

Discussion between US and Japan about the cultural asset rescue in the Great East Japan Earthquake on 11th March 2011

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Organizer : The Japan Society for the Conservation of Cultural Property

Time table and speaker

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PROTECTING WORKS OF ART AND ARTIFACTS FROM EARTHQUAKE DAMAGE: a way forward for the international community

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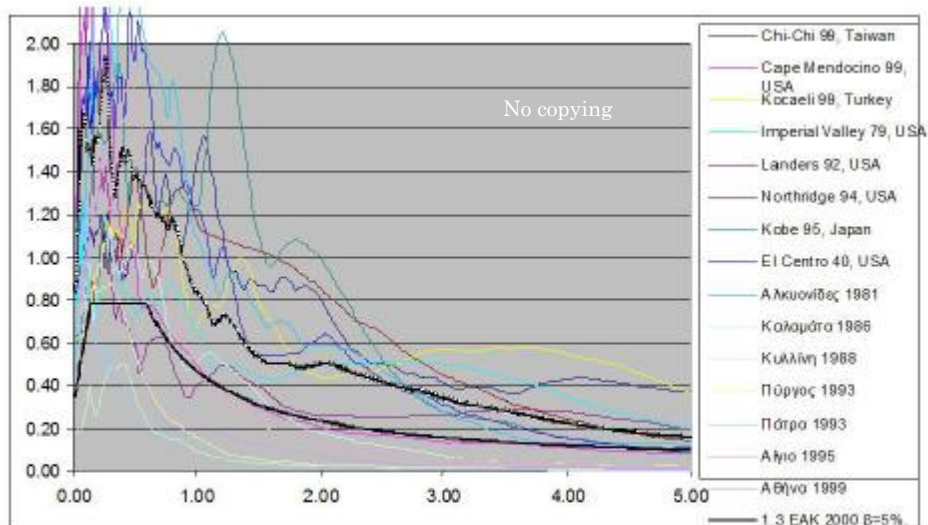
Abstract

Since 1984 the Department of Antiquities Conservation at the J. Paul Getty Museum has developed and applied a broad range of seismic mitigation approaches to the protection of its collections from earthquake damage. These approaches include simple static mounts that cradle and secure objects for exhibition as well as the structural reinforcement of exhibition furniture and the installation of anchors in gallery walls and/or floors. Efforts also include the use of base isolation mechanisms (decouplers) placed under sculpture and display cases. This paper will provide an overview of these efforts. The author will then explore ways in which the international conservation community can advance seismic damage mitigation for collections through multi disciplinary and multi national collaborations.

Introduction

Although a great deal of research and development has gone toward the protection of large-scale structures from seismically induced damage, the protection of contents has gained less attention. And even less research has been focused on the protection of works of art and historical artifacts in museum collections. The value of these treasured collections warrants more attention through partnerships between heritage conservation and the disciplines of engineering and seismology. Since the early 1980's the J. Paul Getty Museum has been collaborating with seismic engineers to develop methods of damage mitigation to protect its collection of ancient artifacts and works of art. The difficulty in accurately identifying the performance criteria for the objects themselves (given their antiquity and complex treatment histories) is well known. As a result research toward providing restraint and support, while also lowering the seismic forces experienced by the objects, are goals of the museum's mitigation and preservation efforts.

Research and design of the various approaches to seismic mitigation at the Getty have been predominantly guided by the determination of a worse case seismic event at the museum site, first characterized by Lindvall, Richter and Associates in 1982 using a probabilistic seismic hazard analysis. The study has been updated several times over the years and it should come as no surprise that each time the probability calls for a more severe event.



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(approximately a 475 year return rate). It's worth noting that the greater displacements occur at lower acceleration. So although the earth MAY in fact shift up to 11-18'' or more, it does so, gently, if that word can be properly applied in such a situation. While the higher accelerations occur with lower displacements.

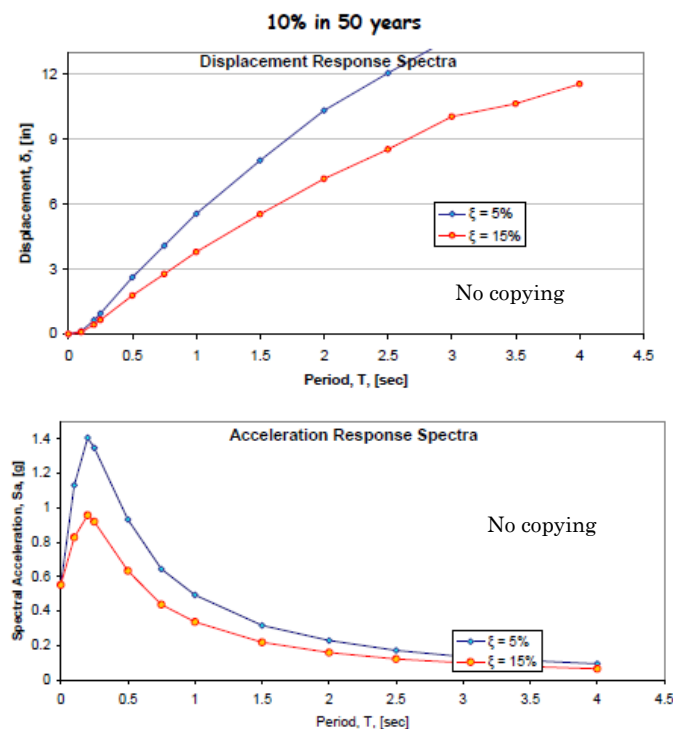


Figure 2: The force and displacement demand for return period of 475 years

These studies have lead to a series of basic guidelines many related to the base-to-height proportions of the exhibition assemblies. These evaluations help us to generally determine what will slide, what will rock and what might overturn

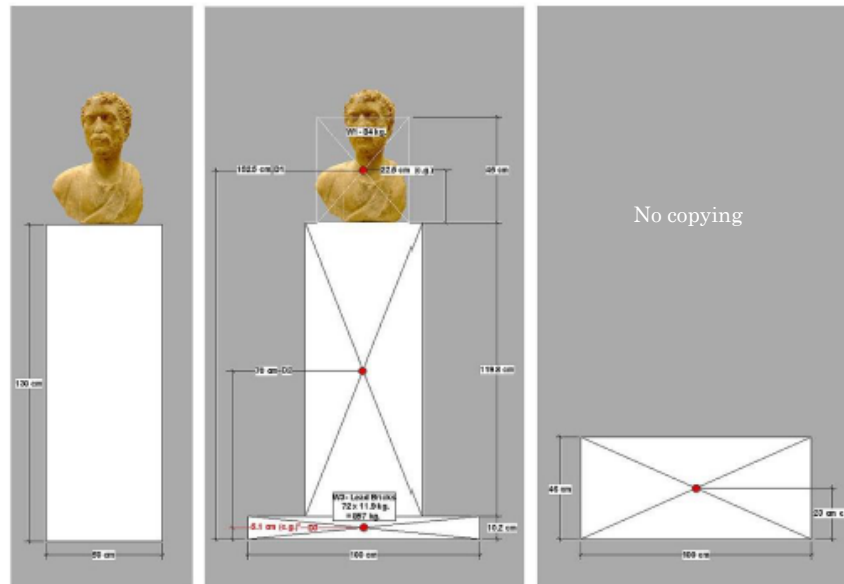


Figure 3: calculation to determine the equivalent block for a display assembly, thus providing a base-to-height ratio

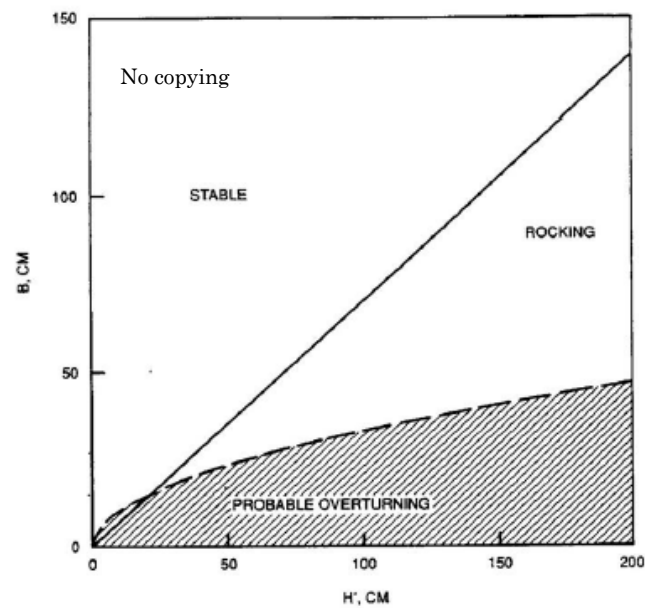
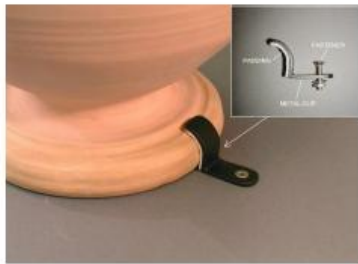


Figure 4: stability chart based on base-to-height ratios

Seismic mountmaking

Two approaches are taken to protect the collections from earthquake forces at the Getty Museum: static and active. Static mounts essentially tie the object to the building (or to exhibition furniture such as display cases or pedestals, which themselves are then anchored to the building structure) and provide restraint and structural support ("cradling") of the object to increase the object's resistance to

transmitted forces. These mounts can take the form of simple tie-down restraints such as metal clips, monofilament tie restraints or small amounts of wax applied to the bottom of the object. All of these approaches are intended to hold the object to the display surface. More complex mounts involve contour "spine" forms (usually made of stainless steel) that intimately follow the contour of the object, adding stiffness as well as restraining movement.



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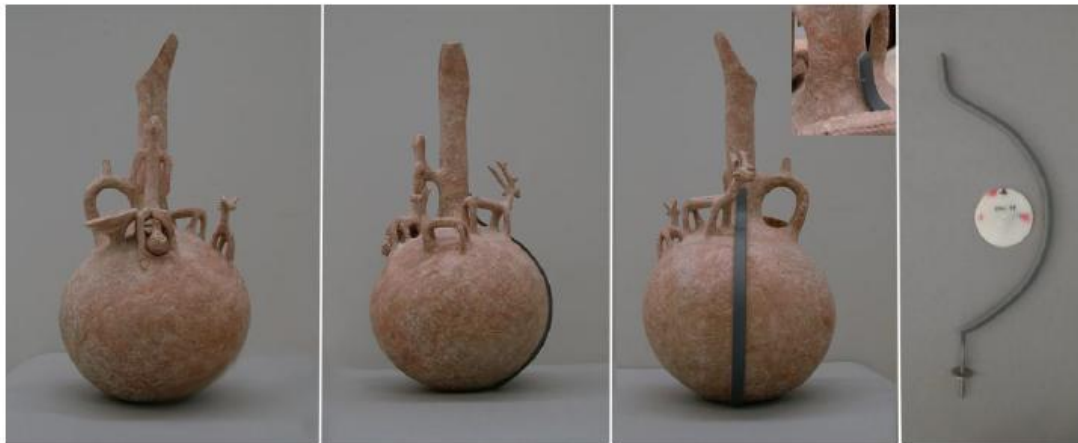


Figure 5: Clips, and two examples of contour mounts (one acrylic and one metal) . The contour mounts extend up one side of the objects. The mount is securely fastened to the display deck surface and the object is tied to the mount with monofilament at the top and bottom of the object.

Larger and heavier objects and display furniture are anchored directly to the walls or floors using a in-the-wall beam system and a series of anchoring points built into the gallery structure.

In all cases these "passive" mount designs are easily added or removed with no direct effect upon the integrity of the object.



Figure 6. Installed behind the gallery walls of the Getty Museum at the Villa are a series of steel beams that are used to anchor large wall hung objects securely to the building, such as this large mosaic.



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Figure 7. A floor anchor and an example of a pedestal anchored to the floor using the built in anchor points

Base Isolation

The Getty museum began designing and using seismic base isolators in the early 1980's. Their function is to reduce inertia forces acting on the museum's structure. These forces would otherwise be transmitted directly to the objects in the collection resulting in rocking, sliding and collision, or even overturning of those objects. 6

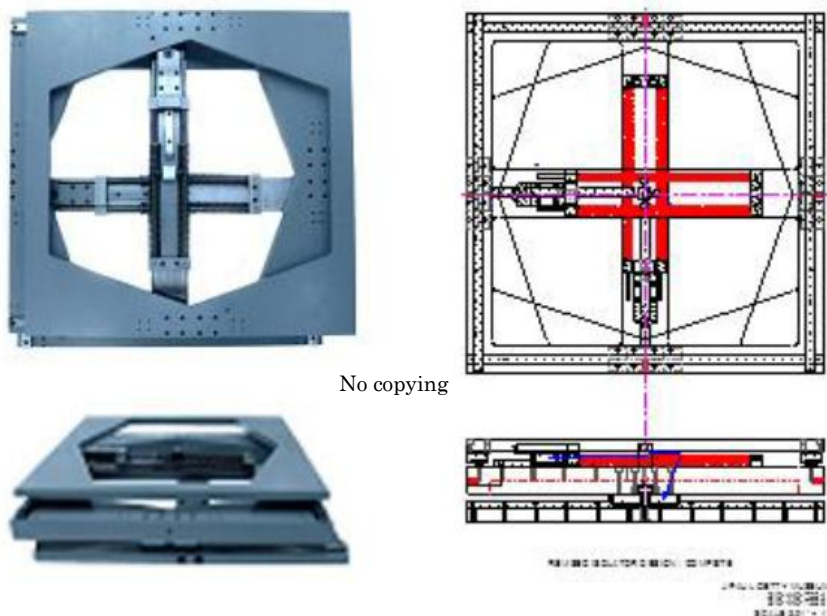
The Lindvall, Richter and Associates study indicated that any isolation mechanism being considered by the museum would have to have a period of greater than 0.9 seconds to reduce acceleration input, estimated to be 0.7 g at its greatest. The necessary displacement required was projected to be approximately 12 inches. An inverted dish isolation mechanism was proposed In 1985. The system was built and proved to significantly reduce the seismic risk to the object.



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Figure 8: early form of ball-and-cone isolator at the Getty Museum (1985)

Within a few years investigations were underway at the Getty museum to discover methods of providing base isolation using simple low cost methods. A number of pedestals were fitted with large metal base plates to stabilize them through altering the base to height ratio of the assembly and hence prevent overturning. These plates were later fitted with Teflon pads to encourage sliding. A study conducted at the University of Southern California much of the development of improved static mounts but it was clear that additional improvements were also needed in the area of isolation mechanisms for the larger, less stable and more fragile objects. A simple tri-level mechanism, developed by the Getty Antiquities Conservation Department, is now used to provide limited movement in the principle lateral directions, allowing the object to move within a defined parameter, as well as at a defined rate of speed, with a predefined degree of ease. Figure 9 shows several views and a schematic of the isolation mechanism.



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Figure 9: A top and side view as well as a schematic of the isolation mechanism

The object must be firmly attached to the isolator (using one of the types of static mounts described above) and the isolator must be firmly attached to the museum structure (using the anchoring points in the museum's floor described above and seen in Figure 6). Two of the three uncoupled stacked metal frames that make up the base isolator displace horizontally in perpendicular directions relative to one another during an event. This displacement is made possible by bearing blocks that slide along parallel rails under each of the two upper frames. Vertical movement is not isolated but the design does assure a full capture in the vertical direction of all components preventing any uplift of the object, display furniture or the three frames of the isolator from the floor. The restoring force is provided by springs, chosen to maximize the available displacement, while limiting the possibility of the isolator abruptly reaching its full displacement capacity. The isolator design is driven predominantly by displacement needs since the frequency content of the earthquakes that contain large acceleration demands are avoided by sufficient displacement (when possible), angle of ramp and the spring rates of the sets of springs used to develop a returning force. The 1984 Lindvall, Richter and Associates study has recently been updated to an event equal to a 10% in 50-year occurrence. The displacement response spectrum of such an event is now used to profile the ideal isolator displacement capacity.

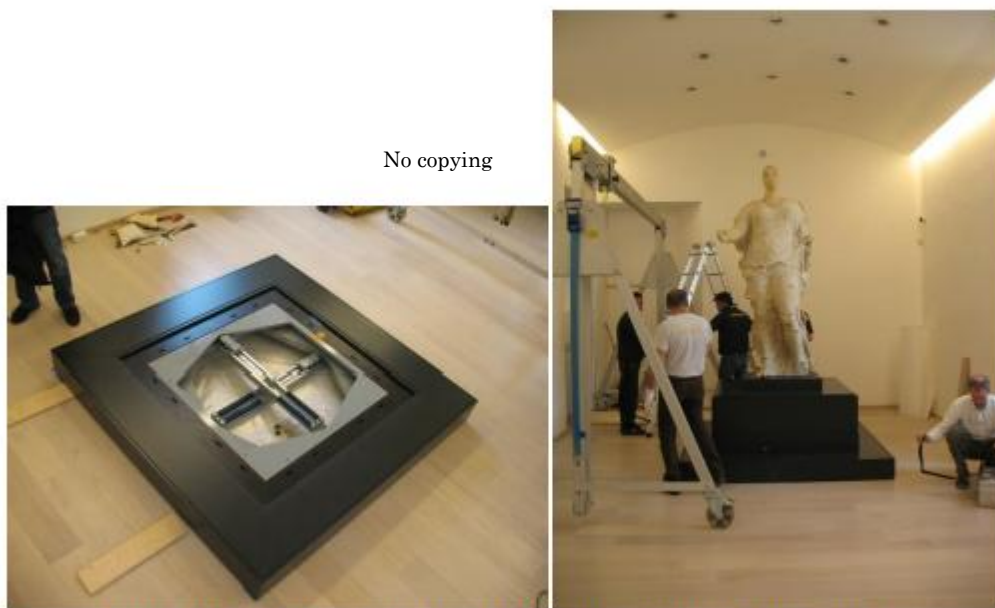


Figure 10: installation of an object in Sicily on a large scale base isolator.

Essentially the base isolation design de-couples the object or display assembly from the ground in a fashion that limits displacement to a predetermined distance and shifts the natural period of the assembly away from the dominant period of the design earthquake.

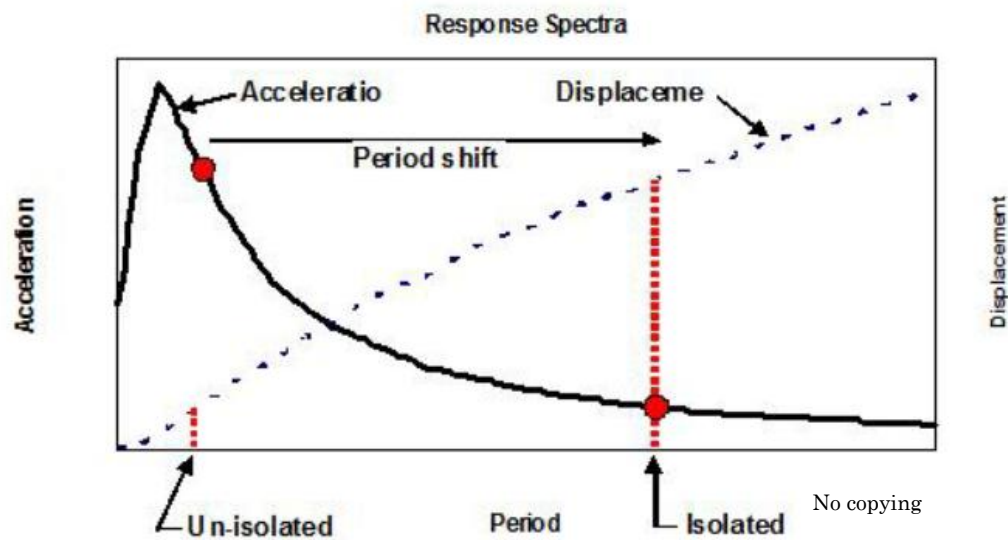


Figure 11: as a result of the isolator the period of any display assembly shifts to a larger period and away from the predominant period of the design earthquake

The three level de-coupler used today in the Getty Museum at the Villa has been continually modified to improve its performance, increase its structural strength, and reduce manufacturing costs, while providing a safe range of protection. Most recently for example, a springs-in-series configuration has been introduced that further modulates resistance in a non-linear, force specific design.

The specific design of the individual base isolators is not only driven by the forces and characteristics of a worst case scenario earthquake however. The aesthetic requirements of museum display as well as the available space restraints imposed by exhibition preferences and public spaces in the museum must be kept in mind. Exhibition designers are included in discussions to assure that the aesthetic parameters of museum display are met and that the size of the exhibition furniture concealing the isolation mechanisms are appropriate for the size and display density of the gallery. These concerns obviously put some limitations on the displacement capacity of the base isolation systems and call for compromises with respect to the level of a risk to be taken.

A future path: international collaboration in implementation, research and development

Each year the losses of cultural property due to earthquakes continues unchecked. Irreplaceable treasures are lost and collections are disrupted for long periods of time, some never regain their former status and contribution. Such loss, damage, and disruption need not occur. In the majority of situations much of the devastation could have been avoided or at least reduced, by the implementation of relatively inexpensive and simple approaches. Why then, in the face of this, has the heritage community lagged so far behind in its efforts to mitigate earthquake damage? Is it

because we might believe that since earthquakes are inevitable and since our ability to precisely predict them is limited, the damage they caused is equally inevitable and ultimately unavoidable? Or is it because those who work to protect heritage treasures from earthquake damage tend to work in isolation? Have we simply not looked around and found ways of working together to improve our efforts? Most likely, it is all of these reasons.

I am here speaking to you today because I believe that right now there exist simple, proven and common sense measures that can be implemented...and can decrease the amount of loss we continually suffer. While further research, particularly that which involves multi disciplinary international teams (conservators, seismologists, engineers, designers), can and should advance the protection of collections significantly, much is already known and can be applied.

Two challenges, two opportunities, are before us:

one of education and implementation, of sharing the knowledge that those protective measures, already known to be effective, exist and can be applied.

And the other of fostering and supporting research to develop improved approaches and mitigation techniques.

Both issues require a degree of outreach on the part of heritage professionals in order to define the needs and reveal the opportunities. Finding solutions requires us to strengthen our voice so that we might inform those who could lend their support. That stronger voice will make the case that mitigation can be both an effective and a financially wise investment.

Both opportunities require a collaborative structure and interdisciplinary as well as international contributions of expertise.

What will it take? What shall we do?

I suggest that those countries most effected by seismic events formulate a working group populated by heritage conservation professionals, engineers, and seismologist charged with outlining programs for advancing mitigation. The group would seek support from government bodies and public, as well as private, foundations. It's actions might start with outreach to museums and then expand to supporting collaborations between heritage collections and university or industry research faculties in order to develop effective and affordable solutions to seismic damage mitigation. Platforms from which those already engaged in the work can share information, review work and find partnership opportunities would then be developed.

At its core this group would determine the most effective way of:

□ **Recognizing the state of knowledge:** by establishing the most effective methods of gathering what has been done and is now underway. This could be enhanced by an international congress as well as an interactive web presence where research and experience would be shared and new partnerships formed. Such efforts might enhance existing events such as the International Institute

for Conservation World Congresses, ICOM-CC conferences or any number of engineering congresses that focus on seismic studies internationally and regionally.

□ **Gathering Data:** A number of international professional bodies (such as the EERI) gather data following earthquakes that allows direct evaluation of the performance of structures or constructions; better understanding of failures; and improved understanding of the nature of earthquake dynamics. The information is widely recognized as extremely valuable to those wishing to evaluate materials, methods and theories. Indeed one might say that the advancements in seismic design and damage mitigation in areas of architecture and infrastructure have all been directly dependent on such observational data. Such learning and research opportunities also exist for heritage conservation. To take advantage of them however requires partnering with and learning from already established professional bodies. It must also be noted that within our own discipline and within the museum community as a whole, a greater degree of transparency will be needed. We must learn to recognize the benefits of sharing information regarding the impact of earthquakes on collections. Achieving this, of course, is directly influenced by our efforts in educational outreach within the heritage community

□ **Collaborative research and development:** It is my firm belief that if the above two steps were under taken then inter disciplinary groups would form and would successfully find support for collaborative research in seismic damage mitigation for heritage collections. The more this could be done on an international scale the better off the entire effort would be.

□ **Dissemination:** Beyond collaborative research, efforts could be undertaken to provide the field of heritage conservation and the general museum community, with basic guidelines for seismic mitigation. Authored by an international group, such publications/workshops/congresses could be translated into a number of languages and be made available, through ministries, private foundations and professional organizations such as ICOM, ICCROM, IIC, etc.

But there are several even more initial steps to be taken. First and foremost is to gather commitments from countries which not only share the threat of earthquakes but the interest and commitment to mitigate the damage caused by earthquakes. An interest and commitment in the long term preservation of world cultural treasures. And so beyond the joy of sharing information, I am here to ask if my Japanese colleagues would like to join in exploring the formation of this initiative.

Arigatou gozaimasu

ありがとうございます

Stabilization Treatment of Cultural Asset Damaged by Tsunami on March 11th, 2011

Nobuyuki Kamba, Masaru Kumagai, Hideo Akanuma,
Hiroshi Wada, Tominori Araki, Haruhiko Suzuki, Yuko Tsuchiya

ABSTRACT

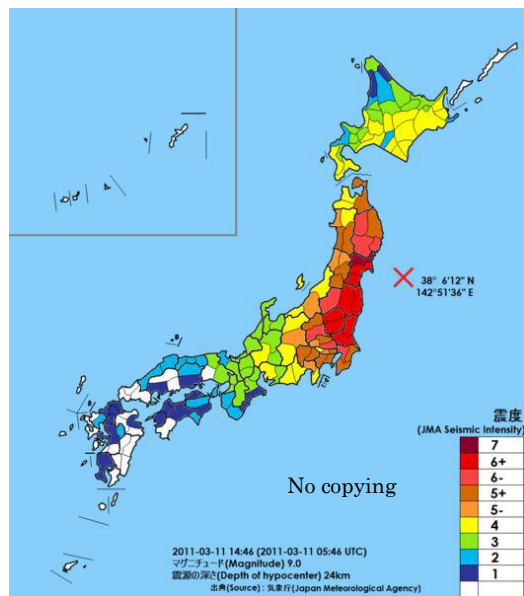
It was conducted a prompt and a wide-range support in the cultural asset rescue in the great earthquake on March 11, 2011. The contribution of the specialists from the museum, the art gallery, the library, and the archive played an important role and strengthened the relationship. The tsunami caused a new type of damage that has never been experienced. A remedial treatment is able to start after removing the salt and colloidal sediment from objects. Then they should be kept in a stable environment. Our presentation shows how the process was established by the collaboration between museum staffs in the region and those specialists who supported them.

1. INTRODUCTION

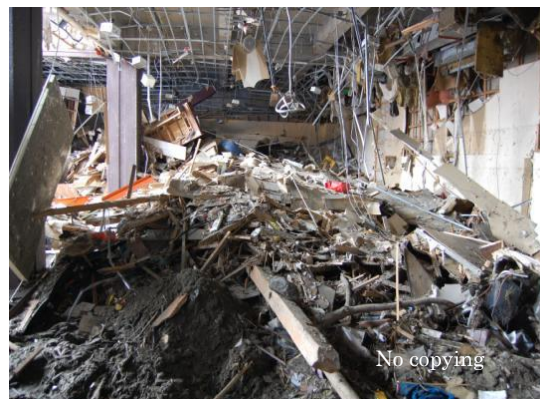
The concept of cultural rescue was created in Japan for the first time after the earthquake of Hanshin-Awaji which occurred on 17 January 1995. After the recent big earthquake, many problems still persist, but it goes without saying that the fast and effective assistance for recovery was deployed in wide areas. The provision of the temporary storage environment after the rescue, the stabilizing treatment which principally included the desalinization of materials contaminated by the sea water and the introduction of the gradual treatment method corresponding to the conditions of the historical materials can be considered as epoch-making.

2. EXTENT OF DAMAGE

That was a tremendous earthquake of magnitude 9.0 with the epicenter at 24 km off shore of the Sanriku Coast at 14:46, 11 March 2011. The strongest 7 in the Japan Meteorological Agency (JMA) Seismic Intensity Scale was recorded. A huge tsunami of the peak height of 49.1m was caused by this huge earthquake. It damaged the coastal region from Tohoku and Kanto districts seriously. The Committee for the Rescue Operations of the Cultural Heritage was created in early April 2011. The member organizations of the rescue committee provided the man power and the materials for the rescue operations. The tsunami which arose after this earthquake seriously damaged the whole city of Rikuzentakata. Personal damage reached 1,556 deads.



Shindomap 2011-03-11 Tohoku earthquake from Wikipedia



Left: Appearance of Tsunami (picture by Toshimichi SATO)

Right: Inside of Rikuzen-takata municipal museum. (Early April 2011)



Left: Museum personnels looked for museum objects in the rubbles (21st April 2011)

Right: Salvaged objects from among the rubbles (30th April 2011)

3. ORGANIZING THE STRAGE CONDITION

More than 300,000 pieces of objects recovered from the damaged Rikuzentakata city were stored in the former Elementary School and Iwate Prefectural Museum. As the School was closing down as of March 2011, this was identified as the appropriate storage for the recovered objects. Many different kinds of the recovered objects were brought into the two-story school buildings and the exercise hall, which covered the entire floor so densely that no one could walk through. The old school premises began smelling of fungus and mold as the time shifted into summer. Documents, magazines, and wooden ethnographical goods were covered with plenty of mold. The metallic products made of iron were covered with red rust entirely. To improve the storage condition in the buildings, the large amount of paper materials were brought into a big market refrigerator which was in two hours distance. Then space left after these objects were used to set up steel shelves. The objects were organized on these shelves and the space was utilized by shifting from one place to another to clean up from room to room with disinfectant. Some objects were fumigated at the end. Then the work condition and the storage condition were organized. The fumigation was conducted in October. Then accurate observation has started to monitor the temperature and RH, fungus and molds, and the air contamination within the buildings.



Left: Salvaged objects were kept in a premise of elementary school which was closed down in March (7th June 2011)



Right: Appearance of elementary school maintained as a temporary inventory (2nd August 2013)



Left: Salvaged objects were kept in a classroom of the old school without order (1st July 2011)



Right: Salvaged objects were packed in boxes and containers for moving (29th September 2011)



Left: Salvaged objects were kept in a excise hall of the old school with the rescue supplies (October 2011)



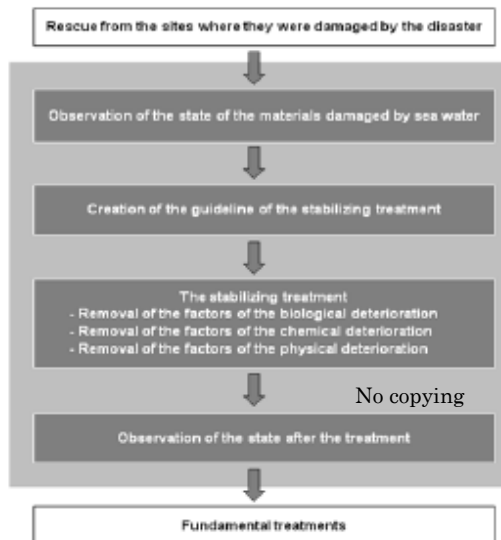
Right: Inside of the high spec storage room in the excise hall (22nd March 2013)

4. STABILIZING TREATMENT OF THE OBJECTS

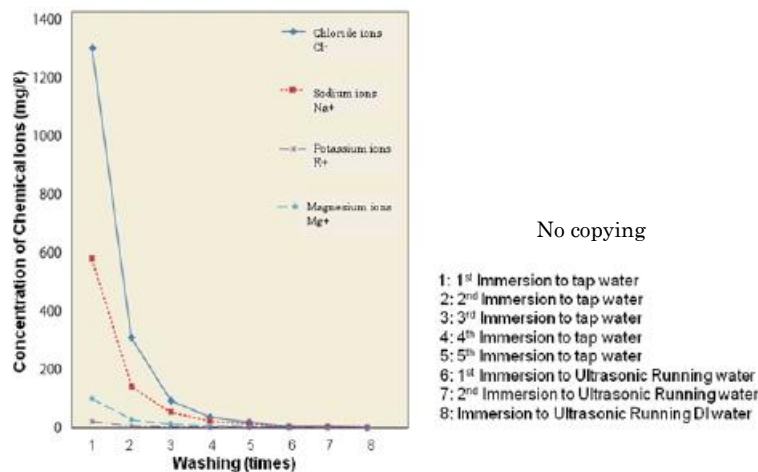
The stabilizing treatment means the inhibition of the deterioration of the damaged objects by the minimum treatment necessary to prevent them from deteriorating in a short period of time. The remedial treatment means the treatment for the fundamental solution. One could not draw a clear line between these treatments. The stabilizing treatment began in mid May 2011, and it will finish within five more years. About 200,000 pieces are yet to be treated in Rikuzentakata city. The stabilizing treatment against the damage caused by the sea water has not been established yet. Therefore, a situation of trial and error is expected by conducting the research.

There are still many underdeveloped areas regarding the stabilizing treatment of objects damaged by the sea water. The current stabilizing treatment was a method which was established by repeated trials and errors. The salts concentration in the water for the immersion processing was analyzed by the ion chromatography. The purpose was to see how the desalting in fact was effective by the wash done according to the process schedule of the stabilizing treatment. The result shows the longer the immersion in the water, the less the concentration of the salts solved into the water. It is remarkable

that more than 90% of the salts were solved by the third immersion. At the same time, the important task will be the removal of the slimy surface and the odor caused by the corrosion of the objects. As the corrosion must be stopped immediately, the 400 ppm solution of sodium hypochlorite (NaClO) diluted in the water or its solution is used to soak these materials for several minutes. The problem with using the sodium hypochlorite solution is its bleaching effect. The color tone tinted after long years on these objects can often be removed.



The workflow of conservation procedure for the struck object by tsunami according to H. Akanuma



The correlation between the number of times of desalting wash and the chemical ions in the water according to H. Akanuma

- >①Selection of materials which can be washed by water
- >②Dismantling of materials
- >③Immersion to the tap water
- >④Immersion to NaClO solution
- >⑤Immersion to the tap water and desalting treatment
- >⑥Ultrasonic cleaning in the tap water
- >⑦Ultrasonic cleaning in the DI water
- >⑧Pressurized dewatering
- >⑨Natural semi-drying
- >⑩Materials inspection and removal of internal sand residues
- >⑪Protective treatment with waterproof water and nonwovens
- >⑫Preliminary freezing
- >⑬Vacuum freeze drying
- >⑭Fumigation disinfection
- >⑮Materials inspection and classification
- >⑯Minimum treatment of peeled-off parts
- >⑰Digital processing of materials
- >⑱Remedial treatment and assembling of materials
- >⑲Storage in neutral paper envelope and in neutral paper foil
- >⑳Observation of the state after these treatments.

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Stabilizing procedure for paper materials according to H. Akanuma

5. CONCLUSION

The stabilizing treatment is to inhibit fast deterioration of the damaged objects by a minimum treatment. The content of the stabilizing treatment should be decided in response to the situation of the damage. The understanding of the content of the treatment was not unified among the specialist who related in the rescue. However, it was first time in the disaster recovery history in Japan that the concept of the process flow to start with the stabilizing treatment then to proceed to remedial treatment was established. It is true that many specialists have contributed to the rescue operation and also learned how is the appropriate process to recover the damaged objects in a difficult situation. Non professional people who learned the process through a workshop conducted by the specialist has also joined the treatment. Support by various people has enabled the preservation of the cultural asset and strengthen the local community.

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Establishment of the Committee for Salvaging Cultural Properties Affected by the Earthquake

Hiroshi Asaka
Agency for Cultural Affairs

The massive earthquake occurred in the afternoon on 11 March, 2011 caused extensive damage in Japan, especially to the Tohoku and Kita-Kanto regions. The subsequent tsunami hit the Pacific coast of east Japan, taking the lives, properties, and the livelihood of so many people away in an instant.

While shuddered at the thought of major damage, in view of greater and widespread damage on cultural properties, historical documents, art objects and museum facilities, the Agency for Cultural Affairs began preparing for an immediate action as a governmental initiative.

The Agency for Cultural Affairs has legal grounds and the budget to rescue national treasures or important cultural properties, however, having gathered information relating to damage to cultural properties in the region, we have come to recognize the necessity to establish a system for the purpose of rescue operations of diverse cultural properties, designated or undesignated, at a national level or a prefectural or municipal level.

As legal grounds to this operation, “Tohoku-Pacific Ocean Earthquake Rescue Programme of Damaged Cultural Properties (Cultural Properties Rescue Programme)” was formulated. Endowment and donations made through the Foundation for Cultural Heritage and Art Research cover its operational expenses. A message was delivered on this matter by the Commissioner for Cultural Affairs himself.

The purpose of the programme is to take urgent action to preserve damaged cultural properties to protect them from being disposed or scattered with removal of debris later on.

Following the requests by boards of education from damaged prefectures, “The Committee for Salvaging Cultural Properties” was launched at the request of the Agency for Cultural Affairs in collaboration with the National Institutes for Cultural Heritage. The secretariat was established at the Tokyo National Research Institute for Cultural Properties.

In the end, four prefectures, Iwate, Miyagi, Fukushima, Ibaraki made rescue requests. The rescue operations were carried out as a collaborative effort with prefectural boards of education. Since the

situation was different at each prefecture both in terms of degree of damage and activity, the Rescue Programme provided different types of support. Fukushima prefecture especially was facing many challenging issues due to the nuclear power plant accident.

There were many issues we had not experienced in the past, such as application of stabilization treatment to a large number of cultural properties damaged by sea water, or drafting an operating manual for nuclear evacuation zones. The Rescue Programme members were able to resolve these issues one by one through their hard work.

This programme was initially designed for one year but later extended by another year, due to a large number of rescued cultural properties in need of stabilization treatment. In March 2013, it was deemed that the objective has been largely met and subsequently the Rescue Committee was dissolved. In Fukushima prefecture, however, rescue operation in the areas where severely affected by radiation became active only recently, in the summer of 2012. Even during current fiscal year, cultural properties are still being rescued and moved from evacuation zones.

The Rescue Committee helped 90 facilities in four disaster-affected prefectures during the two years, participated by a total of 6811 people. Donations made in response to the Commissioner for Cultural Affairs message amounted to 236 million yen.

Going forward, we must seek to establish an enhanced system to rescue cultural properties which is structured in accordance with classification of cultural properties, while maintaining and developing the network comprised of related organizations. A permanent system or an organization should be established either at a national level or within the National Institutes for Cultural Heritage.

Miyagi Shiryounet (Network for Preserving Historical Materials)

A regional initiative to preserve historical materials

Amano Masashi

International Research Institute of Disaster Science (Tohoku University)

The frequent and recent occurrence of huge disasters in the Japanese archipelago was a key to organizing groups for rescuing and preserving historical materials with private owners. The number of such organizations increased after the occurrence of the Great Hanshin-Awaji Earthquake in 1995.

Miyagi Shiryounet (Network for Preserving Historical Materials) was launched when the earthquake hit northern Miyagi Prefecture on 26th July, 2003, with an objective to rescue historical records in possession of private houses in the prefecture.

Similar organizations have been formed throughout Japan for the same purpose of preservation of historical materials. The reason for this has to do with the way those historical materials are inherited from past generations. In the pre-modern era, villages and townships were vested with rights to govern their respective territories, causing a countless number of official and private documents of historical value to be in the possession of private owners. Miyagi Shiryounet and other organizations work for keeping safe these materials from any kinds of disasters.



Miyagi Shiryounet has members of diverse backgrounds. There are researchers such as historians, art-historians and archaeologists, local government officials and institutions in charge of cultural properties and citizens, working in cooperation to conduct activities to rescue and preserve historical materials. Miyagi Shiryounet has its own aim of preserving materials which are beyond the reach of administrative organs and preservation institutes. In order to achieve their objectives, the group is aiming to build a cross-disciplinary network. A survey was conducted in the area to keep track of historical materials, as a preventive measure against the future impact of a disaster.

By the time the Great East Japan Earthquake occurred in 2011, enough expertise had been accumulated through various activities and diverse partnerships for disaster management. Miyagi Shiryounet successfully rescued and preserved damaged materials in disaster area, making use of cross-organizational human networks and systematic exchange of information and technologies between itself and other preservation institutes and organizations throughout Japan, including the Committee for Salvaging Cultural Properties, headed by Japanese Agency for Cultural Affairs.

The mission of Miyagi Shiryounet is to contribute to the inheritance of local culture to future generations through preservation of historical materials. Initially launched as a countermeasure towards disasters, it is now aiming at becoming the center for human interaction and technical exchange for matters related to local historical materials.

"Dealing with disaster-damaged historical documents in paper medium

Amano Masashi

International Research Institute of Disaster Science (Tohoku University)

The Great East Japan Earthquake triggered powerful tsunamis which struck the east coast of Japan, causing extensive damage to historical materials preserved in the region. Among them were paper documents which contained records written on Washi (Japanese style of paper) before the 19th century pulp paper documents since modern period, as well as contemporary private records. A large number of diverse materials were damaged by tsunami at the same time and required urgent rescue.

The major issue faced in the rescue operation was the late start. Life-saving missions and removal of debris had to be prioritized as the entire coastal area was devastated. Moreover, serious shortage of gasoline forced our rescue team to wait for one month longer before set to work in affected areas.

A large numbers of damaged materials were discovered through the serious rescue operation. The number of paper documents found and rescued by Miyagi Shiryounet (Network for Preserving Historical Materials) alone exceeded thirty thousand. Most of these were damp and contaminated with mold. Restoration was an urgent issue.



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Since characteristics of paper materials may vary, freeze-drying was chosen as a drying method

to provide immediate care. Immediately after start of operation, Miyagi Shiryounet started sending damaged documents by freeze delivery to Nara for drying, in response to an offer of cooperation from Nara National Research Institute for Cultural Properties, which was equipped with the biggest freeze-drier in Japan. Tohoku University of Art and Design, in Yamagata Prefecture, provided us with the same



Freeze-Dryer
by Tohoku University of Art and Design

support. We are now in the process of cleaning and repairing dried materials.

The issue we encountered at the time of the Great East Japan Earthquake in emergency rescue operation was shortage of facilities, vacuum freeze-dryer in this case, capable of treating a large number of materials. Damaged materials were too overwhelming for the number of vacuum freeze-dryers in Japan.

There still remains other issues with establishing a broad network of cooperation, such as transportation method of materials and communication line to report on a progress of treatment. As for the materials in possession, anxiety had to be eliminated from owners who were reluctant to send their personal properties to a distant place. In order for us to prepare ourselves against frequent occurrence of major disasters nation-wide, it is necessary to establish regional facilities and build a network across regions.

Response to Damages from Natural Disasters to Cultural Properties, A Continuous Effort since Great Hanshin-Awaji Earthquake in 1995

Toshihide Uchida
Kyoto University of Art and Design

When public museums are exposed to major natural disasters, official support is provided to restore damaged collections (permanent or on rent). In Japan, many museums with collections of art are operated by individuals or private organizations, as opposed to public. Temples and shrines also have art collections. Private houses and their storehouses might house so many historical documents and folk-cultural properties that even the owner does not know how many pieces are in the collection. According to a theory, the number of historical documents might exceed ten billion. Among the old villages still existent in Japan, it is not rare to find an anonymous village protecting a wooden statue of Buddha curved in the 12th century to this day.

Recently, such villages and houses have been hit by earthquake or flood on several places, causing a large number of cultural properties to disappear. Rescuing and restoration of damaged properties owned by individuals are supported by volunteers for the most part, but not to a full extent.

Since the great Hanshin-Awaji earthquake in 1995, we have been engaged in rescue and restoration mission of damaged cultural properties regardless of their ownership, whether public or private. Great Nankai earthquake and a greater Pacific coast earthquake which would include Tokaido and Tonankaido areas (strong intensity with a magnitude level of 8 or 9) are expected to occur in near future. Our current agenda is how to mitigate expected damage on cultural properties from future earthquakes and subsequent tsunami, and how best we could salvage them afterwards. It is therefore necessary to proceed with a research to identify the location of such cultural properties, along with establishment of rather loose networking of volunteer organizations nationwide.

Comments

Jerry C Podany

J. Paul Getty Museum, ex IIC president

I think it is a very unique challenge for Japan to have so many significant treasures in the hands of private collectors. While there are private collections in all countries around the world, the number in Japan seems to be extraordinarily large and reflects the deep love which the Japanese people have for their culture and their past as well as the responsibility they feel to protect and preserve it. But this large number of private collections, of all types and sizes spread throughout the country presents an equally large challenge. While I have no experience in how to manage such a diverse and immense number of private collections, I am greatly impressed by the response of the people. I am especially moved by their willingness to rescue works of art after a disaster. To me this represents a significant and valuable resource to the Japanese government and one which can be mobilized to assist in saving cultural heritage when disasters strike. I suspect that if the government was to reach out further the response of the people would be even more immediate and positive. This brings us back to the concept of a simple guide for response. Something which the people, collectors and volunteers could receive. As a first step it might best start with the most simple and inexpensive methods of caring for those treasures. I am confident that because the Japanese people care a great deal about their heritage they would be willing to make the effort to improve the care of that heritage, not only during and after a disaster, but before one occurs. I would also like to support the statements that the documentation of these many collections, including their location and contents, is extraordinarily important. You have started this effort, and I encourage you to allow it to expand. If it continues to develop it will surely serve as a wonderful model for so many other countries around the world. I have a comment about this because what he has said is very important, but I would rather wait until later in this discussion. In a disaster, the priorities for immediate response will always be to save lives and to restore essential services that support and maintain lives, through medical care, shelter, food distribution and production, infrastructure, basic needs, etc. Heritage usually comes in very low on the list of immediate priorities in the early days following a disaster, even though we can show over and over that its safety, protection and presence becomes increasingly important to people in the weeks and months following a disaster.

The difference between many disasters and that of the 1966 Florence flood was that it wasn't as life-threatening nor did it threaten as severely the infrastructure. It was of course terrible, but it, it mainly affected cultural and commercial/private property.

While saving and sustaining life always has first priority there should also be preparation and support for responding to the needs of cultural heritage and funding held in reserve to support such response.

I want to start by thanking all of you on this panel and in particular Prof. Uchida, Dr.

Kamba and Dr. Fukunaga for the invitation to come and discuss these issues of disaster mitigation, response and recovery. And I apologize for my lack of Japanese language skills. It has been a privilege and a deep honor to listen and to learn about the activities here in Japan, a country that has faced many challenging times and terrible disasters.

Disasters are terrible. We all wish they would never happen. but they inevitably do and it is human nature that we want to forget them quickly and as an unfortunate result not learn from them. But within the profession of heritage preservation, it is our goal to resist nature, and to learn from past events like disasters. We of course would like to extend this goal to controlling nature itself. But that is, of course, not possible. What we can do is be aware of the inevitability of such events and learn from each one so that we might better prepare for the next and better protect our heritage treasures. So I want to take just a moment to say why disasters are, in a way, important. I want to consider how they can push, and have pushed, us to improve our skills and approaches in preservation. You mentioned the Florence Floods. These terrible floods changed our methodologies and the professional development of cultural preservation/conservation for several generations. And I think the latest disaster of 2011 in Japan has the potential to again change everything. To raise awareness of this is why I am here. I am know that I take the risk that you might be offended that I come to talk about mitigating disaster after you've just been through such a terrible one. But I trust that you understand I am here because this is a moment that could change many things within heritage preservation for the better. And particularly enhance our awareness of the importance of response to and preparedness for disasters. It was mentioned in this meeting that if Japan were to make more widely known what was done during the recent set of disasters and how it is coping with the aftermath, that this would give Japan a higher international profile. I think that is absolutely true. But for the rest of the world what is more important is the enormous contribution Japan could make to the international community of heritage preservation. In all areas, from the protocols that were developed by you to transfer materials from a disaster site to a treatment laboratory; to the present and future role of the government and private sector in disaster preparedness, response and recovery. Included as well would be heightening the awareness that we are not just salvaging material heritage but also intangible heritage, people's history and emotional investments. And of course the world could learn a great deal from the observations and experience that guides your future plans. Japan is in a unique position to describe how it will now go about, planning for the next inevitable disaster, even as you face the demanding challenges of recovering from the most recent one. Dr. Kamba mentioned the need for more research and understanding as to how we respond to disasters removal of soluble salts introduced by flooding (tidal wave inundation) was mentioned for example. He noted that we think we know the best procedures, but perhaps under the difficult circumstances present during disaster response we may in fact not know the best methodologies. It is important that we share these observations, these

experiences, and follow up to be sure we are ready for the next challenge.

Finally I want to make a few observations on the way a disaster can re-engage the population with its heritage and its history. We know that after a major disaster, visitation to museums and libraries and attendance at music concerts and theater performances all increase. I believe this is because people start to think about the quality of their lives rather than material goods. About beauty, about the value of the past and the creative efforts of the past. I am here because I have a goal. The goal is to bring experts together and to form an international body that will address and advance these issues of preparedness, response and recovery. In particular preparedness and mitigation of damage. I have a particular interest in the latter aspect; the mitigation of earthquake damage to collections. But of course the needs are so much more broad, as you have all expressed. Rescue of collections, buildings and monuments in villages, private houses, and cities; the creation of salvage networks and the efforts involved in rebuilding and recovery are complex. The community that I would like to create would address and advance all of them.

This community must be inter-disciplinary – engineers, scientists, conservators, art historians, anthropologists, policy makers, etc. And it has to be a large and diverse community. I would never assume to tell you what your next step should be in Japan. You are far in advance of most who face such challenges. But my next step is to ask you if you would like to join that effort that this international group will represent. Help me invite international colleagues that face the same problem, to the table so that we can begin working together and sharing our experiences and developments. That's my goal. I ask that you delegate someone to this task so that these representatives can begin to build the network that will ultimately benefit all of us. Your participation, your knowledge, your experience, is invaluable to the world of heritage preservation, to the future of material heritage.. There is much benefit and advantage for all of us who agree to partner

Thank you.