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SEISMIC PROTECTION OF MUSEUM COLLECTIONS: LESSONS LEARNED AFTER THE 1999 EARTHQUAKES IN TURKEY (1)

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1. This paper is based on the author's post-doc research entitled "Reducing Earthquake Risk to Museum Collections in Turkey" which was conducted in support of the Turkish Cultural Foundation between October 2008-May 2009.

Turkey has a long history of large earthquakes in three major fault zones that place two-thirds of the country. Following the two major earthquakes that struck the nortwestern part of Turkey in 1999, several attempts have been taken at hospitals, schools or administrative buildings. The two earthquakes prompted museum professionals and policymakers to consider measures to protect museum collections as well as buildings against earthquake. After the 1999 earthquakes, various projects, scientific researches, trainings and meetings were and are still being held on the seismic protection of museum collections and there are ongoing efforts. Seismic protection of museum collections is a relatively new topic in Turkey. Although the subject is on the agenda of museum professionals or engineers in some of the earthquake-prone countries such as USA, Japan, Greece, Italy and India in more than three decades, it is not represented enough in the world preservation/conservation literature. The paper aims to provide information about the challenges faced in Turkish museums before the 1999 earthquakes, and mitigation efforts taken at national and institutional levels in the last decade. The data is complemented with two questionnaire surveys, as well as literature review and observations. It concludes with suggestions that might be applied to other earthquake-prone countries which have similar problems. The paper provides an input to the literature through the examples of mitigation efforts in Turkish museums and suggestions for future actions.

INTRODUCTION

There are more than 42 million links on the internet related to the word 'earthquake', which are mostly about houses, schools, hospitals or historical structures. While a great deal of effort has been spent to protect historical buildings, structures or museum buildings against earthquake, and all these efforts which have been represented in the preservation/conservation literature, seismic protection of museum collections have

mostly been inadequate. Nevertheless, the J. Paul Getty Museum along with the Getty Conservation Institute (GCI) have been the pioneering institutions in conducting scientific research and developing mitigation methods for more than three decades, and have had many contributions to the literature. Meanwhile, International Council of Museums (ICOM), International Centre for the Study of Preservation and Restoration of Cultural Property (ICCROM), International Committee of the Blue Shield (ICBS) and United Nations Educational, Scientific and Cultural Organization (UNESCO) play an active role in the post-disaster recovery of museum collections and buildings. Furthermore, list of damaged museums, their photographs, as well as damage assessment reports can be found through ICOM Disaster Relief Task Force (DRTF) webpage (**2**).

2. http://archives.icom.museum/disaster_relief/.

In the case of Turkey, earthquake was not accepted as a threat for museum buildings until the 1999 earthquakes, although it has been the most devastating disaster throughout the history of the country. Before the 1999 earthquakes, there was a few number of seismic mitigation work and scientific researches conducted by Boğaziçi University, Kandilli Observatory and Earthquake Research Institute (KOERI). These were; earthquake vulnerability assessment of the Hagia Sophia Museum in İstanbul, as well as the determination of the seismic protection methods of objects on display. Information was limited to the number of deaths, injuries and collapsed buildings such as schools, hospitals or mosques, and there were no news regarding museum buildings, collections or any kind of cultural heritage properties in the area that had been destroyed due to earthquakes. In this respect, the 1999 earthquakes can be accepted as a milestone on the seismic protection of museum collections. Many initiatives such as projects, scientific researches, trainings, meetings or collaborations among institutions have started after the 1999 earthquakes, and all these attempts are successful in drawing attention to the earthquake vulnerability and risks of museum collections as well as buildings; however, there are still many things which need to be done.

This paper provides information about the seismicity in Turkey and an overview of Turkish museums from the perspectives of earthquake awareness and seismic protection of museum collections. It summarizes the situation of Turkish museums prior to and after the 1999 earthquakes, and outlines the initiatives taken by the museums in the last decade. The data is complemented by two questionnaire surveys, as well as literature review and observations. The paper defines future actions that might mitigate against earthquake risk associated with museum collections. Seismic mitigation efforts of museum collections in Turkey set a good example for museum professionals or policymakers of other earthquake-prone countries which have similiar problems such as lack of awareness or limited resource. This paper also provides an input to the preservation/conservation literature through the examples of mitigation efforts and suggestions.

SEISMICITY IN TURKEY

Turkey is one of the most seismically active regions in the world. Two thirds of the country is located on active fault zones where 70 % of the population live.

> "The Anatolian Block is compressed by African and Arabian Plates from the south and Eurasian Plate from the north. This compression is responsible

> for complex deformation of the Northern Anatolian Fault Zone that causes major earthquakes along the fault in Turkey" (Şahin and Tarı, 2000).
>
> "Average annual number of earthquakes equal or greater than a magnitude of 5.5 on the Richter scale is 0.76. With this frequency, Turkey rates sixth in the world. Average number of people died annually due to earthquakes reached 950 and corresponding direct economic costs reached one billion US$ annually, in the last two decades" (Erer, 2010).

The August 17, 1999 7.4Mw Kocaeli and the November 12, 1999 7.2Mw Düzce earthquakes are the greatest natural disasters of the twentieth century in Turkey, after the 1939 Erzincan earthquake in the eastern region.

> "Two consecutive earthquakes with magnitudes over seven in the same region is very seldom in the world seismic history. As a result of these two devastating earthquakes, ten cities and many other locations were directly affected" (Sucuoğlu, 2000). "Death toll exceeded 18,000, over 100,000 buildings were destroyed, 600,000 people were forced to leave their homes and estimated financial losses reached 10-15 billion US dollars" (Erer, 2010).

AN OVERVIEW OF TURKISH MUSEUMS

In this section, data is collected through two questionnaire surveys. The first questionnaire was implemented on 14 selected museums, including state museums, palace museums, military museums and private museums working under the the General Directorate of Foundations, municipalities, private companies in İstanbul, in 2003 (**3**). The second was implemented on state museums in Turkey, in 2009. 73 museums out of 92 replied to the questionnaire (**4**). Both questionnaire surveys were developed to get information about the current situation of museums in terms of staff, building, collections, disaster experience, earthquake preparedness and mitigation efforts.

There are 189 museums working under the auspices and authority of the Turkish Ministry of Culture and Tourism. There are also 157 private museums working under the General Directorate of Foundations, municipalities, universities, private companies, but supervised by the Ministry of Culture and Tourism (**5**). There are 13 museums working under the the Turkish Grand Assembly (**6**) and 9 museums working under the Ministry of National Defence.

State museums are controlled and financed by the Ministry of Culture and Tourism. Most of them have traditional management approaches, facilities, display techniques and storage conditions. State museums are comprised largely of archaeologists and art historians, and experts such as conservators, restorators and mount-makers, who can fulfill the seismic mitigation work and are not allocated in most of the state museums. Anatolian Civilization Museum in Ankara, State Painting and Sculpture Museum in Ankara, Antalya Museum, Ephesus Museum in İzmir, İzmir Archaeological Museum, State Painting and Sculpture Museum in İzmir, Topkapı Palace Museum in İstanbul and Diyarbakır Museum have laboratories, as well as conservators, restorators or mount-makers among their staff. As for the rest of the state museums, conservation/restoration work takes place either in the Central Laboratory for Restoration and Conservation located in İstanbul or in the temporary laboratories of the excavations during the excavation season. Besides, a couple of museums such as Bodrum Underwater Archaeological Museum in Muğla, Bolu Museum, Malatya Archaeological Museum, Turkish and Islamic Art Museum in İstanbul have conservation laboratories (Ertürk, 2009);

3. The first questionnaire survey was developed as part of the project entitled "Seismic Conservation of Historical and Cultural Treasures of a World City: Sizing the Need and Formulating an Action Plan for the Museums of İstanbul, Turkey", which was conducted by the author and Bilgen Sungay in support of the World-Bank Provention Consortium Disaster Risk Reduction Program between July-December 2003.

4. The second questionnaire survey was developed as part of the author's post-doc research.

5. http://www.kulturvarliklari.gov.tr/belge/1-45478/eski2yeni.html; http://www.kulturvarliklari.gov.tr/belge/1-42821/eski2yeni.html, (23.12.2011).

6. http://www.millisaraylar.gov.tr/portalmain/, (23.12.2011).

Figure 1. Example of an overcrowded display case, İstanbul Archaeological Museums. Photo by author.

however, conservators or restorators are not allocated permanently. There is neither adequate facility nor space for post-disaster recovery in any of the state museums. However, the main problems are not only lack of staff, facilities or limited resources, but it is also overcrowded display cases (**Figure 1**) and storage areas, improper shelf loading and unrestrained objects. It is becoming difficult to change the place as well as decrease the number of objects on display, because collection items are increasing due to the excavations which take place every year and storage areas are almost full. As the historical buildings are converted into museums, the storage areas and exhibition galleries cannot be expanded as to compensate for the enlargement of collections. A special permission is required for fastening objects or display/storage furniture in historical museum buildings and it is a very time-consuming task.

On the other hand, it is observed that museums affiliated with the General Directorate of Foundations, municipalities or universities are in a poorer state in terms of staff, facilities, display techniques and storage conditions in comparison to state museums. However, some of the museums working under the General Directorate of Foundations and municipality museums do not have funding problems. Moreover, the protection of museum collections against earthquake is not the priority, and it is not in the agenda of museum staff. Museum staff has an overloaded schedule, as they are responsible for basic museum duties such as documentation, expertise, collection development or exhibition installation.

Museums, which are working under the auspices of the Ministry of National Defense, are in a good condition in terms of staff, funding and facilities. Military museums operate more successfully in seismic mitigation work compared to state museums, municipality museums, university museums or museums working under the General Directorate of Foundations. More importantly, as a majority of the museum staff are soldiers and have military training, they are all very well-organized prior to, during and after an earthquake. Besides, military museums have well-organized and equipped laboratories with trained and qualified conservators or restorators.

Palace museums that are affiliated with the Turkish Grand National Assembly are in a similar condition compared to the military museums.

Staff are very much aware of earthquake risk. Besides, Directorate of National Palaces is one of the leading institutions in taking steps towards the protection of museum collections both on storage and display, although palace museums are located in the historical buildings, and a special permission is required for fastening objects or display/storage furniture.

In case of private museums which are mostly in the hands of private companies, the situation is quite different than the aforementioned museums. Private museums are the changing face of the Turkish museology, because comtemporary museological principles are being applied in terms of facilities, conservation work, display and storage conditions and museum activities. Private museums are self-financing, but they are supervised by the Ministry of Culture and Tourism. In most of the private museums, earthquake mitigation work is accepted as an important topic similar to the other museum duties in the staff agenda. Museum staff are implementing some of the mitigation methods both on storage areas and exhibition galleries.

Challenges Faced Before the 1999 Earthquakes

In the past earthquakes, objects in the Turkish museums were damaged because of tipping and falling, shaking, crowding and colliding, improper shelf loading, insufficiently restrainted objects and storing objects in inappropriate areas. Earthquakes have caused damage especially on more fragile objects such as glass, porcelain, terracotta and some stone objects either in storage areas or on display. Likewise, some of the glass, porcelain and terracotta objects were damaged in the Adana Archaeological Museum, Afyon Museum, Bolu Museum, Burdur Museum, Cankiri Museum, Tiled Pavillion of the İstanbul Archaeological Museums, Kocaeli Museum, Sakarya Museum, Topkapı Palace Museum and Dolmabahçe Palace Museum in İstanbul in the earlier earthquakes (Ertürk, 2009).

> "As a result of the 1999 Kocaeli earthquake, buildings of Turkish and Islamic Art Museum, Topkapı Palace Museum, Dolmabahçe Palace Museum, the annex building of the İstanbul Archaeological Museums, and State Painting and Sculpture Museum in İstanbul are also affected" (Erdik et al, 2008).

Luckily, secondary threats such as floods, fires or gas explosions caused by an earthquake did not occur in any of these museums.

Before the 1999 earthquakes, most of the museum staff and policymakers were unaware of earthquake risk related to museum collections and this was the main problem. As a result of a lack of awareness, the importance of training and taking mitigation measures were not taken into consideration. Lack of training was preventing the allocation of trained and qualified staff in museums, and thus museum staff were unaware of different types of mitigation measures. Budget allocation for developing the conditions both in storage areas and on display, obtaining materials, developing scientific research or assuring trained and qualified staff was also related to the earthquake awareness of museum staff and policymakers.

Besides, damage assessment reports of either museum collections or buildings were only reported to the museum directorate or to the Ministry. The information was not shared with the related international organizations. In fact, it was not even possible to access the information through national organizations. At the time of the 1999 earthquakes and immediately afterwards, there was no group of experts involved in seismic protection of museum collections. Luckily, only a limited number of unsecured and fragile objects were damaged.

7. The program was renamed as Disaster Preparedness Education Unit (AHEB) in 2004.

Seismic Protection Efforts Taken in the Last Decade

Seismic protection of museum collections is a relatively new topic in Turkey in comparison to the other earthquake-prone countries in the world. Disaster Preparedness Education Program (AHEP)(**7**) of KOERI was initiated in 2000. AHEP realized a number of projects, trainings and meetings in collaboration with Yildiz Technical University, Faculty of Art and Design, Museum Studies Graduate Program in order raise awareness about the earthquake risk that museums are exposed to.

İstanbul Seismic Risk Mitigation and Emergency Preparedness (ISMEP), the World Bank funded-project was conducted by the İstanbul Special Provincial Administration and İstanbul Project Coordination Unit, between May 2005 and December 2011. Earthquake risk assessment of the collections housed at the annexed building of the İstanbul Archaeological Museums; earthquake performance assessment and preparation of structural seismic retrofitting designs of the Mecidiye Kiosk of the Topkapı Palace Museum, annexed building of the İstanbul Archeological Museums, Hagia Sophia Museum and Saint Irene Museum in İstanbul were included in the project.

A distance learning program has been developed in 2010, by Boğaziçi University, KOERI, Department of Earthquake Engineering, Boğaziçi University, Center for Disaster Management (CENDIM), Yıldız Technical University, Museum Studies Graduate Program and J. Paul Getty Museum as a last attempt. "Guidelines for planning of mitigation approaches, and for the production and implementation of mitigation technologies, products, as well as images and articles will be included in the distance learning program" (Sungay et al, 2010).

Museum Initiatives Taken After the 1999 Earthquakes

The Topkapı Palace Museum, which is one of the most visited museums in Turkey, is a state museum. The museum is not only important in terms of its history and collections, but also with its mitigation efforts taken after the 1999 earthquakes. The former museum director, Filiz Çağman, strongly believed in trainings in order to raise awareness of the museum staff, and

Figure 2. Object secured with plexiglass mount and monofilament, Imperial Treasury Exhibition Gallery, Topkapı Palace Museum, İstanbul. Photo, T Mimarlık Dekorasyon Ins. Taahhüt San. ve Tic. Ltd. Sti., courtesy of Topkapı Palace Museum.

Figure 3. Object secured with metal L brackets, Çanakkale Archaeological Museum. Photo by author.

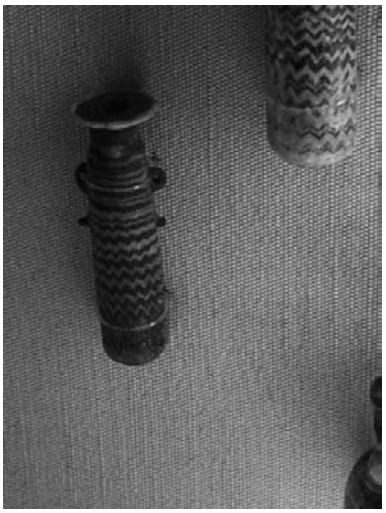

Figure 4. Object secured with monofilament, Sadberk Hanim Museum, İstanbul. Photo, Courtesy of Sadberk Hanim Museum.

Figure 5. Example of objects wrapped and boxed in the Storage Museum, İstanbul. Photo by author.

thus Topkapı Palace Museum housed Emergency Planning and Earthquake Preparedness Seminar, Earthquake Risk and Emergency Planning Meeting, and Seismic Mitigation Workshop, between 2000 and 2001.

The museum directorate has started to take effective and low-cost mitigation methods right afterwards. It is observed that, there is relatively less difficulty in mitigating storage areas than exhibition galleries, because mitigation measures in the storage areas do not need to include aesthetic considerations. Thus, some of the storage cabinets were anchored to the wall L brackets, large and heavy objects were moved from higher shelves to lower ones. Same type of ceramics were moved from exhibition galleries to storage areas, and were wrapped and then placed in individual boxes (Sungay and Ertürk, 2004).

Besides, the most important step was taken during the renovation work of the Imperial Treasury Exhibition Gallery (reopened in 2001). The museum directorate was very much aware of the earthquake vulnerability, and it was the first time in Turkey where a renovation work in a museum was held by considering earthquake risk. New showcases were put into the most secure places-niches-of the gallery. Additionally, the number of the displayed objects were reduced, and objects were fastened with plexiglass mounts and monofilaments. At the time of the renovations, conservators, restorators, or mount-makers were not allocated in the museum. Thus, the interior designer, Çağlayan Tuğal, who was responsible for the renovation work, produced the mounts and secured the objects with mounts, and then used monofilament to tie the objects to their mounts (Sungay and Ertürk, 2004) (**Figure 2**).

In the Sultan's Caftan Exhibition Gallery, showcases were covered with security films in order to hold showcase glasses together in case of breakage. In the paintings storage, paintings were hang on the compactor screen system with safety hooks both from top and bottom corners, and lockes were used in order to prevent the screens from travelling along the rails during an earthquake (Sungay and Ertürk, 2004).

27 state museums that have already started to take measures such as; fastening showcases and storage cabinets onto the wall and floor, fastening some of the fragile objects with mounts and/or monofilaments (**Figure 3**), as well as boxing fragile objects, and using different types of restraints across open-shelving units in the storage areas (Ertürk, 2009).

Sadberk Hanim Museum, which is one of the private museums in Turkey, is located in İstanbul. In the storage areas of the Archaeological and Turkish and Islamic Art Objects, netting was used to cover the entire open face of the storage unit, and ceramics, porcelains were stored in blocks of ethafoam in which cavities had been carved to fit the shape of the objects. Gradually, different types of mitigation methods have started to be used; small glass objects were secured with museum wax from the base of the objects, tiles and ceramics were fastened with plexiglass mounts, monofilaments and some of the small objects were secured with monofilaments (**Figure 4**). Storage shelves were anchored with metal brackets to the wall and storage cabinets were secured with locks (Sungay and Ertürk, 2004).

Among the private museums, Pera Museum and Rahmi M. Koç Museum in İstanbul are other leading institutions with mitigation efforts. In the Pera Museum, some of the objects were secured with plexiglass mounts and monofilaments on permanent exhibitions and storage areas were reorganized with the consideration of the earthquake risk. Pera Museum

was the hosting institution of the first international conference on the earthquake protection of museums. The museum will publish the seminar proceedings which may be another useful tool for the dissemination of knowledge. Rahmi M. Koç Museum was also secured some of the objects with mounts and monofilaments on permanent exhibitions.

The Military Museum in İstanbul, which is working under the Ministry of National Defense, have already started to take mitigation efforts. Some of the fragile objects were fastened with mounts and monofilaments. Storage areas are very well-organized in case of an emergency situation. These storage areas go under regular inspections and objects are all cleared from pathways.

Opening of the Storage Museum (**8**)(2006) in İstanbul, which was working under the Turkish Grand National Assembly and housed the collections of palace museums, was an important step in order to store the objects in a separate building with an adequate space and taking seismic mitigation measures in storage areas. In Storage Museums, objects were wrapped with ethafoam and acid free tissue, and boxed (**Figure 5**). Restraints such as bungee cords were stretched across the face of the open-shelving units to prevent the contents from sliding off. Compact storage cabinets were mounted to the wall with L brackets both from the top and bottom.

Besides, the following seismic mitigation efforts have been taken in Dolmabahçe Palace Museum and Beylerbeyi Palace Museum in İstanbul; framed works and consoles were secured not only at the top, but also at the the bottom corners to avoid swinging or pounding against the wall. Safety hooks of chandeliers were all checked to prevent the hanging wire from escaping the hook. Small vases were secured with museum wax. All the mitigation works are being held by the full-time conservators, restorators of the palace museums (Sungay and Ertürk, 2004).

SUGGESTIONS FOR FURTHER STEPS

General Directorate of Disaster Affairs, as well as research centres/ institutes working under the universities such as Boğaziçi University, Gazi University, Dokuz Eylül University, Middle East Technical University, İstanbul Technical University and Ankara University are working in relevance to disaster management or earthquake research in Turkey. On the other hand, Turkey is one of the member states of ICCROM. National committees of ICOM, International Council on Monuments and Sites (ICOMOS), UNESCO, as well as associations of museum professionals or archaeologists, which may take actions prior to, during and after an earthquake, already exist in Turkey.

However, there is still an urgent need to create a non-profit organization dedicated to the conservation and preservation of Turkey's cultural, living, movable and immovable, tangible and intangible heritage with a focus on earthquake preparedness. Experts, scientists and related professionals from different disciplines should be allocated in the organization. The duties and responsibilities of the organization may be as follows;

- to conduct activities in order to maintain the topic of earthquake preparedness in the agenda of heritage professionals, policymakers and the public;
- to develop capacity building projects or trainings in order to have trained and qualified people for taking mitigation measures;

8. The museum was renamed as Museum of Palace Collections and was reopened in February 2011.

- to develop scientific research to find out low-cost and effective mitigation methods;
- to develop policy and regulations to make legal interventions;
- to develop a databank of damaged museums/monuments/sites, photographs and damage assessment reports for future actions;
- to provide consultancy and expertise;
- to provide technical support to local administration whenever heritage is under threat;
- to provide space for salvage operations;
- to provide accurate and updated data flow in case of an emergency and a post-disaster situation;
- to foster collaborations and partnerships both at national and international levels.

A department within the organization should undertake fundraising issue and generate sponsorhips, because budget allocation specific to this topic is important for taking the necessary steps.

Furthermore, it is also a need to undertake a national survey which focuses on museum preparedness against earthquake. Only two questionnaire surveys were developed until now. However, a more comprehensive survey is needed. For instance;

> "Indian National Trust for Art and Cultural Heritage (INTACH) undertook a national survey with a team, who visited 125 museums of different categories. The team wanted to find out whether museum authorities were aware of the harm in the absence of mitigation efforts and whether anyone had received any training in the area of damage mitigation" (Agrawal, 2008).

This will be quite an important step to determine the current situation of museums throughout Turkey.

On the other hand, it is necessary to set up the National Committee of the Blue Shield in Turkey, and continue to develop collaborations among national and international organisations in the field.

A module or a course on seismic mitigation of museum collections should be integrated into the curriculum of museum studies, conservation or related programs in order to train future museum professionals.

As most of the palaces or historic houses are re-used as museum buildings in Turkey, it is advised to strengthen these buildings in order to make them earthquake resistant. In terms of future applications, it is very important to design new museum buildings in order to have well-organized facilities to house the collections in better conditions and accomodate the growth of collections.

CONCLUSION

Specific measures have been taken in Turkey, especially after the 1999 earthquakes; however, more initiatives should be taken for the future. A non-profit organization, which will fulfill the overall requirements on the seismic protection of cultural properties with its own interdisciplinary team is an urgent need in Turkey. The organization will not only develop research, trainings or policies along with providing technical support and consultancy, but will also raise funds through campaigns or sponsors for

9. http://www.eqprotection-museums.org/.

the topic. It will work closely with national and international organizations, institutes, universities, museums, and provide the necessary data flow among the institutions.

Easy and inexpensive mitigation methods such as decreasing the number of objects in order to avoid overcrowding, padding and boxing objects, using restraints across open-shelves, securing objects with mounts or monofilaments have been used in several Turkish museums. On the other hand, more expensive but promising technologies such as base isolation haven't been applied to any objects or museum buildings yet. Besides, experimental investigation of object behaviors and the performance of seismic risk analysis of museums have been limited.

On the other hand, encouring steps such as projects, trainings, meetings have been held, an earthquake protection website (**9**) has been launched and various reports or articles have been published in the last decade. Distance learning package is also underway. All these efforts reflect the power of partnerships among related institutions, especially between universities and museums.

As a result of the questionnaire surveys and observations, it is clear that the most important issue is to continue to raise awareness among policymakers, authorities and museum professionals about the earthquake risk, its potential damage, as well as to develop and implement measures on the protection of museum collections against earthquakes.

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MÜZE ENVANTERİNİN DEPREME KARŞI KORUNMASI: TÜRKİYE'DE 1999 DEPREMLERİNDEN ÇIKARILAN DERSLER

Türkiye, ülkenin üçte ikisini kaplayan üç ana fay hattında meydana gelen büyük depremlerle uzun bir simik geçmişe sahiptir. 1999 yılında Türkiye'nin kuzeybatısında meydana gelen iki büyük depremi izleyen dönemde, hastane, okul veya idari binalarda pek çok önlem alınmıştır. Bu iki deprem, müze koleksiyonlarının ve binalarının depreme karşı korunmasına yönelik önlemler alınması konusunda müze uzmanları ve idarecileri harekete geçirmiştir. 1999 depremlerinden sonra, müze koleksiyonlarının depreme karşı korunması konusunda birçok proje, bilimsel araştırma, eğitim çalışması ve toplantı gerçekleştirilmiştir ve bu çalışmalar halen devam etmektedir. Müze koleksiyonlarının depreme karşı korunması konusu Türkiye'de nispeten yeni bir konudur. Her ne kadar bu konu ABD, Japonya, Yunanistan, İtalya ve Hindistan gibi bazı deprem ülkelerindeki müze uzmanları ya da mühendislerin 30 yıldan fazla bir süredir gündeminde olsa da, dünyada korumayla ilgili yazında yeterince ele alınmamıştır. Makalede, Türkiye'deki müzelerin 1999 depremleri öncesinde karşılaştığı sorunlar ve son on yılda ulusal ve kurumsal olarak alınan önlemler hakkında bilgi verilmektedir. Makalede yer alan bilgiler, iki ayrı anket çalışması, yazın taraması ve gözlemlerle desteklenmiştir. Makale, benzer sorunlara sahip diğer deprem ülkelerine uygulanabilecek önerilerle son bulmaktadır. Türkiye'deki müzelerde alınan önlemlerden örnekler ve ileriye yönelik önerilerle makale yazına katkıda bulunmaktadır.

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