Palazzo Abatellis, Palermo.

The outstanding setup of the Pietà Rondanini in the Castello Sforzesco in Milan by BBPR took into consideration the relationship of one piece with the collection, the room, and the site. The visit of the room was a journey inside the museum tour. The pieces along the room worked as introduction to the view of the iconic Michelangelo's work, the climax of the path. Once reached the top of the hall, the visitor walked along the semi-circular wall until discovering the marble: a kinetic approach. From 2015, the statue is in an other area of the castle, the Ospedale Spagnolo. The architect De Lucchi designed the new set up. The statue is placed at the center of an almost empty room, the base level of the marble has been lowered, and the entire room is dedicated to it. We passed from the discovery of the Pietà in an intimate space to the so-called one-man show setting. The new setup embeds all the recent exhibition technologies, from lighting to anti-seismic [29]. The case of the Pietà exemplifies as the display of a museum object is the resulting combination of curatorial programs, managerial choices, museographical approaches, and applied technological solutions. The inauguration of the renovated spaces of the Castello Sforzesco, including the relocation of the Pietà, was programmed jointly with the most important event of the year: the Milan Expo 2015.

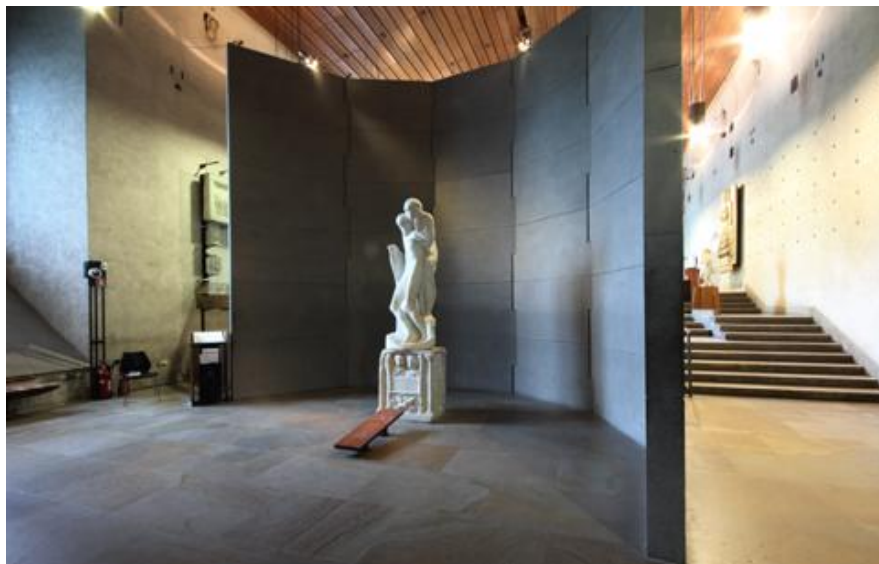


Figure 3: BBPR, The Pietà Rondanini by Michelangelo at the Castello Sforzesco, Milan.

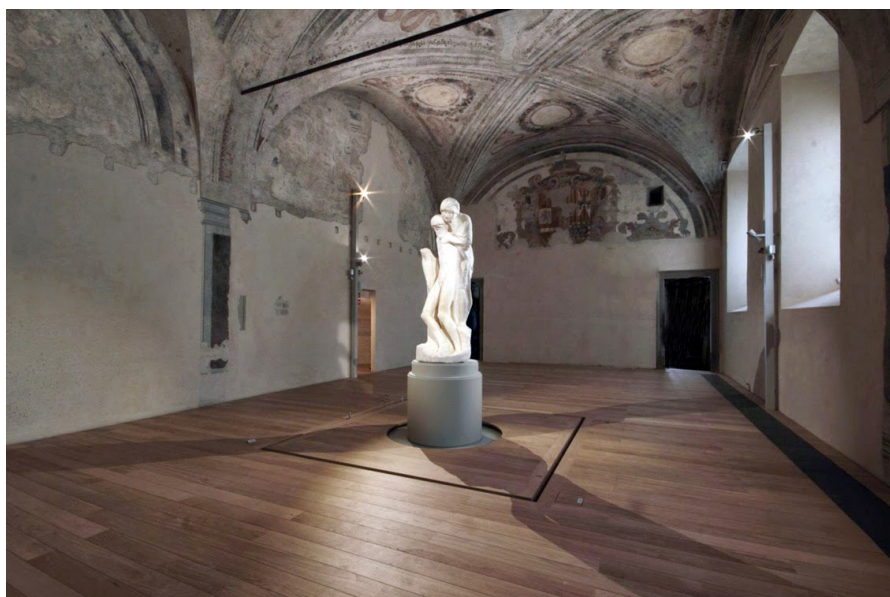


Figure 4: M. De Lucchi, the new set up of the Pietà Rondanini by Michelangelo at the Castello Sforzesco, Milan.

Although the fortunate season of exhibitions and experimentations come to an end, today we can profit of the possibilities that the agreements between academia and museum institution can offer. If practical experimentations are limited, in other words the possibility of using temporary exhibition as an experimentation field, we can use digital tools and technological devices to simulate and test possible solutions. Furthermore, we can profit of the presence of international networks composed by academics, professionals, and museums to easily share and compare results and experiences.

The presented examples are useful references for the Bargello's case because they exemplify a successful dialogue between the display and the historical architectures, and the ability in enhancing the collections. Though these references are mostly not anti-seismic, they are useful to understand the museographical approaches. In the next months, jointly with the National Museum of Bargello, we will decide which room of the museum will be redesign. At that point, and before the effective design, other suitable references will be deeply examined and other safety devices tested. It is going without saying that each collections need specific references. For example the setting up for big statues follows different exhibit principles and solutions than an armory room, or a design dedicated to textiles is not applicable to ceramics. Once defined the room, and with the support of the analysis form, we will start the designing phase.

4. CONCLUSION

In designing a museum setup, whether if permanent or temporary, the simple introduction of anti-seismic devices is not enough. It is a multidisciplinary team work that has to take into consideration several variables. A non recent document, edited by the French Ministry of Culture in 1986, suggests some useful guidelines for new museums. About the museographical aspects, it expresses few basic principles, still valid. For examples, "a wrong codification of the display could lead to serious dangers. In particular, one risk is the standardization of museums in a rigid way and the trivialization of the museographical display. A mistaken approach would destroy one of the richest quality of museums, their uniqueness"[30]. The text enhances the importance of the object and its preservation: "in general, everything should starts from the object and everything should put at the service of the object and its display. The general program of the exhibition has to be integrated with the evaluation of the "spatial potential" of each piece and its presence in the general scenography." From these pages we have the confirmation of the importance of the specificity of the site, of the link between object and place, of the respect of diversity, but also the necessity of a scientific program and of prior detailed study of the site and of the object.

The museographical analysis composes by two main tools: the drawing, as an instrument of study, and the study of the references. These two tools are necessary to develop a coherent and correct museographical planning that integrates with both the curatorial project and the technological anti-seismic solutions (together with all the other safety elements). The choice and the study of the references relate to the site, to the kind of collection, and to the curatorial program.

The next phases of the research RESIMUS foresees the development of an integrated project at the National Museum of Bargello. The project will follow the curatorial direction

and the results of the analysis coming from the compilation of the RESIMUS forms. The group will collaborate in designing the best and coherent display setting. The final outcomes of the research will be a detailed design for a room of the museum.

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