

Seismic Risk Assessment. The Case of the Exhibition “Di Tutti i Colori” in Montelupo Fiorentino, Italy

From Theory to Real: Conception, Project, and Realization of a Temporary Exhibition

Giada CERRI, DIDA – Department of architecture, University of Florence, Italy

Abstract: The paper is part of a work-in-progress research on earthquake damage mitigation for museum collections. It is part of the research multidisciplinary project *RESIMUS – Resilience Museums* developed by a group of researchers of DIDA – Department of Architecture of the University of Florence. Although the large acknowledgment on seismic risks, a shared culture on the protection of museum collections is still missing. The contribution focuses on some museographical aspects, precisely on the design of a temporary exhibition. It illustrates the application of the RESIMUS approach to the temporary exhibition *di Tutti i Colori. Racconti di ceramica a Montelupo, dalla “fabbrica di Firenze” all’industria e al design* (on show in Montelupo Fiorentino – Italy from March to September of 2019). The paper illustrates the preparatory phases of the exhibition, the strengths and weaknesses of the event, the adopted methodologies, and the outcomes. One of the research goals was to narrow the gap between academic theory and everyday museum practice. This exhibition represented the opportunity to raise awareness about the importance of the seismic risk assessment in temporary exhibitions.

Keywords: *Temporary exhibition—Seismic vulnerability—Ceramics—Museum—Best practice*

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1. Introduction

Earthquakes represent a threat to cultural heritage. Although a general awareness about the importance of anti-seismic measures is raising, this mostly concerns buildings and constructions. After an earthquake, the registered extensive damages to the movable cultural heritage triggered a reflection. Both academic and professional milieu questioned the possible applicable solutions to protect the content of museums, galleries, and churches. There is a wide body of literature about the seismic risk assessment of movable cultural heritage. This interests mostly big artifacts and the dynamic behavior of the objects. The Getty Museum of Los Angeles, USA, was a pioneer regarding the analyses of the risks for museum collections (Podany, 1991). Academic studies pursued a series of tests to forecast the scenarios of danger and therefore identify the best suitable solutions to avoid damages (Berto, 2012; De Canio, 2012; Liberatore, 2000; Ciampoli, 1992; Agbabian, 1990). Some museums, after experiencing uncountable losses, started applying anti-seismic devices to some objects

of their collections (Archaeological Museum of Olympia, Greece, Kobe Museum, Japan, Getty Museums, Los Angeles, USA) or constructing new anti-seismic museum structures (Christchurch Art Gallery Te Pan o Waiwhetu, New Zealand; MUNDA – Museo Nazionale d’Abruzzo, Italy). Although the large acknowledgment of the risks caused by a seism, a shared culture on protecting museum collections is still missing and the gap between academic literature and practice is wide.

The paper presents part of a work-in-progress research on earthquake damage mitigation for museum collections. It focuses on some museographical aspects, precisely on the design of temporary exhibitions. The next section introduces the research project RESIMUS, RESilience MUSEums, of DiDA – Department of Architecture of the University of Florence. The third section focuses on the existing protocols and measures about the seismic assessment of the movable museum collections, and the following one presents the application of the RESIMUS method to an actual case study: the temporary exhibition *di Tutti I Colori*. The article concludes with general remarks, highlighting the necessity of considering the application of anti-seismic measures inside temporary exhibition design as a good practice. In particular, it highlights the possibility of integrating both coherent museographical design and anti-seismic devices. The result is the progressive improvement of the museum display settings.

2. Seismic Safety of Exhibitions: Documents, Guidelines, and Protocols

Preservation, conservation, and enhancement are capital keywords in the museum field. International committees, museums, and cultural institutions collaborate to delineate common guidelines, standards, and shared protocols for protecting museums and museum collections from various risks. The text edited in 1993 by ICOM and ICMS, *Museum Security and Protection, A handbook for cultural heritage institutions*, was intended to be a general textbook with international standards and basic security procedures. Later, other texts have been released. One is *Running a Museum: A Practical Handbook* (2005) by ICOM, a compact manual born to be a reference book to those working in museums in Iraq. Given the universal interest of the topic, this has been customized to be a basic book dedicated to those working in museums. Other texts came along (Jalla, 2015), they all share the necessity of setting common parameters and procedures to protect, preserve, and enhance the cultural goods. In Italy, the text elaborated jointly by MIBACT, ICOM, and Carabinieri nucleo tutela patrimonio culturale (2015) represents the most updated document in this field. Although dedicated to the protection against theft, vandalism, terrorism, smuggler, etc., it proposes useful measures and suggestions on museum risk assessment. These documents are precious and necessary. Unfortunately, none of them dedicates to the seismic hazard. ICOM and UNESCO devote documents to the emergency and to the recovery after earthquakes, but not about prevention (Sendai, 2015; ICOMOS, 2014; HFA, 2013; 2007). Up to now, common sense, practice, and high expertise of the museum staff are the most effective preventive measures against earthquakes.

In practice, some museums have applied anti-seismic measures to some of their pieces (De Canio, 2012; Cigada, 2016). Unfortunately, these expensive operations commonly occur after the damages. Rarely, they are preventive acts (the Milanese case of the Pietà Rondanini is an exception). These interventions usually concern big or iconic artifacts, such as sculptures, and the application of specific technologies, like isolation platforms (McKenzie, 2007). The lack of specific norms and

prescriptions dedicated to the preservation of museum collections in case of earthquakes involves museums at both international and national levels. Norms and actions direct usually to the structure of the building (NTC, 2008) without considering the contents. The Getty Museums first tested some preventive measures to a series of objects of medium-little dimensions, becoming a pioneer¹ in the museum panorama (Podany, 1991). In the volume *When Galleries Shake* (2017), Podany presents some examples of safety solutions applied to objects on show: clips to hold vases to the cases, shaping mounts, special holders, weights inside the vases. He showed that little gestures, and limited money, sometime might avoid uncountable damages. The measures of prevention and protection of museum objects are essential to both permanent and temporary exhibitions. According to Podany (2017), in the case of an earthquake, temporary exhibitions are the most exposed setups. Besides, in certain geographical areas shakings of low-medium intensity might be frequent. They rarely affect the structure but can be dangerous to collections, causing extensive damages to objects and people. The lack of norms also affects the temporary exhibitions. In organizing it, both the lender and the host venue have to follow some procedures and restrictive protocols (London agreement – IEO, 2002). Among the several documents, the facility report comprises a form describing the spaces of the hosting institution (MIBAC, 2002). Each loaned object is accompanied by an ID form. This document lists the requested safety and conservation measures of each traveling piece, for example: alarmed case, specific hygrometric environment, temperature of the light, etc. (ICOM, 2014). If the hosting museum satisfies all the mandatory conditions, the loaning institutions give his clearance to proceed. The anti-seismic devices are not requested yet.

3. Seismic Risk: the RESIMUS Research Project

RESIMUS (Resilience Museums) is a multidisciplinary ongoing research developed by scholars at DIDA – Department of Architecture of the University of Florence. It focuses on the preservation of the cultural heritage and on raising awareness about the seismic hazard for museum collections and museums (Viti, 2018). The academic research team is composed by academics coming from different fields: museography and architectural composition, structural engineering, history of architecture, survey and new technologies applied to architecture. The team collaborates with professionals (geologists, restorers, museum curators, etc.) and museum institutions (e.g., National Museum of Bargello, Florence – Italy; National Archaeological Museum Gaio Cilnio Mecenate, Arezzo – Italy).

The main RESIMUS research project's goals are: preserving the movable cultural heritage, raising awareness about the seismic hazard for museum collections and museums, spreading the culture of seismic prevention of museum collections among the cultural institutions. To do so, the team provides innovative responses to vulnerability, understanding the fragilities of museum collections and exhibitions and proposing solutions that integrate both coherent museographical design and anti-seismic devices (Cerri, 2019). The first steps are the analysis and the rating of the collections. The data are obtained by filling in the RESIMUS form (a standard form customized by the RESIMUS team) and both experts and non-experts can complete it. This records the current situation of: museum building, one of the rooms, internal setting of that room, the typologies of the showcases, and

¹It is worth mentioning that the Getty Foundation and Research Center are partners to several museum and institution around the world located in other seismic lands

the objects. The analyzed results give the vulnerability rating of: objects, showcases, and rooms. After a phase of consultations (between the research group and the members of the museum team), the final goal is the design project (alternative layout or improvement of the existing setup). The challenge is elaborating projects that guarantee both safety and responsive behavior in case of a seismic event. Such operation increases the awareness of the museum about seismic prevention. The group tested this approach at the National Museum of Bargello, Florence (Cerri, 2019; Viti, 2018).

4. The Case Study *Di Tutti i Colori*

The design of the exhibition *Di Tutti i Colori. Racconti di ceramica a Montelupo, dalla “fabbrica di Firenze” all’industria e al design* was the occasion to apply the RESIMUS approach to temporary exhibitions and to test it. Before, the RESIMUS team used it in two museums (Florence and Arezzo) and on permanent exhibitions and on single artifacts (Cerri, 2019; Tanganelli, 2018; Viti, 2018).

About the exhibition: general information

The city of Montelupo Fiorentino is part of the metropolitan territory of Florence (Città Metropolitana di Firenze). Montelupo is historically important for the production of ceramics. The city gained its fortune thanks to the Medici’s dynasty that traded its ceramics around Europe and the Americas. After periods of low production, the place acquired new prosperity in the aftermath of the Second World War, when some kilns started collaborating with artists and designers. Today, despite of the crisis of the sector, Montelupo is one of the most important Italian ceramic districts. The Montelupo Museum Foundation manages the museums, promotes the local production, and conserves the historical collections. *Di Tutti i Colori* opened from March 6th to July 28th, 2019 and was set up in the *Palazzo Podestare* (Podestà’s Palace). The Palace is the hosting venue for temporary exhibitions and special projects curated by the foundation. This historical building used to be, in order, a civic palace (Podestà’s residence and then Municipal House) and the prior location of the Ceramic Museums. The building articulates on four floors, only two are equipped for exhibitions (ground and first floor). The follow-up of the exhibition dedicated to the Renaissance period was organized within the current Ceramic Museum.

The exhibition told the history of the local ceramics from the 13th Century to the current days (Mandolesi and Vignozzi, 2019). More than 120 ceramic objects narrated: the rise and fall of this ceramic district, the innovations and the new techniques, and the recent design experiences. Organized chronologically, the exhibition used the colors as a narrative thread. The ground floor hosted the ceramics from the 13th to the 17th Century, the first floor that from the 18th Century to nowadays, and a special section was dedicated to the ceramics for the table.

The visit began with an immersive space. Sounds, lights, and images transported the visitor in a suspended atmosphere, calling back the protagonists of the exhibition: colors, ceramics, and the city of Montelupo. The colors represented a distinguished element of this specific ceramics. The so-called traditional exhibition started after the introductory rooms. The exhibit design was intentionally simple. The concept of the exhibition was to present the ceramics in a suspended environment where the bright colors of the objects stood out on the neutral tones of the background. Light

semitransparent fabrics hanging from the ceiling were the leitmotiv of the design. The fabrics characterized the spaces and served as communicative supports.

The Design of the Exhibition

In general, the production of a temporary exhibition involves many fields and knowledge. The success of the event is given by the combination of the synergic work of many people with unique backgrounds and roles². The design of this exhibition was conducted as a whole. The solution was a combination of: analysis of the site and of the objects on show, coherent museographical approach, and adoption of safety measures. The budget was low and, since the beginning, the designed solution was intended to be: simple, economic, and seismically safe. Thanks to the studies conducted by the RESIMUS team (numerical and virtual models, testing labs, review of the literature), the range of the available safety solutions was quite clear. The difficulty of the operation was to combine such solutions, the design idea, and the materials already possessed by the museum. As anticipated, the concept of the exhibition design was to stress the narrative power of the ceramics (color, shape, decoration). The outcome was the combination of three elements: a flat platform, on which bases, and cases were arranged; the semitransparent hanging fabrics, to articulate the space and as a support of all the accompanying texts; the showcases. This represented a sort of basic module of the exhibition.

In exhibition design, the digital instruments are powerful resources. Here, they were used in two different phases: 1) management of the exhibition 2) immersive exhibition. First, the construction of the exhibition has been discussed upon a 3D model. The virtual model allowed the curators to visualize the work in progress design and to agree on the final result. The possibility of discussing on both two-dimensional and three-dimensional visualizations eased the dialogue within the group. The model allowed the general evolution control of the project, characterized by a high number of the pieces. The management of the pieces was handled with a relational database (FileMaker). Instead of polished renderings or sophisticated models, a light and easy-to-change model was used: SketchUP. Instead of having photorealistic renderings, the visualization has been realized through digital collages. Second, the immersive spaces were accomplished in collaboration with the studio Unità C1 Visual Environment. An animated ribbon, flowing on two walls, and a virtual decorative plate characterized the first room. The technology was simple: two projectors, music, and one digital video. In the second room, the projections directed on three walls, one of which was a mirror. The result was a digital elaboration and composition of pictures and sounds. Such immersive multi-sensory space worked as an introduction to the exhibition. Due to the typology of the exhibition, there was no need for advanced numerical digital calculations as applied in some RESIMUS research (Tanganelli, 2018, Viti, 2018).

² The realization process goes under five main steps: I) Feasibility (Idea, Feasibility - cost, resources, etc., Purpose Statement); II) Preliminary Design (Assembling the Players, Communication Goals, Rough Schedule and Budget, Research/Front-end Evaluation; Storyline/Conceptual Design/Formative Evaluation, Design the conceptual design or layout of the exhibit area, Describe the look and feel of the exhibit); III) Detailed Design (Script/Final Design/Formative Evaluation, Cost Estimating and Design Revisions, Communication design); IV) Production Planning (Final Production Schedule and Budget, Construction and Specification Documents, Promotion of the event); V) Production (Fabrication and Installation, Opening, Maintenance, Summative Evaluation, Exhibit Redesign/Adjustments, Disassembling). See: Smithsonian Institution, THE MAKING OF EXHIBITIONS, 2002 Capital Heritage Connexion <https://www.capitalheritage.ca/plan-design-exhibition/>; Eventually, there should be a sixth phase in the case the exhibition foresees a follow up or animation during the time of opening.

The Seismic Risk Assessment of the Exhibition

The challenge of the design operation was foreseeing a low seismic risk assessment of the exhibition by applying anti-seismic devices. As for the general design, the anti-seismic devices were included in the initial budget. The goal was to gain the greatest of the result with the least expenditure. From a conservatory point of view, ceramics is a simple material: it does not suffer from high or low temperature, light exposition, and specific hygrometric conditions. The only threat is the dust. The risk assessment for the ceramic exhibition concerns: theft, accidental hazard, and natural disaster. The first two risks depend on people and are solved by applying standard procedures (described in the procedure of loans). The natural disasters are rare, not predictable, and rarely considered. The adopted solutions followed Podany's prescriptions and suggestions and derived from the RESIMUS studies. About the seismic risk assessment, the evaluation of the risks depended on: geometrical configurations, typology of the objects, and goals (Tanganelli, 2018). In this exhibition, specialized calculus and advanced models were ineffective. Thus, the expeditious approach was identified as the best option (low cost and effective). The prediction of the risks was expected using the RESIMUS form. Instead of having self-standing bases, the project foresaw the fixation of them on large platforms. The platform worked as a stabilizer, preventing the movements of sliding, rocking, and overturning. Such system worked as one structure.

The white platform had the functions of: absorbing the vibration in case of an earthquake, working like a distress pillow; being a braking distance, avoiding the necessity of other physical solutions (barriers); being a sort of continuous white path. The platforms had variable extensions (depending on: the site specific location, the typology of the room, and the specific objects on show). The showcases, already possessed by the museum, were placed on top of the platforms. To maintain an adequate level of protection, the adopted solution was to fix the cases to the platform, avoiding or mitigating the risk of rocking, overturning, and sliding. Some of them were open, others locked by a transparent case. Although plates, jugs, mugs, vases are light objects, they still need to be secured to the bases. Special fixing and removable wax, sacks filled by sand, and specific mounts were used. As said, little but effective actions would prevent significant damages. The sum of all these actions diminished the risk level of the exhibition.

The realization of the exhibition

Unfortunately, some events modified the planning and the project. In particular, a budget review and some mistakes in general management caused major delays. Running close to the opening, a series of cuts and simplification of the projects were made. Although unpleasant, it is a recurrent situation in these kinds of events. The effort is finding doable compromises. The consequence of the budget cut was the reduction of the expenditure, like carpentry, so the platforms became flat panels. A series of delays and the move up of the press tour by four days before the opening caused the anticipation of the delivery of some of the loans. When the first objects arrived, the exhibition works were at the end but still ongoing. Once a loan is placed and locked no one can touch or move it (nor it or and its case). Thus, there was no time to fix all the showcases and the bases at the panels.

In spite of everything, the exhibition opened in the right term, received good critics and reviews. It was visited by a discreet amount of people and both the Foundation and the Municipality (the organizers) were satisfied with the results. Unfortunately, safety measures were not fully applied. This was

a lost occasion of realizing the first complete anti-seismic temporary exhibition. Without preventive devices, the exhibition had not a low level of risk.

5. Conclusion

Delays, complications, obstacles, and errors might occur during the setting up of an exhibition. Usually, these are solved applying contingency plans. Unfortunately, the elements not prescribed by law and perceived as superficial might be cut off to save money or to hurry up. Such choices complicate the process of assessing the risk level of the setups. Therefore it is important to have codified and shared guidelines about the protection of the collections, also from earthquakes.

The case of the exhibition is useful for the RESIMUS project for several reasons: it is the first attempted test of the RESIMUS approach on a temporary exhibition; it proposed and tested simple and low-cost solutions, which, in theory, every museum can adopt; it was the occasion for testing the different settings with and without the safety measures; the RESIMUS has been used also as a risk assessment form.

Although the digital technologies were not used in an innovative way, the novelties are the approach and the scope of the project. The exhibition contributed in raising awareness about the seismic hazard for museum collections. Although the application of the preventive measures did not completely succeed, the exhibition was the occasion to start defining a selection of best practices to share among museum institutions and international museum bodies (ICOM, UNESCO, etc.). One of the major goals of the RESIMUS research is to contribute to filling the gap in the museum policy framework (e.g. safety guidelines, emergency plans, etc.) in both national and international contexts. The case of the exhibition *di Tutti i Colori* represented an important unique field of experimentation.

Quoting Podany (2017), “we cannot yet predict or control the inevitable earthquakes, but the damages resulting from their forces can be reduced. We should begin.”

Figures

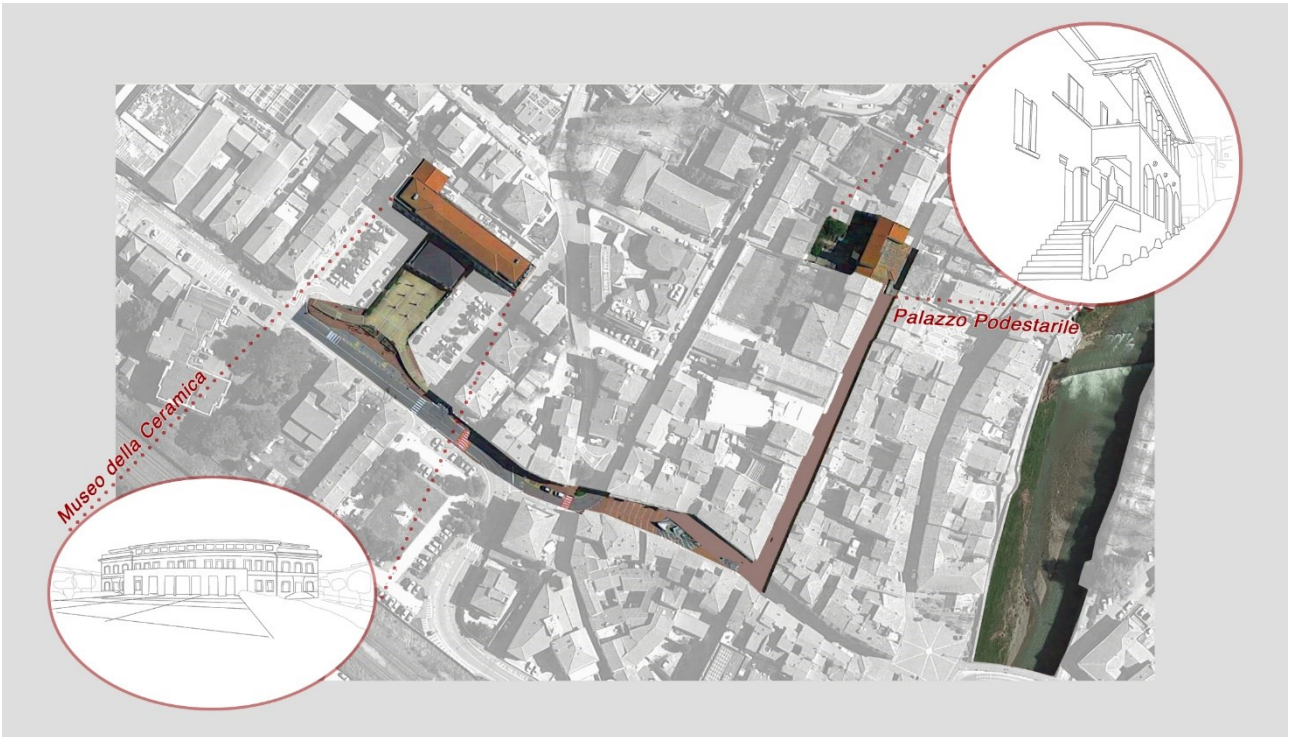


Fig. 1. Venues of the exhibition (© Giada Cerri)



Fig. 2. Concept of the exhibition design (© Giada Cerri)

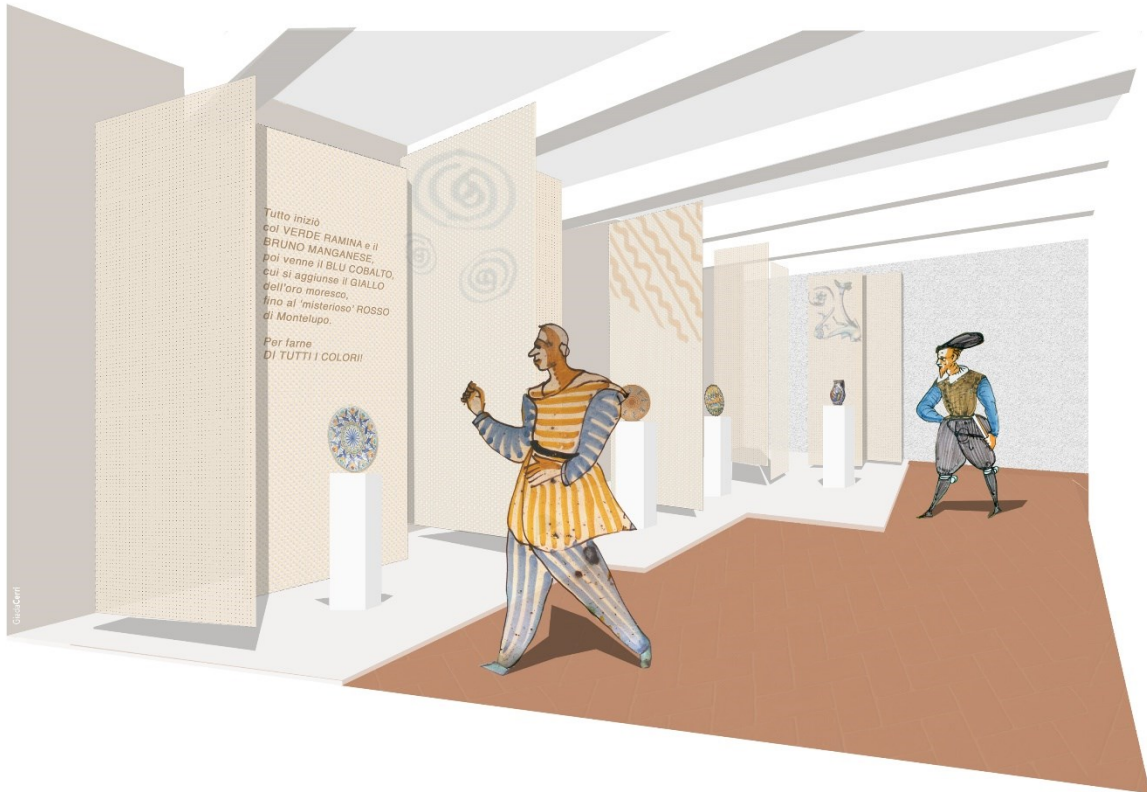


Fig. 3. Maquette of the exhibition design project (© Giada Cerri)



Fig. 4. The exhibition, ground floor (© Anna Positano)

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