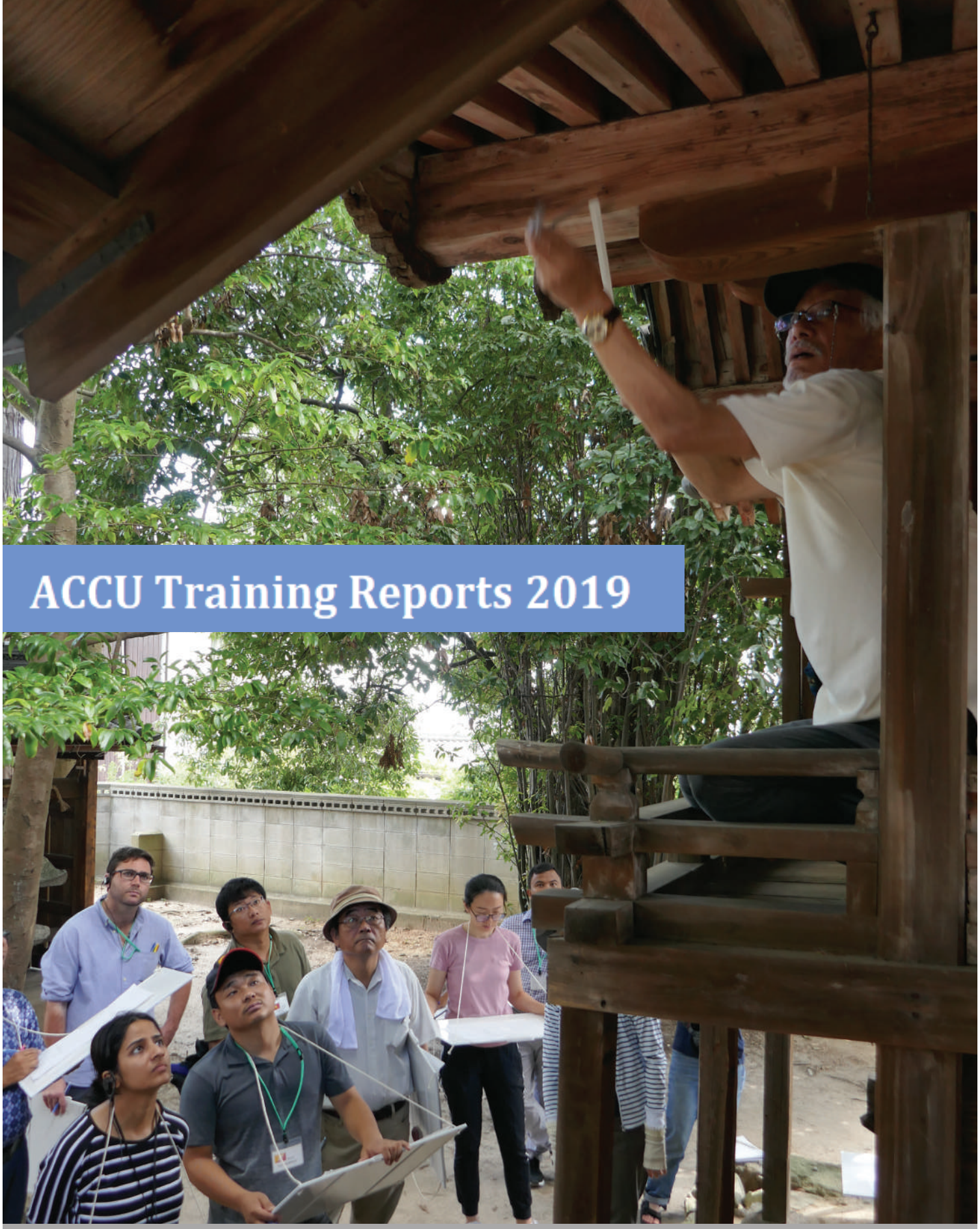
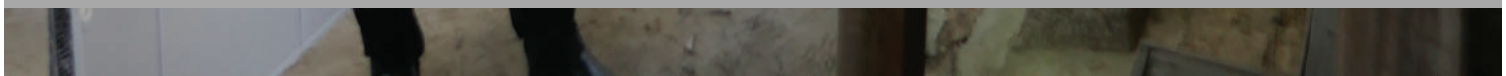


ACCU Training Reports 2019

Cultural Heritage Protection in the Asia-Pacific Region

- Documentation, Conservation, and Utilisation of Museum Objects
- Conservation and Management of Wooden Structures
- Photographic Techniques for Cultural Properties



Preface

The Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU Nara) has been conducting training programmes on cultural heritage protection since 2000. For the programme held in Nara, a total of 301 heritage practitioners from 36 countries of Asia-Pacific region have joined in the Group Training Course and 86 from 25 countries have done in the Thematic/Individual Training Courses. Additionally, 211 experts have taken part in the Regional Workshop conducted in each country of the Asia-Pacific region.

This volume contains the training reports written by participants of the Thematic Training Course, Group Training Course, and Regional Workshop. The contents of each programme are as follows:

Thematic Training Course

-Participants: 6 mid-career professionals with 10-15 experiences from Kyrgyz, Tajikistan, and Uzbekistan

-Training period: 24 July – 7 August 2019 (15 days)

-Theme: Documentation, Conservation, and Utilisation of Museum Objects

-Venue: Nara, Japan

Group Training Course

-Participants: 16 young professionals with 5-10 years experiences from 15 countries

-Training period: 4 September – 3 October 2019 (30 days)

-Theme: Conservation and Management of Wooden Structures

-Venue: Nara, Japan

Regional Workshop

-Participants: 18 professionals who are involved in documentation of cultural heritage at museums or relevant institutes in Cambodia

-Training period: 18 – 23 November 2019 (6 days)

-Theme: Photographic Techniques for Cultural Properties

-Venue: Phnom Penh, Cambodia

Contents

I. Thematic Training Course

Country Reports

Practical training at Gangoji Institute for Research of Cultural Property

Country Report

Khairullo Ibaidullaev
Deputy Director for Science
Historical Division, Science Department
"Sulaiman-Too" National Historical Archeological Museum Complex

1. Overview of the Museum

1.1 Museum organizational structure

Sulaiman-Too National Historical and Archaeological Museum Complex

The Sulayman-Too National Historical and Archaeological Museum Complex, one of the largest museums in Kyrgyzstan, is located in the City of Osh, also known as the Southern Capital of Kyrgyzstan. The museum was founded on September 13, 1948 by a decision of the Executive Committee of the Osh Regional Council of Workers' Deputies of the Kyrgyz SSR No. 770 "On the Founding of the Regional Museum of Local Lore in Osh".

The museum complex includes the unique Sulaiman-Too mountain, a UNESCO World Heritage site. Since 1975, this mountain has been a geological reservation. In 1982, when the mountain, together with monuments of archeology and architecture on its slopes and at its foot, was transfered to the museum, it became an integral structural component of the Sulaiman-Too National Historical and Archaeological Museum Complex.

Sulaiman-Too Security Zone

Since 2004, the museum holds "National" status, and is directly managed by the Ministry of Culture, Information and Tourism of the Kyrgyz Republic.

The museum complex employs 98 people and has the following structural units:

1. Administration Department, 7 employees
2. Accounting Department, 8 employees
3. Storage Department, 6 employees
4. Exhibition Department, 4 employees
5. Methodology Department, 3 employees
6. Science and Education Department, 8 employees
7. Popularization and Monitoring Department, 6 employees
8. Maintenance Department, 56 employees

1.2. A brief description of the museum (present condition of the collection items, exhibition halls, and storage facilities)

New buildings, meeting the requirements of museum standards, were constructed for the museum in 2000. The exhibition area is 2,090 square meters, and the storage facility area is 447 square meters.

Number of storage items: The museum has a collection of more than 33 thousand exhibits. They include 6,694 archaeological items, 3,702 ethnographic items, 19,852 photographic documents, and 1,196 art and craft items, paintings, sculptures and prints. The exhibits are arranged in five rooms in the following order: a room for woolen, felt, cotton and silk materials. There is a room for wooden or copper exhibits and paintings, a room for photographic documents, a separate exhibition of archaeological items in the basements, a room for precious metals. The museum exhibition reflects the nature and history of southern Kyrgyzstan from ancient times to the present day.

Number of visitors (2018): 217,658 including 6,748 visitors from non-CIS countries.

1.3 Cooperation and assistance from foreign countries including Japan

We cooperate with such international organizations as UNESCO, UNDP, SOROS Foundation. The main methods of cooperation include seminars, trainings, festivals and exhibitions.

2. Current Job Responsibilities

Currently, as a Deputy General Director for Science, my responsibilities include the overall supervision of scientific activities in the museum complex, in particular, preparing plans and reports, replenishing the collection, recording and storing exhibits, organizing exhibitions, events, etc.

3. Challenges

Management of museum collection: The main problems that I often encounter are related to collection, in particular, recording and storing the exhibits. We record the exhibits using old methods. We have already begun digitizing the exhibits, however this has also been inefficient so far.

Preservation and restoration: There are no professional restorers or the corresponding laboratory in our museum. We now preserve and restore the museum objects on our own, but this is not enough.

Monitoring: In our complex, as I mentioned above, there are architectural and archaeological sites. Their condition is constantly monitored by our staff. But we want to learn modern methods and practices of monitoring archeological and architectural sites.

Exhibition method: Our museum exhibition was last composed in 2000 and needs to be renewed. We want to learn new, modern methods and techniques for making up an exhibition.

Public Cooperation: We also need experience in working with the public. This includes involving volunteers, sponsors, public organizations with the purpose of developing museum practices and preserving monuments.

Organization of museum practices: We need experiences in the field of museum management, personnel management, preparation of work plans, etc.

Exhibition hall

Museum storage room

4. Need

Higher educational institutions in our country do not yet train museum specialists. A course in museum practices was launched last year, but few students enrolled. The job of a museum specialist is not very popular with young people, maybe because of low salary.

Therefore, our museum also short of staff. Every year, there are fewer and fewer experienced specialists. Such seminars are very important to us in order to gain international experience and share it with other museums in Kyrgyzstan.

Country Report

Nurizat Omorova
Restorer Assistant
Art Group,
The National History Museum of the Kyrgyz Republic

1. Overview of the Museum

Kyrgyzstan is a country with rich centuries-old history. On its territory, there are a lot of archaeological sites of ancient and medieval history. As in other countries of the world, our country has its own National History Museum of the Kyrgyz Republic, which preserves the centuries-old culture and history of the past and present for the future generations. The capital of Kyrgyzstan is the prosperous City of Bishkek. The National History Museum is located in the center of Bishkek, in the Ala-Too Square. The museum is subordinate to the Ministry of Culture of Information and Tourism of the Kyrgyz Republic.

There are 16 departments with 131 employees in the museum:

1. Administration and Management – 5 employees
2. Main staff – 4 employees
3. Department of Archeology – 4 employees
4. Department of Ethnography – 4 employees
5. Department of Research and Exhibition – 5 employees
6. Department of Collection Storage – 7 employees
7. Department of Recording Collection – 5 employees
8. Restoration Department – 4 employees
9. Department of Research and Methodology– 5 employees
10. Department of Education and Public Outreach – 6 employees
11. Department of Information and Communication – 3 employees
12. Artistic Design Team – 3 employees
13. Accounting Department – 3 employees
14. Engineering Department – 16 employees
15. Maintenance Department – 25 employees
16. Service staff – 32 employees

The national museum was founded on December 9, 1925. In 1991, it moved to the building of the Lenin Museum constructed in 1984. At the entrance of the museum there is a sculpture dedicated to the epic poem “Manas”, and in front of it there is a monument to the world-famous writer Chingiz Aitmatov.

The National History Museum of the Kyrgyz Republic is one of the first scientific and educational institutions in the country. The museum houses extensive archaeological collections that reveal the secrets of early civilizations and the life of primitive people. In addition, the museum stores ethnographic valuable items, such as the traditional clothing of Kyrgyz nomads, woven items, leather and wooden items, and horse tack. There are also numerous commemorative instruments and clothes of the great representatives of the Kyrgyz people, such as those belonging to the great composer Toktogul Satylganov, ballet dancer Bubusara Beishenalieva, great writer Chingiz Aitmatov and other famous personalities. The museum has over 100,000 collections. All of them, both displayed and stored, are genuine. The museum staff members do their best to keep these collections in good condition.




Thanks to the inspiration and hard work of former director Isiralieva Anarkul Ybykeevna, the museum has been renovated. The halls are equipped with new multimedia devices; there is a specially designated area over two floors where master classes for children and adults are held. The storage rooms are equipped with modern devices for storage, restoration and conservation of collections.




The total area of the museum is about 8,000 m^2 including 4,000 m^2 of exhibition halls; the storage area for museum collections is about 800 m^2. Each hall of the museum is dedicated to a certain topic such as Archeology, Ethnography, Soviet times, and Modern times. There is a hall for temporary exhibitions too.

2. Collaboration with Other Countries

The museum cooperates with the embassies of Russia, Japan, China, Turkey, USA, Germany and other countries. With the help of the USA, we made an open storage hall called "The Gold of Ancient Kyrgyzstan". Unfortunately, it was lost during the renovation in 2018. The surrounding territory of the museum was renovated with the help of Turkey. In addition, the museum often holds exhibitions of Chinese and Japanese craftsmen and artists – ceramics, gold jewelry, shadow theater, calligraphy and so on. Japanese experts conducted a spectral analysis of ceramic and gold items. The inside of the museum was renovated by German designers who also brought in new equipment.

3. Current Job Responsibilities

I am an artist, designer, and also assistant to Koibagarova Toktokan, who is the chief restorer. Our responsibilities include the restoration of valuable artifacts.

As a professional designer, I helped set up new exhibitions in the museum of writer Chingiz Aitmatov and hero of the Soviet Union Cholponbai Tuloberdiev in the Talas region as well as the Museum of Local History located in the Batken region together with fellow researchers and historians of our museum.



Unfortunately, there are no professional restorers who could design and use improvised materials correctly in our museum and in our country. For restoring and preserving museum collections, our staff members have to do using special materials such as glue, paper, specialized double-sided tape, nails, fishing lines and so on.

For example, in the village of Krasnaya Rechka in the Chuy region, the parts of a Buddha sculpture dating back to the 7th-8th centuries, made of local clay used for building temples, were found by archaeologists from Russia and experts from the Academy of Sciences of the Kyrgyz Republic. For restoration of this Buddha sculpture, the restorers from Hermitage used the glue invented by the experts of Hermitage.

In our restoration practice, we often have problems on conservation of metal, wooden or leather items. Currently, three chief restorers work in our museum; two of them specialize in archeology and the other specializes in ethnography. The main problem in our country is the lack of universities that train museum workers and restorers. Also, due to poor funding, our employees rarely conduct archaeological excavations, so the artefacts are often excavated illegally by treasure hunters.

I hope that professional restorers from other countries will conduct training seminars and master classes on the latest technologies for the restoration and preservation of museum collections, especially objects made of wood, metal, leather, soft materials and clay.

Country Report

Bobomullo Bobomulloev
Junior Researcher
Department of Archaeology,
National Museum of Antiquities of Tajikistan

Overview of the Museum

The National Museum of Antiquities of Tajikistan is a state budget organization with the status of the National Museum founded in 2001. The museum is subordinate to the Institute of History, Archeology and Ethnography of the Academy of Sciences, Republic of Tajikistan. The main goal of the museum is to preserve and display the valuable cultural properties of Tajikistan. Since the museum is a division of the Institute of History, Archeology and Ethnography, majority of the museum collections are the objects found during scientific archaeological excavation conducted by the Institute. The museum purchases only a very small number of its collections from local people.

National Museum of Antiquities of Tajikistan

The Museum has seven exhibition halls on an ongoing basis. These halls are in chronological order:

1. Hall of the Stone Age.
2. Hall of the Bronze Age.
3. Hall of the Early Iron Age.
4. Hall of the Achaemenid and Greco-Bactrian periods.
5. Hall of the Kushan era.
6. Hall of the Early Middle Ages.
7. Hall of the Middle Ages.

Currently, more than 10,000 collections are on display at the museum halls.

Exhibition Halls of the National Museum of Antiquities of Tajikistan

The museum stores more than 100,000 items in the storage rooms. These are the results of archaeological excavations in Tajikistan over more than 70 years.

Storage of the National Museum of Antiquities of Tajikistan

Painting collections in the museum storage

The museum has two departments: Department of Archeology and Department of Restoration and Conservation. The total number of employees of the museum is 35 people and 15 of them belong to the Department of Archaeology.

Every year, the Department of Archeology organizes and conducts archaeological excavation in Tajikistan. The main task of the excavation is a more in-depth study of the history and archeology of the country.

Wall Painting Preservation Project Supported by Tokyo National Research Institute for Cultural Properties

From 2008 to 2014, thanks to the support of the Tokyo National Research Institute for Cultural Properties (TNRICP), a large project on the conservation and restoration of wall paintings was carried out at the National Museum of Tajikistan. Within the framework of the project, significant work was performed over more than five years. Japanese restorers and specialists carried on the restoration work literally from the smallest fragments of murals that had been stored in the museum storage for several decades. It should be noted that the scene with the image of "Musicians" from Hulbuk was put together and restored from small fragments to become the precious item of our museum. As part of a joint project with the TNRICP, the museum storage and archives were modernized.

TNRICP employees restoring murals

Museum Storage

In addition, TNRICP experts also held seminars and trainings for restorers both from Tajikistan and other Central Asian countries for years. I will take this opportunity to once again express my gratitude to all NRICPT employees who participated in the preservation of the cultural heritage in Tajikistan.

Workshop with participants from all countries of Central Asia in the National Museum of Antiquities of Tajikistan

Current Job Responsibilities

I work for the Museum as an archaeologist and study the Bronze Age in Tajikistan. My job duties are conducting field archaeological excavations; documentation of archaeological finds; preparation of collections for the exhibition; and conducting excursions in the Museum. Over the past five years, I participated in archaeological excavations of Bronze Age sites such as Sarazm, Farkhor and Kangurtut. The Site of Sarazm was discovered in 1976, and since 2010 it has been inscribed on the UNESCO World Heritage List. Farkhor and Kangurtut are new sites founded recently and they are the results of the research and excavation conducted by the National Museum of Antiquities of Tajikistan.

Country Report

Manuchekhr Rakhmonov
Junior Researcher
Department of Conservation,
National Museum of Antiquities of Tajikistan

Functions of the Museum and the Department of Restoration and Conservation

The National Museum of Antiquities of Tajikistan was founded by a decree of the Government of the Republic of Tajikistan on April 4, 1996, and the Department of Restoration and Conservation began its work in 1998. The main task of the Department is the restoration, conservation and preparation of objects for the exhibition in the Museum. One of the first and most striking projects of the Department is the restoration of a large statue of "Buddha in Nirvana" with length of about 13 m.

There are currently four employees in the Department of Restoration and Conservation who work under the guidance of my teacher Burkhonov Rustam. We restore sculptures, paintings, ceramics, metal (gold, silver, copper, bronze, etc.) objects, wooden objects, and objects made from other materials. The problem in the Department is lack of human resources; there are not enough restorers employed.

The responsibilities of the Department mainly include:

1) **Monitoring the condition of the objects displayed in permanent exhibitions, as well as those stored in the Museum's storage rooms.**
2) **Laboratory work.**
3) **Participation in archaeological excavation (primary restoration in the field).**

Every year the restorers of the Department treat several museum objects that are not protected with display cases. They include a large statue of the "Buddha in Nirvana", a model of the stupa, a sculpture of Nana, wall paintings, etc. "Treat" here means "removing the dust" from the objects. This is required work because they become dusty during the year due to the influence of weather conditions. The treatment of such objects is carried out with special brushes and cotton wool using industrial alcohol, acetone, and distilled water. We treat other museum objects after assessing their conditions and conduct the restoration and conservation if necessary.

Laboratory Work

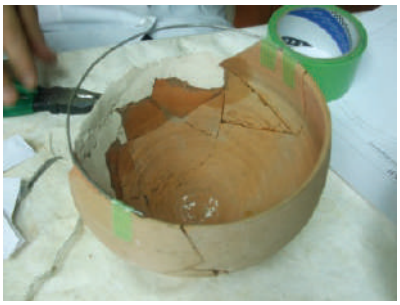
In addition, the Department restores new collections the Museum receives as a result of archaeological excavations or from the public. When new objects arrive at the Department, the degree of damage is determined in the restoration laboratory. Then, pre-restoration examinations are carried out such as visual observations, chemical analysis, and radiographic scanning. Finally, we make a restoration plan for a particular object. For example, I mainly work on ceramic objects, and my work procedure is as follows:

1) Photographing the object before, in the process, and after restoration.
2) Cleaning the object with citric, acetic, hydrochloric or formic acid dissolved in distilled water in a concentration suitable for the object.
3) Desalination using only distilled water. The object is placed in a container with distilled water, and the water is changed periodically.
4) Drying the object by technical means and in a natural way.

5) Reinforcement (impregnation). Depending on damage of the object, ceramics are reinforced (impregnated) with A 3-5% solution of PBMA in acetone, alcohol (technical), and xylene.
6) Bonding with a 10-15% solution of PBMA in acetone.
7) Treatment with mastic. The mastic solution is prepared from polyvinyl butyral dissolved in distilled water. Mastic paste consists of desalted clay, alabaster and a small amount of sand.
8) Colour selection (if necessary).





Restoration of Wall Paintings

In Tajikistan, special attention is paid to wall paintings. For example, I participated in exposure and removal of the painting “Tulips” in the ancient city of Penjikent in 2012.

Beginning in 1949, restoration experts at the State Hermitage, led by Pavel Ivanovich Kostrov, developed conservation and restoration methods that made it possible to preserve adhesive painting on loess plaster, charred wood, and unbaked clay sculpture. This technique is based on the use of solutions of a synthetic polymer, low viscosity poly (butyl methacrylate) (PBMA) in various solvents (acetone, xylene, alcohol, MEK). PBMA is colourless, light-resistant, chemically inert, and resistant to aging, so it has all the necessary properties of a restoration material. This technique, developed specifically for Central Asia wall loess paintings, has been successfully used for over 70 years. It should be noted that these methods have been continuously improved.

The work of restorers on each layer included a few steps.

1) Cleaning the painting surface.
2) Reinforcing the prime coat and paint layer with 3-5% PBMA solution in acetone.
3) Drawing the mural image on plastic film.
4) Photofixation.
5) Creating a protective film by repeatedly applying an acetone solution of PBMA on the surface of the painting.
6) Closing with gauze using an acetone solution of PBMA.
7) Removing the painting by thin layer on a lath.
8) Removing plaster residues from the back.
9) Fixing the back side of murals with PBMA acetone solution (if necessary).








Archaeological Excavation

In addition, the staff members of the Department always participate in archaeological excavations. They carry out initial restoration of new finds that need restoration.

Since 10 May 2019, I have been working in the Sarazm excavation site in the Panjakent region, northern Tajikistan. Sarazm is the only proto-urban monument of the Eneolithic and Bronze Age that is inscribed on the UNESCO World Heritage List. During this period, I have restored and preserved about 10 artefacts in the museum and excavation site.

Collaboration with Japan

The National Museum of Antiquities of Tajikistan, in particular the Department of Restoration and Conservation, has been cooperating with the State Hermitage Museum of the Russian Federation since the very start. In the framework of cooperation with the Hermitage, our specialists are invited to monthlong internships for further training. In addition, the Museum and the Department have cooperated with restorers from Tokyo National Research Institute for Cultural Properties, Japan (TNRICP) for several years. Thus, within the framework of a project with the TNRICP, the painting called “Musicians” was restored. Japanese colleagues also conducted special trainings to share knowledge and experience with our experts. They also provided important assistance in acquiring a few necessary instruments for the Department.

Country Report

Bakhtiyor Khodjaev
Curator of the Numismatic Collection
Department of Numismatic,
State Museum of History of Uzbekistan

Introduction

Uzbekistan is a country of ancient civilization and deep culture. Uzbekistan has an ancient and eventful history which includes the general historical processes of the development of civilization, the diversity of its forms and the variety of manifestations, as well as features and patterns that are characteristic only of the history of Uzbekistan. Among the Central Asia states, Uzbekistan the largest number of historical and ancient cultural monuments as well. The soil in our Republic is a precious archive that stores unique historical and archaeological monuments of different eras from the first men to large ancient states. As a natural result of extensive archaeological research in Uzbekistan, archeology became an independent branch of historical science with a number of outstanding discoveries of world significance.

At the end of the 2nd century BC the Great Silk Road was taking shape, the first transcontinental road in the history of mankind that connected the civilizations of the East and the West. The era of antiquity in the historical and cultural regions of Uzbekistan is characterized by rapid progress in all areas of material, artistic and spiritual culture: quantitative and qualitative growth of cities, a high level of irrigation development, agriculture and handicraft production, a wide interaction of various cultures, rapid development of trade and commodity-money relations.

In total, more than 1,000 monuments of architecture and archeology have been restored. This all contributes to the preservation of the cultural heritage of the Republic, and the study of the monuments of the ancient history of the people.

Currently, there are 7,750 cultural heritage sites under state protection in Uzbekistan. They include 3,945 archaeological monuments. Four cities – Khiva, Bukhara, Samarkand and Shakhrisabz – are included in the UNESCO World Heritage List. Currently, work is underway to perform the procedure for 43 items of cultural and natural heritage to make the “On the Silk Road” nomination list.

Overview of the Museum

The State Museum of the History of Uzbekistan is the largest scientific and educational institution in Central Asia. As a multidisciplinary scientific institution, the museum performs the functions of: a research institute, the largest storage of monuments and spiritual culture, a center for the promotion of historical knowledge. The museum has been part of the Academy of Sciences of the Republic of Uzbekistan since 1943 when the Academy was founded.

The museum exhibition occupies the third and fourth floors of the building. The total exhibition area is 2,500 square meters. The number of exhibits exceeds 10,000. In the design of the exhibition, complexes of archaeological finds, ethnographic material, coins, written sources, photographs were used widely and diversely. The exhibition will, of course, be changed, improved, replenished with new exhibits, and in this connection new sections and other exhibitions will appear.

Over the past 5 years, more than 250 textbooks, monographs, study guides, and scientific articles have been published.

Museum Collections

The museum stores over 300,000 collections in the storage rooms. In over 140 years of its existence, the museum has collected more than 300,000 items in the following areas: archeology – 72,000, ethnography – 18,000, numismatics – 100,000, material relics – 17,000, artworks – 1,300, documents and photographs – 70,000, as well as other historical materials and sources. Affiliated is the scientific library with unique editions of the 9th – 20th centuries and earlier manuscripts.

Archaeological and Numismatic Collections

Archaeological excavations conducted by the State Museum of the History of Uzbekistan for many years have been the main source of replenishment of the museum's archaeological and numismatic collections. Such famous archaeologists of Uzbekistan as M.E. Masson, T. Mirgiyazov, V.I. Sprishevsky, M.E. Voronets, Yu.F. Buryakov, L.I. Albaum and others worked in the museum.

The stone era in Uzbekistan is represented by numerous cave and ground sites, flint mines and individual finds that reflect all periods of development (Paleolithic, Mesolithic, Neolithic). They reveal the progressive nature of the development of human society in Uzbekistan: from the earliest groups up to developed cultures of the Neolithic era.

The numismatic collections of the museum are of great historical value. They include coins minted in a wide chronological framework from the 5th century BC up to the 19th century. The collection contains coins of dynasties: Achaemenids, Alexander of Macedon, Seleucids, Greco-Bactrian kings, Kushan, Khorezm, Sogd, Chach. In addition, the collection contains a significant number of coins of medieval dynasties: Takhirids, Samanids, Karakhanids, Genghisides, Temurids, Khanate of Bukhara, Khanate of Khiva and Khanate of Kokand.

Golden Items

In May 2013, in the village of Maysky (Tashkent region), during excavation works, workers discovered gold items. Subsequently, the state transferred the gold items to the museum, including various gold parts of the belt set, gold plaques superimposed on the bridle, gold stripes for clothes and fragments of other items.

Among the finds there was only one gold coin of Byzantium, tremissis, presumably of the 6th century. The front has a beardless emperor in a ceremonial tiara, you can see armor, part of the shield with the image of a rider. On the back face, there is an image of the goddess Victoria. The image of Victoria, the goddess of Victory, is also characteristic of the early Byzantine coins of the 5th-6th centuries. These finds are of crucial historical importance.

Cooperation with Other Countries

Agreement with the Museum of the University of Tokyo on the study of the Stone Age in Uzbekistan. 2018-2022;
Memorandum of Understanding with Eastern Chicago University. 2018-2022;
Memorandum of Understanding with the Shanghai Museum of the People's Republic of China. 2018-2022;
Memorandum of Understanding with the National Museum of Kazakhstan 2018-2022;
Memorandum with the Luoyang Museum of the People's Republic of China. 2019-2023;
Memorandum with the National Museum of the Sultanate of Oman. 2019-2023;

Country Report

Dilafruz Karimova
Junior Researcher
Department of Registration and Recording of the Museum Collections
State Museum of History of Uzbekistan

General Information of State Museum of History of Uzbekistan

The museum was founded on July 12, 1876 as the *National Museum of Turkestan* and opened in Tashkent on the initiative of Russian scientists – members of the Turkestan branch of the Moscow Society of Lovers of Natural History, Anthropology and Ethnography. Very soon after the museum was founded, it collected its main collections and prepared and held a number of international exhibitions: in Paris (in 1900) and in Milan (in 1906). The museum also contributed to the opening of museums in Samarkand (1896) and in Ferghana (1899).

- Since February 1919, the museum became known as the *State Museum of Turkestan*, and later received the name of *Main Central Asian Museum*.
- In the past 20th century, the museum changed its name and location many times.
- According to the resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 203 dated April 21, 1992, the "Museum of the History of the Peoples of Uzbekistan" was transformed and named the State Museum of the History of Uzbekistan.
- Currently, the museum is located in a building on Rashidov Avenue, which was built in 1970.

Exhibition halls of the State Museum of the History of Uzbekistan:

- The territory of Uzbekistan in the era of stone (1.5 million years BC – 4th millennium BC)
- The territory of Uzbekistan in the era of bronze and early iron (from the 3rd to the 1st millennium BC)
- Formation and development of statehood on the territory of Uzbekistan (middle 1st millennium BC – 4th century AD)
- State entities on the territory of Uzbekistan in the 5th-13th centuries
- The development of science and culture in the 9th-12th centuries
- Renaissance in the era of Amir Temur and Temurids (14th-15th centuries)
- Uzbekistan in the 16th-19th centuries
- The conquest of Central Asia by Tsarist Russia (second half of the 19th century – early 20th century)
- Uzbekistan during the totalitarian system
- Independent Uzbekistan – a free country (since 1991)

The main research areas:

- Collecting, studying, recording and storing museum collections, as well as creating scientific works based on museum storage material
- Development of scientifically based concepts, thematic structures and plans for stationary exhibitions and displays
- Development of original methods and programs aimed at performing a wide range of educational tasks on the formation of a national ideology

- Preparation and publication of scientific works and popular publications, monographs, collections of articles, albums, guides, catalogs, teaching aids for schools and universities and the use of museum materials in educational and pedagogical practice
- Conducting research
- Organization of research excavation
- The development of modern areas of museology

Research work:

The main results of basic research:

- ***Museums of Uzbekistan in the 21st century—New approaches and development prospects (2017-2020)***

  We collected information on independence period activities in relation to history, literature and from art history museums located in Tashkent.

The main results of applied research:

- Creation of an electronic database "Monuments of history and culture" (based on the collections of the State Museum of the History of Uzbekistan) (2015-2017)
- The electronic database including 81,440 items (2015-2017)

Department of Recording and Registration of Museum Items:

The work related to the reception of items acquired by the museum, as well as the recording of museum collections and the storage of documentation is carried out by the Department of Recording and Registration of Items in the following order:

- The museum's Committee for the Procurement of Items examines all items acquired by the museum for permanent storage and make up a protocol;
- Based on the protocol, an acceptance certificate is drawn up in three copies, one of which is transferred to the Department of Recording and Registration of Items, the second is handed to the custodian of the respective archive, the third is given to the person who transferred this item to the museum;
- Based on the protocol and acceptance certificate, the item received in the museum is entered in the museum book of receipt of the main collection for permanent storage, and the item serial number is entered in the acceptance certificate.

This department creates all museum certificates for items received for permanent or temporary storage, and one copy of each document is stored in the department. It also keeps and stores the book of receipt of the main and auxiliary collections of items for permanent and temporary storage. The documents for several years are collected in a separate joint folder.

In addition, the department prepares the general report on items transferred to each museum collection during the year.

Children's Museum

In August 2011, for the first time in the history of the Republic, the Children's Museum "In the World of Wonders" opened in the Museum of History. The museum targeted the children aged 4 to 14 years. The main purpose of the Children's Museum is to help children, through special programs and exhibitions, develop and enrich their knowledge of history, as well as to show their abilities in practice. The museum has the following departments: "Archeology", "Numismatics", "Pottery", "Embroidery", "Fine Art", and "Gifts of Uzbekistan".

Job Responsibility
Since my main activity and scientific research are related to archeology, I regularly deal with the archaeological collections of the museum.

Archaeological excavations conducted by of the State Museum of the History of Uzbekistan for many years have been the main source of replenishment of the museum's archaeological collections. Famous archaeologists of Uzbekistan such as M.E. Masson, T. Mirgiyazov, V.I. Sprishevsky, M.E. Voronets, Yu.F. Buryakov, L.I. Albaum and others worked in the museum. Archaeological excavations have become the main source in the replenishment of the museum's archaeological and numismatic collection.

Under the leadership of L.I. Albaum, our experts took part in the study of ancient settlements of the Surkhandarya region: Balalyktepa, Zangtepa, Jumalaktepa, Khayrabattepa, and the settlements of Old Termez – Fayaztepa and Chingiztepa. At that time, Buddhism had come to the southern regions of Uzbekistan; in the 1st-3rd centuries AD, and played an important role in the life of the population of Northern Bactria, and Termez (ancient Tarmita) became the main center of Buddhism. At that time, large monasteries were built: cave monastery (Karatepa) and aboveground monastery (Fayaztepa). Buddhist monks from Sogd and Bactria played an outstanding role in spreading Buddhist teachings in China. Dalverzintepa (near the modern city of Shurchi) in the Surkhandarya region was an important Buddhist center of that time.

Cooperation with Research Institutes and Museums of Several Countries

- Agreement with the Museum of the University of Tokyo on the study of the Stone Age in Uzbekistan. 2018-2022
- Memorandum of Understanding with Eastern Chicago University. 2018-2022
- Memorandum of Understanding with the Shanghai Museum of the People's Republic of China. 2018-2022
- Memorandum of Understanding with the National Museum of Kazakhstan 2018-2022
- Memorandum with the Luoyang Museum of the People's Republic of China. 2019-2023
- Memorandum with the National Museum of the Sultanate of Oman. 2019-2023

From October 15 to December 15, the museum hosted Chinese international exhibition "Blue and White as a Symbol of the Greatness of the Great Silk Road" in cooperation with the Shanghai Museum of the PRC. As a result of international relations, a temporary exhibition was opened in cooperation with the Luoyang Chinese Museum.

In September 2018, together with the Institute of Oriental Studies of the University of Chicago, a seminar on "Preservation and restoration of archaeological sites" was held for specialists from museums of Central Asia.

International Archaeological Excavation
A project was implemented with the financial support of the Japanese Research Foundation "Japan Foundation" for September 6 – October 2, 2011. The main goal is to study the unique cultural heritage, preserve and transmit it to future generations, as well as to train young specialists on the methods of protection and preservation of cultural heritage via the joint efforts of archaeologists, restorers, architects, museologists of Uzbekistan and Japan.

The Uzbek-French international excavation in Zharkutan Monument (2nd millennium BC) was conducted in 2011. This excavation, organized by Uzbek and French archaeologists, discovered the cemeteries of the Dzharkutan monument in the Surkhandarya region dated to the second millennium BC. Studying the graves made it possible to determine the extent and nature of the funeral rites and religious beliefs of the ancestors of the Uzbek people in the Bronze Age. The artefacts found during the excavation were included in the museum exposition "Bronze Age of Uzbekistan".

As part of the Agreement with the Museum of the University of Tokyo, archaeological excavations at the monuments of southern Uzbekistan were carried out in order to study the archaeological sites of the Stone Age. More than 30 grottoes and caves were explored to look for the presence of cultural layers and the habitat of an ancient people. In 2015, in the village of Machai (Surkhandarya region), the excavation research discovered a new monument, the Kainar-Kamar. Archaeological work in 2016-2017 resulted in significant material dating from the ancient period to the Mesolithic.

II. Group Training Course

I. Country Reports

Practical training on photographic documentation at Tanaka Family Residence

Filling The Gap for Protecting Hheritage Sites in Bhutan: the Need for Legislation and Stakeholders' Awareness

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This paper aims to assess the linkage of past and present practices in heritage sites protection in Bhutan and the gap between them, which has stood as a challenge for heritage practitioners in implementing protection schemes and for custodians of heritage sites in imparting their say in the protection of those sites. These challenges have long existed and this paper only intends to identify their issues and possible actions to address them, but does not necessarily provide solutions to holistically overcome such challenges, as they are part of the practice of conservation.

Protection of heritage sites has made gains at a tremendous pace in Bhutan, both in principle and in methodology, since the establishment of a governmental body, the Special Commission for Cultural Agency, in 1985. This does not mean that no protection was carried out before this administrative step. Rather, protection based on international practices and doctrines has been introduced in Bhutan ever since, while professionals working in the field have sought to harmonize these international practices with traditional ones. The operational guidelines for implementation of the World Heritage Convention, for example, has been one such important guiding document, even though Bhutan has not endeavored to inscribe even a single site on the World Heritage List.

Fig.1 Entrance side view of Semtokha Dzong

Protective works for heritage sites in Bhutan are carried out through executive orders of the government. Before the Ninth Five Year Plan (FYP; 2002–2007), most of the works were carried out based on the plans and instructions of renowned master carpenters, with little or no involvement of professionals in the field of heritage. Many foreign experts visited the country and tried to impart standard practices in conservation, but the age-old system of passing down intangible skills in craftsmanship through veneration of master craftsmen, and the perception of heritage sites as dynamic assets which have altered over the course of time,

have been detrimental factors for the development of modern notions of protection for heritage sites. The traditional approach has also prioritized living factors, and the value of antiquities and relics preserved in heritage sites, over the structures themselves. After the implementation of the first ever conservation project at Semtokha Dzong in the Ninth FYP, and subsequent projects up to the current Twelfth FYP, the approach to the conservation of heritage sites has changed. Through a series of policy documents and public awareness measures, the Department of Culture, as the lone governmental agency involved in the protection of heritage sites, has succeeded in instituting standard approaches to the protection and management of heritage sites. With technical assistance from Kyushu University of Japan and the UNESCO office in New Delhi, the Department of Culture has drawn up the first ever holistic legislative document on heritage sites, the Cultural Heritage Bill, which has been tabled for deliberation in the Parliament since 2016. Some of the provisions of the Bill are being implemented with the understanding of the stakeholders. Many new developments are being brought to the field of heritage protection. However, in the same manner as for most countries in the world, Bhutan has a long way to go to reach the required level of protection.

Fig.2 Carpenter working on traditional joinery detail (top left); masons dressing stone (top right); women ramming earth (above)

To understand the problems, this paper intends to focus on two aspects of cultural heritage in Bhutan and to outline the areas which need attention, not only for professionals working in the field of cultural heritage but also the general public and decision makers.

Considering the spiritual value of heritage sites as the paramount, or sometimes the only, value of cultural heritage

For the first aspect, this paper will reflect the findings of an inventory carried out in 2016–2017 in Paro Dzongkhag.[1] This *dzongkhag* was selected for the inventory since it has the highest concentration of *lhakhangs* [2] in Bhutan and is one of the country's developed *dzongkhags.* In addition, it has the only airport in Bhutan, and tourism is key to its economic activity.

The project aimed to survey *lhakhangs* in Paro Dzongkhag built before the sixteenth century. According to the National Inventory List (NIL) maintained with the Department of Culture, there were 80 *lhakhangs* built before the sixteenth century in Paro. However, during the site verification and documentation, only 58 sites could be assessed due to the availability of proper information and the consistency of data with reference to the NIL.

Fig3. Some of the heritage sites surveyed in Paro Dzongkhag

The results of the inventory raised concern in the Department of Culture. Table 1 shows the interventions found to have been carried out at the surveyed *lhakhangs*.

Reconstructed	9
Renovated	39
No repair	10

Table.1 Interventions at 58 lhakhangs built before the sixteenth century

Out of 58 *lhakhangs*, nine have been totally reconstructed, meaning there are no or very few portions remaining of the former historic structure. Another 39 *lhakhangs* had been renovated but the renovation works had partially destroyed or lost important parts of the structure. Only 10 *lhakhangs* have remained intact with no intervention as of recently.

The assessment of the survey results and the information gathered from the owners and caretakers of the *lhakhangs* revealed interesting findings, particularly regarding the perceptions of owners and caretakers regarding the protection of heritage sites. From the various justifications provided for interventions, the most common were the following in 10 cases of reconstructed and renovated sites.

1. For better structural stability
2. More important cultural assets, relics and statues, are well preserved in the new structures
3. The sanctity and significance of the place is maintained despite the reconstruction
4. Continuity of the living heritage
5. Relevance to the community and stakeholders

Fig.4 Reconstruction in progress (left) and major alteration to the design (right)

This analysis of the perspective of the owners and community reveals that their consideration of heritage value is solely from a religious/spiritual point of view. The spiritual value associated with a heritage site is one of the important values of the site but not necessarily the only value. At some of the sites, the historical relevance of the structure was paramount, but through reconstruction traces of the original form have been completely erased, thus losing one of the essential values of the site. The relevance to the community and stakeholders is also an important criterion for the management of cultural heritage, but should not be viewed as contradicting the heritage value, and if possible the process of protection should seek to align such relevance with the value of the site.

The Cultural Heritage Bill-2016 aims for value-based protection of cultural heritage. The bill states that cultural heritage value "shall be understood as aesthetic, architectural, archaeological, historical, scientific, religious or spiritual significance that is of importance to the nation of Bhutan, by reason, of:

i. bearing witness to important historical events of Bhutan;
ii. demonstrating the course of Bhutan's history or spiritual development;
iii. association with the life or achievement of a person or group of persons of importance in Bhutan's history;
iv. association with a particular community for social, cultural or spiritual reasons;
v. representing traditional social systems, lifestyle or livelihood of Bhutan;
vi. exhibiting unique integrity of humanity with the natural environment;
vii. representing the uniqueness of style, techniques or innovations of a particular period;
viii. potential to educate, illustrate or provide further scientific investigation or analysis that will contribute to understanding Bhutan's history or cultural heritage;
ix. any other matter which is relevant to the determination of cultural heritage value."

The definition in the bill shows the way to determine the cultural heritage value, but it does not necessarily end there. The process of determining cultural heritage value, particularly for heritage sites, is more crucial than the final statement of significance. The bill shows the way, but the journey taken in the process is most important. That process requires consideration of human resources. Further, the involvement of the owners or caretakers and their awareness will play a pivotal role in it. Aligning the original mindset of the stakeholders to the appropriate process of determining the value of the site requires more than the technical skills of conservation.

The enactment of the Cultural Heritage Bill has been a top priority of the Department of Culture since it was submitted to the government in 2016. The bill has yet to come through as an Act. The first daunting task foreseen after it becomes an Act is to integrate other important values of heritage sites, at a level equal to or greater than the spiritual value, with the stakeholders' appreciations of the sites.

Segregation of cultural heritage property and traditional buildings

"It is important to segregate and understand the distinction between the property or site as cultural heritage or traditional/old property or site," according to Professor Tsuguto Ezura, of Okayama University of Science, Japan, as his take on the general trend of protection methods of cultural heritage. This statement is of vital importance for us to reflect on in the protection work carried out in Bhutan. It is through such segregation and distinction that protection methods can be appropriately determined.

To carry out the segregation and distinction of heritage sites, a comprehensive inventory is required. The Department is currently working on this inventory of heritage sites, in parallel to the registration of heritage sites as mandated in the Cultural Heritage Bill. The inventory will be pivotal for the value-based protection of heritage sites. Based on the inventory of heritage sites and their proper segregation and distinction, and in accordance with the legislation, appropriate methods for protection need to be determined. It is not a straightforward case or a standard approach, but will be specific to each site.

In conclusion, the gap highlighted in this paper, between traditional and modern practices in heritage site management, is common to every nation promoting cultural heritage protection. The professionals working in the field of cultural heritage need to understand this and the support of governments will be crucial to overcome the challenges. Stakeholders and the general public have a huge role to play in the process. Capacity building and awareness are also vital parts of the process. There is never a single perfect approach to the protection of cultural heritage, as the contexts are intricate. However, the right process will always lead to wise protection.

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[1] The term *dzongkhag* means "district." There are twenty districts in Bhutan.

[2] Buddhist temple.

Present Situation and Challenges Regarding Tangible Cultural Heritage in Cambodia
Cultural Heritage Protection: The Cambodian Context

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I Geographical Setting

Cambodia covers an area of 181,035 square km, forming part of the southwestern portion of the Indochinese peninsula. The country's maximum extent is about 580 km from east to west and 450 km from north to south. Cambodia shares its 2,438-km border with Thailand (in the west and north) and Vietnam (in the east and southeast). In the southwest Cambodia is bordered by the Gulf of Thailand.

II Cambodian Cultural Heritage Resources

The most up-to-date heritage inventory shows that Cambodia has more than 4,000 archaeological sites, including prehistoric sites, ancient mounds, ancient monuments, man-made water reservoirs, irrigation systems, cave sites and ancient Buddhist temples, which have been discovered throughout the country and are dated to between the late 3rd millennium BCE and the 19th century based on current research. The majority are monuments in brick or sandstone. It is common to see basalt, brick, sandstone and laterite monuments scattered throughout Cambodia.

With regard to the immovable tangible cultural heritage, the General Department of Cultural Heritage, under the Ministry of Culture and Fine Arts (MCFA), maintains a register of the monuments and sites in Cambodia. The tangible heritage has been classified under various categories such as colonial and modern buildings, monuments, forts, old wooden buildings of pagodas, caves, graves, places where significant wars have been fought, etc. Cambodia also has a significant built heritage from its colonial and early independence periods, and excellent recent studies are available of the process of architectural and urban history and development in the capital city of Phnom Penh and in three provincial towns (i.e. Battambang, Kampot and Kratié, with its neighboring city of Chhlong). The early colonial cities developed without any directed planning, and were divided into French quarters and those of the local inhabitants: Khmers, Chams (Islamic Khmers), Chinese, Vietnamese, etc.

Fig1. Archaeological map of Cambodia


Fig.2–3 Pre-historical archaeological site and its excavation: Laang Spean Cave dated to about 70,000 BCE, located in Battambang province, western Cambodia


Fig.4–5 Angkor Borei cemetery (400 AD), Takeo province, southern Cambodia




Fig.6–9 Basalt, brick, sandstone and laterite monuments and ancient bridges of Cambodia



Fig.10–11 Old vihears of Mahaleap and Svay Sach Phnom pagodas, 19th century
Fig.12 Old stupa, early 20th century

III Conservation of Monuments and Old Buddhist Temples

The MCFA has been making considerable progress in the restoration and conservation of the monuments and old pagodas under its responsibility, which exclude the Angkor monuments of Siem Reap province, Preah Vihear Temple, and the Sambor Prei Kuk Temple Group that are under the responsibility of the APSARA, Preah Vihear, and Sambor Prei Kuk Authorities, respectively. Work at these latter monuments is also sponsored by UNESCO, foreign governments and other partners representing international donors and research communities.

In the meantime, emergency work for the preservation of monuments and old buildings at pagodas and other heritage sites has been maintained by increasing police, guards and security personnel on a more regular basis.

Fig.13–15 National Museum of Cambodia and its stone conservation laboratory

Fig.16–19 Emergency work on monuments

Fig.20–23 Emergency work for first aid needs

Fig.24–27 Monuments before and after restoration

Fig.28–30 Pagoda and community involvement

Fig.31–33 Stone decorative conservation and transformation

IV The Challenges and Conservation of Old Buddhist Temples:
"Case Study of Vat Chen Damdek Khang Choeung Monastery"

I now present a case study related to the Chen Damdek Monastery. The scope of this training marks a significant step forward for case studies such as the following.

Vat Chen Damdek Khang Choeung Monastery is one of the most well-known pagodas in Phnom Penh, as the 15th-century birth of the pagoda coincided with that of Phnom Penh. The pagoda has one of the oldest ancient temples left from the reign of King Norodom, built in 1887, along with other buildings such as dormitories and cemeteries, all of which are well-preserved ancient structures built during the French colonial period. Vat Chen Damdek Khang Choeung Monastery of Wat Daekdae is one of the oldest surviving monuments of Udong art found at Wat Preah Vihear in Udong. Therefore, I would like to present the case of the preservation of Buddhist buildings at the Vat Chen Damdek Monastery of Phnom Penh, preserved and restored by MCFA.

Vat Chen Damdek Khang Choeung Monastery was built of brick, lime, tile, and concrete, and having ornamentation and a gabled wooden roof. There were wooden doors and windows, with iron planks around them, numbering two doors at the east and two others at the west, plus nine windows on the north and nine on the south. The temple is 21 meters long and 12 meters wide. The exterior is adorned with ornaments on the roof and wooden facades on the east and other concrete sections (renovated during the 1960s). The interior section has wooden pillars, ceilings, tiles and concrete, featuring gold motifs on the ceilings, roofing units and pillars.



Fig.34–36 Vihear before and after restoration

Risk Factors

Without proper maintenance, Vat Chen Damdek Khang Choeung Monastery was severely damaged, and the causes of the damage were structural changes, building life expectancy, lack of moisture maintenance, and especially pest damage.

- Human factors: The monks do not pay much attention to the heritage value of the old vihear.
- Natural factors: Weather, rain, sun and humidity have damaged the structure of the vihear in many places, such as the outer pillars and parts of the walls. Many parts have been damaged.
- Insect/pest factors: Among insects, termites are the most destructive, with the roof of the vihear completely eroded from termite damage.

The Phase of Preservation and Repair of the Vihear

- Removing termites: Termites are destructive to the structure of the vihear.



Fig.37–38 Removing termites from the wooden structure
Fig.39 Poison for removing termites

- Restoration of roof accessories and ornaments

Fig.40–42 Repairing the damaged wooden structure of the temple

- Restoration of wooden structures destroyed by termites: Reinforcing with wooden supports of damaged and corroded portions (door frames, window frames, roof top).

Fig.43–45 Restoring wooden portions destroyed by termites

- Restoration of brick pillars: Pillars damaged by natural factors (rain, sun, time…).

Fig.46–48 Repairing brick pillars

- Repair of sculptures: Most of the sculptures and ornamentation needed repair.

Fig.49–51 Sculpture repairs

Conservation of the Wooden Structure, "National Museum Building''

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I. Introduction

It is very important that we pay attention to the conservation of buildings which are more than 50 years old, because all types of old buildings can identify for us the lifestyles of our ancestors, whether of low or high livelihood, and some can show us the style of the owners or describe for us the events of an era. Styles and aesthetics of buildings change by era, so that we can identify for example fives styles of traditional Khmer houses. Even though some old buildings are not yet listed as National Heritage, they are still treasures of our nation. All kinds of important buildings include stone temples, brick colonial buildings, pagodas, and also wooden buildings such as houses. Everywhere in Cambodia there are all kinds of such buildings, both provincial and urban (Fig. 1).

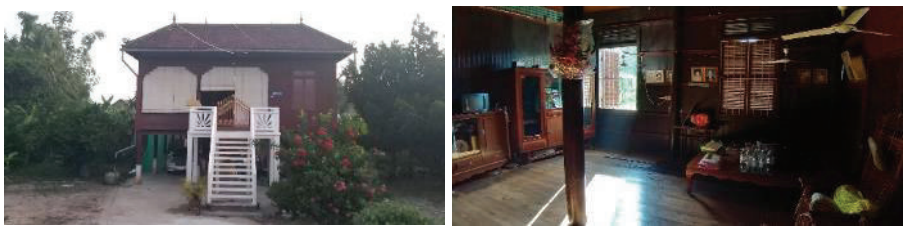


Fig.1 A 60-year-old provincial house

II. Museum history

The National Museum of Cambodia (NMC) houses one of the world's greatest collections of objects of Khmer cultural materials, including sculptures, ceramics and ethnographic objects from the prehistoric, pre-Angkorian, Angkorian, and post-Angkorian periods. The museum promotes awareness, understanding and appreciation of Cambodian heritage through the presentation, conservation, safekeeping, interpretation and acquisition of Cambodian cultural materials. It aims to educate and inspire its visitors (Figs. 2–3).

The foundations of the principal structure of the Museum were laid on 15 August 1917, and it was completed two-and-a-half years later, during the Khmer New Year and was inaugurated on 13 April 1920. In 1924 the building was slightly altered. The central section of the east façade was renovated in 1986 under the supervision of Cambodian architect Vann Molyvann. The museum was closed between 1975 and 1979, the years of Khmer Rouge control, and re-opened on 13 April 1979.
During the years of Khmer Rouge control, the museum was evacuated and abandoned. The museum suffered from neglect during this time. After liberation on 7 January 1979 it was found to be in disrepair, its roof rotten, the garden overgrown and a colony of bats inhabiting the museum roof. The building was seriously damaged at that time by animal, human, natural and other factors.

However, despite such obstacles the last decade has seen considerable progress, thanks to generous assistance from individuals, foreign governments and numerous philanthropic organizations. In recent years the Museum has successfully addressed a range of key concerns, including the protection and repair of the museum building.

Fig.2 The Albert Sarraut Museum in 1933

Fig.3 The Albert Sarraut Museum in 1920 (©NMC)

III. Preservation and repair work on the main building, National Museum of Cambodia

After suffering from neglect and being abandoned for many years during the Khmer Rouge regime, the museum building was preserved and repaired again by the national government with generous assistance from various individuals. Below is a summary of the course of repair work.

In 1994 Australia provided funds to renovate the structure of the museum building, such as the rafters, battens and roof tiles. Some of the damaged timber rafters were removed and replaced, and some of the roof tiles were cleaned and repaired. Additionally, a new batten ceiling was added above the old one. This repair program ended in 1995.

In 2001 a structural intervention to construct a new "bat-proof" ceiling was proposed. The National Museum of Phnom Penh had a problem with a sizable colony of bats living in the large roof space over the museum's priceless collection of Khmer sculpture. A report was prepared, following a request from the National Museum of Phnom Penh in collaboration with the Wildlife Conservation Society, New York, for developing an answer to the future of the bats and ultimately the future of the museum. An inspection of the building was undertaken by a team from the World Monuments Fund working at Preah Khan. Eleanor Briggs provided funds for financing the preliminary investigations and the development of the design program.

Apart from the above, to protect the museum building from the colony of bats the director of the museum, Mr. Kun Samen decided in October of the same year to expel the bats from the roof space, and the plan was carried out until completion in March 2002.

In 2006, through cooperation between the Ministry of Culture and Fine Arts of Cambodia and the French Embassy in Cambodia, a portion of the galleries (Exhibition Hall B) was renovated, with tiles of the floor removed and restored again (Fig. 4), and an old painting on a window repainted (Fig. 5).

Fig.4 Renovation of the exhibition hall in 2006 (©NMC)

Fig.5 Repair and repainting of a window of the National Museum, 2006 (©NMC)

In 2008 part of roof was repaired with funds from the national budget. This time the focus was not so much on the structure of the roof but on portions of the roof top, such as part of the tile roof and its ornaments (Bos Sbok, Neak Dang Kda, etc.) and the top of timber structure (Fig. 6).

In 2018 part of the structure of the roof and the ornaments were renovated. The Ministry of Culture and Fine Arts provided the budget and experts to repair and restore structural parts of the roof. In cooperation with the experts, the Planning Office of the Department of Museums provided some damage documentation, and photographed and reported on the work.

Fig.6 Repairing the roof top, 2008 (©NMC)

IV. National Museum Building

The National Museum is composed of four wings encircling a central patio. The front wing of the National Museum consists of a lower basement floor and a raised main floor with the National Archive on the upper floor. The three exhibition gallery wings have been constructed as lofty single story structures with longitudinal bearing masonry walls, a wooden roof structure, and a lightweight wooden ceiling. The masonry bearing walls have a thickness of 38 cm.

Physical dimensions

The east façade is 97.09 m long, the north and south sides are 72.98 m, the floor area of the exhibition galleries is 2,800 m^2, that of the studios and stores is 540 m^2, the offices and archives are 1,200 m^2, and the total is 5,190 m^2.

Museum plan

The museum has a plan of two floors, the first floor functioning as gallery halls and three conservation labs. These include the stone, metal, and ceramic conservation labs. The second floor is used for offices, library, and the textile conservation lab (Fig.7).

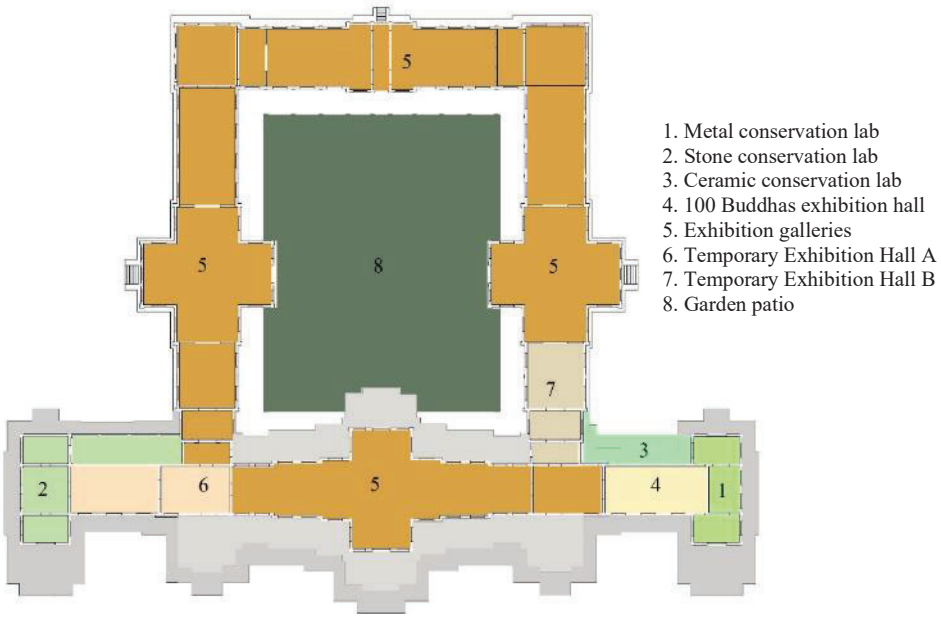


Fig.7 The Museum ground floor plan

V. Techniques and experiments in conservation and restoration of wooden structures

Renovation of a colonial building in Kampot

Renovation of a colonial house on a list of UNESCO or culture heritage buildings is not easy, as we have to keep it in the same older style. We can change to a functional floor plan but the building elevation has to keep the current appearance. Accordingly, before renovation or conservation, a record of the existing state is required. This work needs to be careful for all steps, first checking the existing site and old photographs of the building before renovating, then measuring to draft extant plans, observing all structural deterioration of the building to determine what parts should be removed or reused or restored. If the structure is still strong or there is no damage it is better, but if parts of the structure must be removed it is a big problem, as we have to find some technique to stabilize the structure before it is dismantled (Fig. 8). Dismantlement should be done step by step.

Fig.8 Stabilizing a structure to be dismantled, colonial building in Kampot, 2014

Museum roof top renovation

Dismantlement

This describes the techniques used in conservation of the roof top and ornaments of the Museum building. Site preparation is an important step when starting construction. After the site is prepared, taking photos before dismantling and then checking and noting the order of dismantling the structure is needed for restoration. Then removal and repair or replacement of damage can proceed (Fig. 9)

Fig.9 Dismantling an ornamental structure of the roof top (Bos Sbok) 2018 (©NMC)

Replacement and tidying up

Unsound structural members were removed and replaced with prefabricated items, but some members that could be used again were cleaned and repainted (Fig. 10).

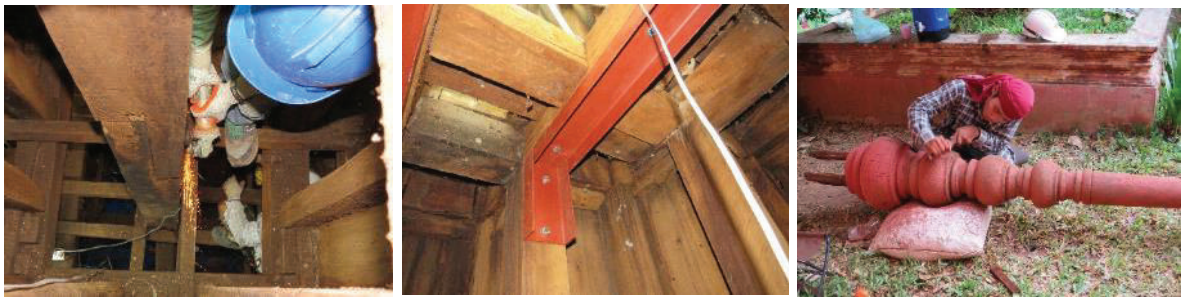
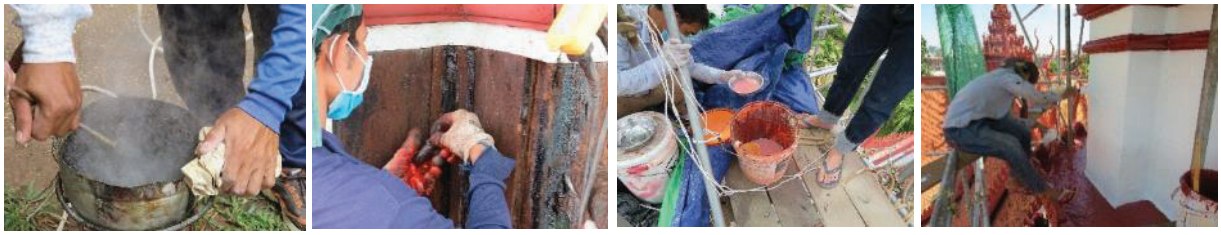


Fig.10 Replacing and cleaning structural members of the roof top (Bos Sbok) 2018 (©NMC)

Waterproofing and repainting

Latex mixed with sand was used for waterproofing wooden parts. The latex must be warm before mixing with sand. Waterproofing and repainting were done after restoration (Figs.11–12).



Figs.11–12 Waterproofing and repainting the roof top of the Museum building (©NMC)

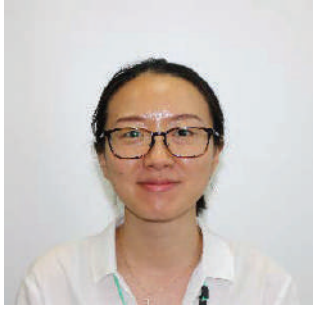
Restitution

The last step is restitution of the structure. This step should carefully follow the reverse order of the dismantlement (Fig. 13).

Fig.13 Restitution of the roof top of the Museum building 2018 (©NMC)

VI. Issues and needs

This 100-year-old building still has many problems from multiple factors such as nature and animals. Rain causes a lot of problems, as water flowing in from the roof to the galleries and other parts is harmful to the ceilings and walls. Not only that, the large storage area in the basement is sometimes flooded by heavy rains. Some collections are also affected. The elevation of the building is damaged by the atmosphere, including the brick walls and the stairs outside the tile floor area. Incidentally pigeons reside everywhere in the building, in the side galleries and along the roof of the museum. The walls inside and outside of the building are soiled and damaged by pigeon droppings, resulting in bad aesthetics for the building. To prevent all these problems, other techniques are required. For its future needs the museum might consider repairing the patio roof top structure and tiles causing that roofing part to have some problems in need of fixing. It will be hard to do this job, as the repair must be done part by part, because of a lack of funds and expert techniques in this field of work. However for the future the Museum needs to provide its young professionals with more technical skills in protecting against natural and animal risks. The Museum needs more cooperative programs to enhance and update the staff's knowledge. In conclusion, this workshop is very important for young professional conservators in Cambodia.



Some Discovered Issues in Conservation Work in China Protection and Utilization of Cultural Heritage

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I am a conservation architect practicing at Tsinghua University, China, being fortunate to live in an era that is unparalleled for our cultural revival. In 2012 during the 18th CPC National Congress, the president of our country, Xi Jinping, proposed the motto "to make the relics come back to life." It subsequently became a national undertaking to restore all sorts of cultural heritage. Along with protective measures, the utilization of our cultural heritage in modern development has become increasingly important. Most of my professional work involves designing protective shelters, relics exhibitions and building renovations. In the following report, I will introduce some of the issues I have encountered in my work as a conservation architect.

Issue I: Insufficient Historic Record

From Neolithic times in the Hemudu region (6,000-7,000 BCE), we already have relics of wooden structures with mortise and tenon joints. Wooden structures constitute the majority of our traditional building types that have evolved for about 9,000 years. However, only two historic treatises on architectural design and construction survive today, the *Yingzao Fashi*, a treatise on architectural standards published in 1103 AD (Song dynasty), and the Qing Gongbu Codes for Architectural Practice, published in 1734 AD (Qing dynasty).

We did not have our own history of architecture until the 1930s when members of the Yingzao Xueshe, the Society for the Study of Chinese Architecture, successfully translated these two treatises from ancient Chinese and thus deciphered the building construction and management techniques of the Song and Qing dynasties. Their study was accompanied by extensive field trips around China, recording and analyzing real-life examples to confirm their understanding of the treatises, as well as to fill in the gaps in the records. During one of their trips in Shanxi, they identified the Nanchan Temple, which is dated to 784 AD (Tang dynasty), as the oldest preserved timber building in China. The fruits of their research laid the foundation for the history of Chinese architecture and building culture. One of the most important discoveries was that our traditional architecture has an order that is based on the measurements of the brackets, and each component of a building conforms to a very precise proportional system.

Notwithstanding their contributions, we still know very little about the appearance of buildings before the Tang dynasty, because written records were lost, and compared to earthwork relics that may last for thousands of years, timber structures tend to perish easily. These reasons have made the reconstruction of buildings before the Tang dynasty rather difficult. From 2016 I started to work on the conservation of the family mausoleum of the Marquis of Haihun (Fig. 1) near the city of Nanchang, Jiangxi. The mausoleum was built before 59 BC for the first Marquis of Haihun and his offspring. It represents a unique example of a marquis-level mausoleum from the Western Han dynasty (202–8BC). My tasks involve designing a protective shelter for the tombs of the Marquis and his wife (M1 and M2), as well as reconstructing some of their sacrificial buildings for exhibition.

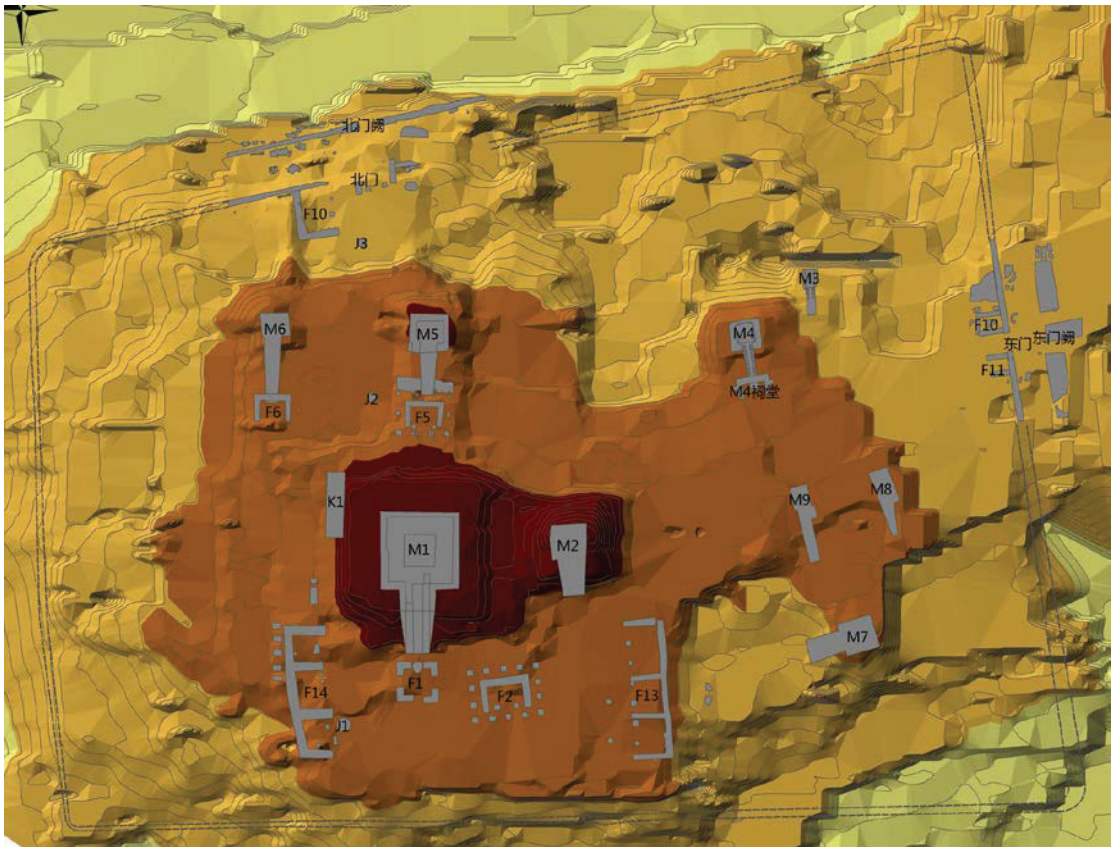

Figure 1. The archeological plan of the family mausoleum of the Marquis of Haihun

The buildings above ground were completely gone, but we could extract some building information from the features surviving in the soil. We could confirm that in front of M1 and M2 there were four sacrificial buildings (F1, F2, F13 and F14) and could infer the size and layout of the buildings from their bases and rammed earth foundations. There were also tiles scattered nearby, significantly larger than the ones from later dynasties. This indicated a larger basic unit for the building plans. A wooden bracket was found inside one of the ancient wells, a rather important discovery because it would shed light on the proportion and structural members of architecture of the Western Han dynasty. However, because of insufficient historic records to confirm the finding and lack of monetary support from the government for more on-site staff and experts, the report was never completed. Since 2016 we have organized several meetings with experts on archeology and architectural history to discuss the reconstruction work. Even though each time we made some progress, piecing together details confirmed from the site and other contemporary relics, we still do not have a complete picture for the architecture of the Western Han dynasty.

Issue II: Inadequate Conservation Management

As wooden relics are both complex and vulnerable, they need special care for documentation and risk management when they are removed from their original locations. Even though nowadays we use highly advanced tools such as HD photography, 3D scanning and GIS to measure and digitize the relics, much historic information can be lost due to negligence during the documentation process. A 3D scanner can produce high-definition 3D models of artifacts, but it cannot reconstruct how each component is put together in complex relics such as wooden structures. Therefore, a professional system for on-site documentation is extremely important for successful preservation.

The tomb of the Marquis of Haihun, like its contemporary noble tombs, was buried with abundant treasures and made with marvelous building techniques. Most of the noble tombs in the Han dynasty were emptied and destroyed by tomb robbers from later eras for their treasures. The tomb of the Marquis of Haihun, however, was exceptionally well preserved because it was fully flooded during an earthquake in 318 AD, and the water made the tomb both airtight and impenetrable. The wooden chamber inside the tomb, along with the buried objects, presented to us the life of the Marquis of Haihun, because during the Han dynasty the nobility would build their tombs to replicate their everyday life settings.

The chamber was built with large pieces of camphor wood, intricately interlocked together. The archeologists recalled that when they first opened the tomb, they were amazed by the strong fragrance inside. By the time we first visited the site in 2016, a year after its excavation, the layout of the chamber had been well preserved, but we could still detect the scent of the wood. However, each member dismantled from the top of the chamber was laid out randomly and numbered with a loose paper label.

When we visited for the second time, the labels were gone, and some of the wooden pieces could no longer be returned to their original locations. Later, serious water leakage was found at the bottom of the chamber, so the remaining portion of the chamber was quickly removed for processing to make it waterproof. Because of a drastic change in humidity, the wooden pieces became dehydrated, shrank quickly, and lost their fragrance. As a result, there was no hope to restore the original chamber.

Advanced technology can do little to save wooden relics from deterioration and misplacement without a carefully executed conservation management plan. A thorough conservation plan should be devised in advance, even in cases of emergency, to monitor the risks to the remains when they are removed from their original environment. The plan should also be carried out with considerable care and discipline. Once we lose the original condition, we lose it forever.

Issue III: Fading Craftsmanship Heritage

In Chinese history, human professions have been categorized into the four classes of scholars, farmers, artisans, and merchants, from the most esteemed to the lowest. Wood craftsmen therefore belong to the second lowest social class. Considered as high art through the lens of modern people, architecture as a creative profession was not so favored by the historic elites compared to poetry, painting or calligraphy. Architectural design was also strictly regulated by building codes of each dynasty to control the construction scale and cost to avoid corruption and transgression. For these reasons, very few books were devoted to architectural design and craftsmanship. The ingenuous skills of the best craftsmen were orally transmitted through family heritage and kept secret from others, and thus were easily lost during wars and dynastic changes.

Each dynasty adopted new standardized building systems, and the founding emperors usually burned down preceding buildings or renovated them in the contemporary style for political and economic reasons, so most of the extant historic buildings have been rendered in the styles of the Ming (1368–1644 AD) and Qing (1636–1912 AD) dynasties. Construction techniques were an invisible part of building history that was poorly transmitted. Even with written regulations and real-life examples, it remains a mystery how craftsmen from each dynasty selected the timber materials, processed them, and made them endure.

In 2017 I started to work on a renovation project in Wuhouci, Chengdu, China. Wuhouci dates back to 223 AD, during the Three Kingdoms period (220–280 AD). It consists of the mausoleum of Liu Bei, the emperor of Shu Kingdom, and the memorial halls for him and his most revered prime minister Zhuge Liang. The original buildings of the Three Kingdoms period are completely gone. Because Zhuge Liang was widely known for his outstanding wisdom, war strategies, and most crucially, his loyalty towards his emperor, he became an exemplary figure throughout Chinese history. Many emperors from succeeding dynasties spent considerable sums of money for renovation and expansion of the memorial for people to commemorate Zhuge Liang. The current layout mostly preserves that of the Daoguang Emperor (1821–1850 AD; Fig. 2), with all of the buildings rebuilt in the Qing dynasty.

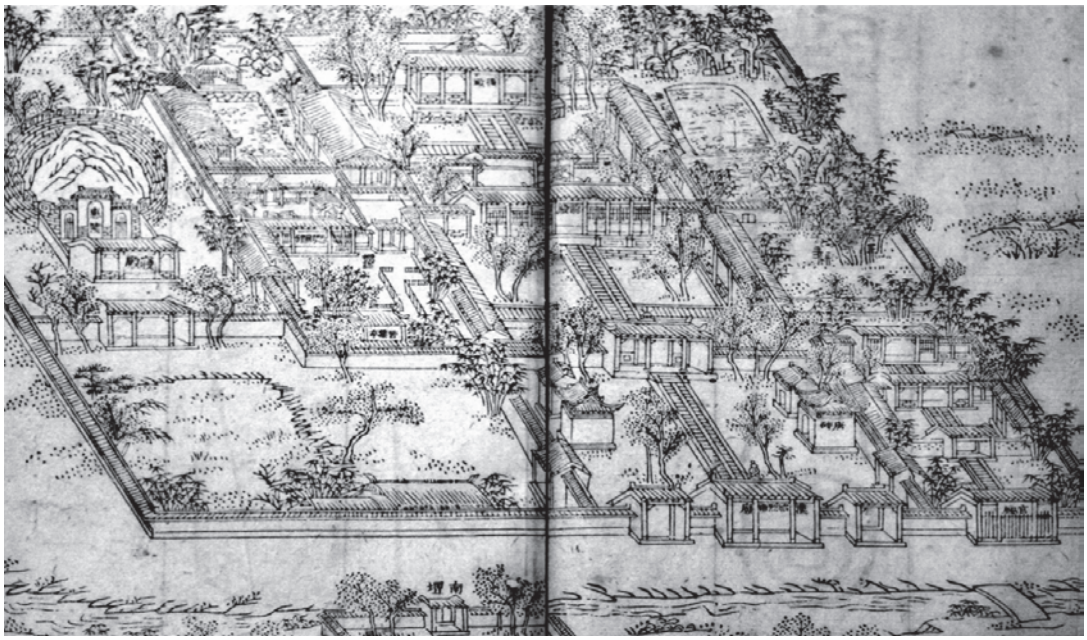

Figure 2. Layout of Wuhouci during the Daoguang years of the Qing dynasty

In modern days, because concrete construction turned out to be much more efficient and less expensive, the woodcraft industry has gone downhill. Since the 1980s, after a major renovation and addition of an exhibition hall, Wuhouci became a public museum. Some of the traditional wooden architecture has been replaced with concrete structures, built in the likeness of the Qing style. The exhibition hall was also built in concrete with a traditional appearance. Even though some of the important buildings were renovated in wood, they turned out to be less elegant and cannot be expected to last long because of the difficulty of finding wood of the same quality, and the loss of original techniques.

Conclusion

With more archeological sites of early history being uncovered, increasing amounts of historic building information is becoming available to us. Comparative studies of such remains worldwide would also help in reconstructing the ancient building styles and techniques. A shared vision regarding conservation management plans would also help us to improve our site documentation and risk management to preserve our heritage in a non-destructive manner. We also need to learn from the Japanese craftsmen and architects how to develop systems that will allow wood craftsmanship and construction to endure through modern development.

Traditional Knowledge Systems in India: The Case of Dravidian Style

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India is a country with one of the most extensive assemblages of living built heritage in the world, with a rich cultural past and several magnificent historic precincts. Since the time of ancient civilisations natural products have been used as the primary construction materials, and the early construction methodology has influenced that of later ages. The remains from Indus Valley Civilization (3300–1300 BCE) indicate the use of timber in upper storeys which have not survived. Many ancient treatises from the Vedic period and early texts and commentaries mention timber constructions, including urban dwellings, palaces, temples, sculptures, idols and vernacular structures providing protection against the extremes of weather and calamities. We also have a well-developed tradition of wooden architecture for Hindu temples in India, but owing to the perishable nature of this material, none of the early structures have survived, with only a few remaining that explicitly use timber, while others lie endangered.

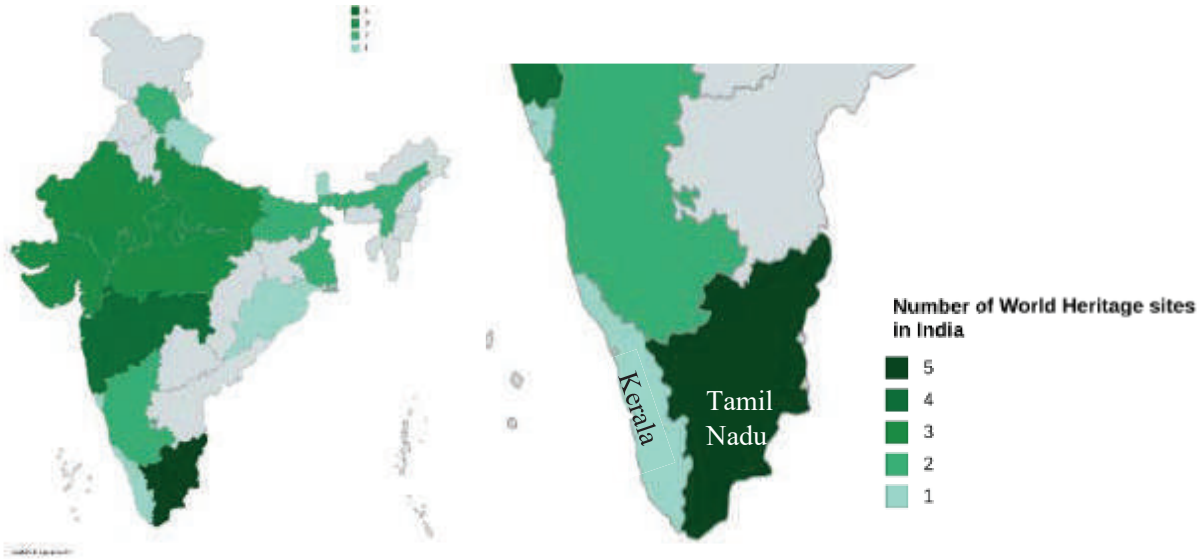

Figure 1. World Heritage sites in India (source: Pinterest, 2018)

The Indian subcontinent comprises 29 states each having a diverse vernacular architecture varying with the local construction requirements, materials, and culture. I am currently settled in South India, hence focusing on traditional timber architecture from the two southern states of Kerala and Tamil Nadu. The traditional architecture of these states has two distinct architectural styles called the Kerala and Dravidian styles. Both are based on *Vastu Shastra* principles but show distinct regional features. The Kerala style consists of residences and temples built primarily in timber, while the Dravidian style comprises mostly temples and *mandapams* (pillared gateways) constructed in stone.[1]

The present report discusses two case studies from my professional work in Tamil Nadu, and one literature study from a Conservation Master's thesis on traditional timber construction.

[1] (Thampuran, 2010)

Case study 1: Strategies for rehabilitation of the Rajagopuram, Arulmigu Naganathaswamy Kailasanathar Temple Brahmadesam, Tamil Nadu, NCSHS, IIT Madras report (2017)

This temple is said to have been constructed in the tenth century CE with subsequent additions by later kingdoms. The overall temple complex was in satisfactory condition and structurally safe except for the Rajagopuram, which is the main entrance to the sanctum. Significant differential settlement was noticed on the north side of the Rajagopuram, the possible cause for which could be the natural drainage process at the site, as corroborated by the masonry crack patterns and structural distress in the Rajagopuram as shown in Fig. 2a.

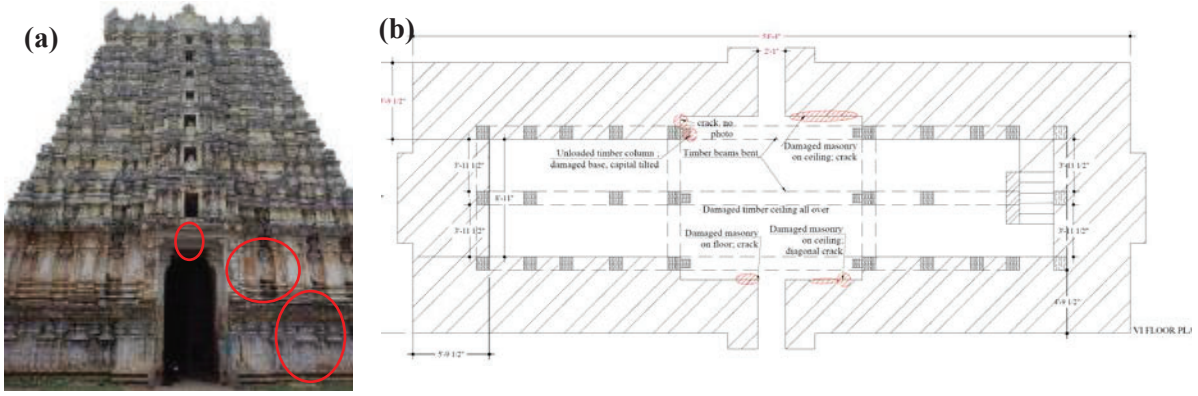

Figure 2. (a) Gopuram front elevation with cracks, and (b) typical upper floor plans

The Rajagopuram is a seven-tier brick masonry structure over a base called *kalkaram* (stone construction) which has the entrance opening. The typical floor plan of the tiered layers is shown in Fig. 2b. Each floor has structural timber columns supporting the timber ceiling as shown in Figs. 3 and 4a. Timber structural members also showed noticeable damage with excess deflection and missing or damaged timber components at various levels (Fig. 3). Cracks in the timber beams were observed at the third-floor level at a critical location with corner separation in the masonry (Figs. 4a and 4b). At a few locations on the sixth floor the timber columns appear to be unloaded or detached from the beam and the floor.

Figure 3. Timber ceiling components showing excess vertical deflection and missing panels

The timber post-and-lintel system in the upper floors has some members embedded in the masonry. Due to damage to the masonry or dampness these vertical posts and the horizontal members in the flooring also show various signs of deterioration.

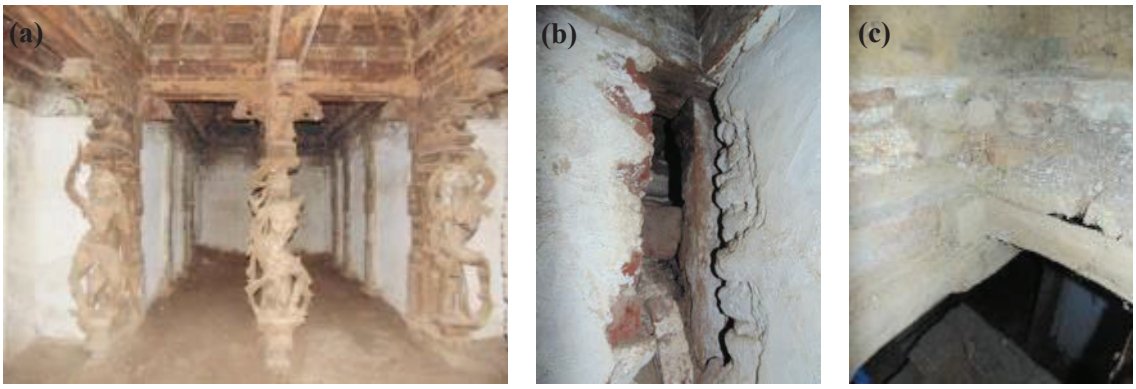

Figure 4. Sculpted columns and timber members embedded in the masonry

At the topmost level (seventh floor), a loss of mortar and deteriorated mortar joints are observed which is the possible cause of rainwater seepage inside the Rajagopuram. The ingress of rainwater through openings at different levels of the structure causes perpetual dampness in the timber elements and accelerates the deterioration of both masonry and timber (Fig. 5).

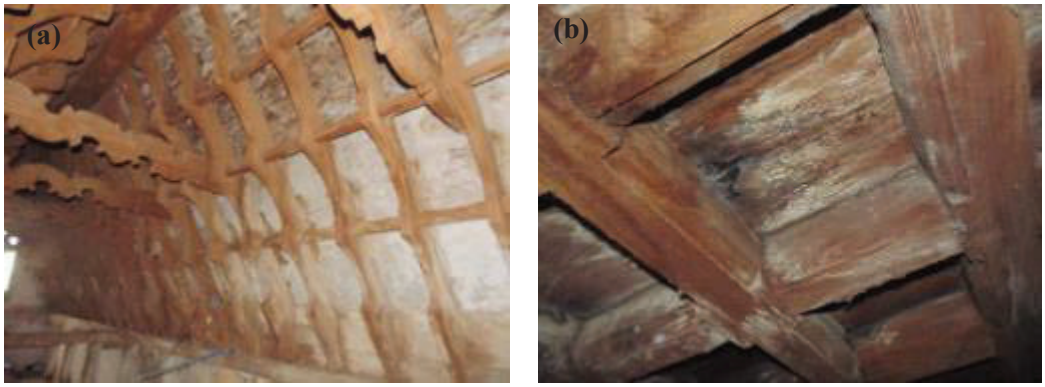

Figure 5. (a) Loss of plaster and mortar in the ceiling and walls at the seventh-floor level, and (b) deterioration in lower ceilings

The biggest challenge is the inaccessibility of these vertical towers, as they are not open to the public and problems do not get noticed until we see signs of damage on the exteriors. Also, such problems become aggravated due to a lack of regular maintenance or any repair protocols on the part of concerned authorities.

Case study 2: Conservation of the 'Church of Our Lady of Light' shrine, Chennai, Tamil Nadu (2019)

This 500-year-old Portuguese church is listed as a Grade I heritage building in Chennai (http://www.cmdachennai.gov.in/HeritageBuildings-PhaseI.html). The main hall and altar are built of laterite stone set in lime mortar (original structure); two transepts were added later in brick masonry to the north and south and the entire structure was re-plastered in cement (date unknown). The structure has a history of differential settlements with cracks in the north transept. Open joints/gaps in the terrace tiles and an inadequate drainage system allow water ingress into the structure, which is absorbed by the porous masonry. Laterite has a high rate of moisture absorption (up to 17%), meaning the walls can hold large amounts of moisture and cause perpetual dampness in the structure. This moisture needs a proper channel to escape, since the cement plaster being nonporous fails to allow the moisture to escape completely, causing degradation of the laterite masonry walls.

The presence of moisture causes damage to the materials, weakening the masonry structure and also affecting principal non-structural elements in the interiors, such as wooden friezes in the altar and statues made of timber.

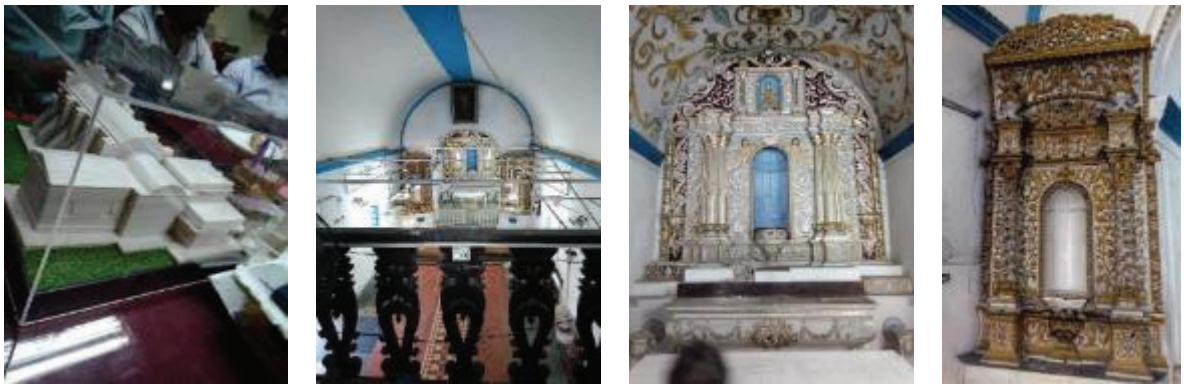

Figure 6. A 3D model of the church, with interior views of the altar and timber friezes

The other structures and elements made of timber include the mezzanine floor (suffering from poor maintenance), a staircase (new addition), and teak and rosewood furniture. Some wooden members appeared to be damaged due to moisture ingress in the roof (Fig. 7a). Damage to the timber was observed after removal of the panels, with a loss of material and hollow sounds in the panels indicating termite attacks, corroborated by mud tubes on the walls as shown in Fig. 8a.

Figure 7. (a) The north transept after tile removal, and (b, c, d) dismantled timber panels

The exterior of the altar (Fig. 8b) has no plinth protection, and stagnated water has caused dampness to rise in the walls, the trapped moisture in the plastered masonry being detrimental to the structure.

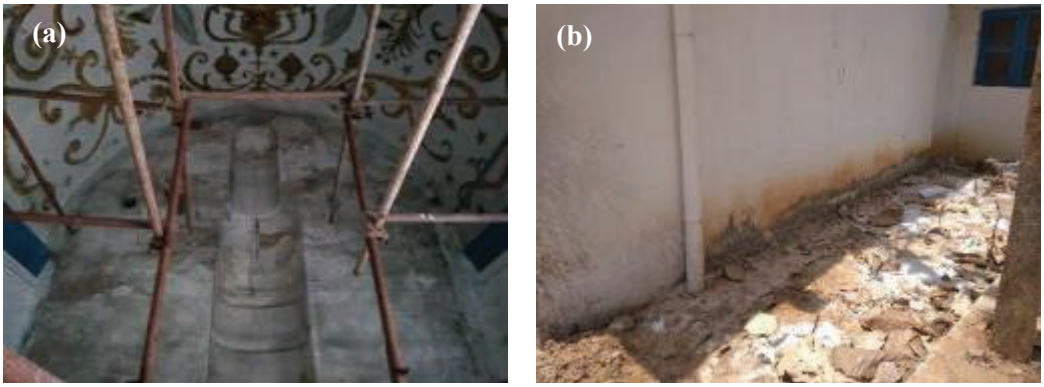

Figure 8. (a) The altar after removal of the wooden panels, and (b) the exterior wall of the altar

Literature study: Padmanabhapuram Palace, Tamil Nadu; Master's Thesis (2018)

Padmanabhapuram (present Tamil Nadu) is an ancient capital of the former kingdom of Travancore. The 6.5-acre palace complex (1550 to 1750 AD) is a protected monument of the Department of Archaeology, State Government of Kerala.[2] Being the oldest and largest surviving example representative of its style of traditional timber architecture, the structure is a quintessential example of indigenous building technology, exquisite craftsmanship and superior knowledge of material science, codified as the *Taccusastra* (the science of carpentry).[3] It is on the tentative list of UNESCO World Heritage sites in India.

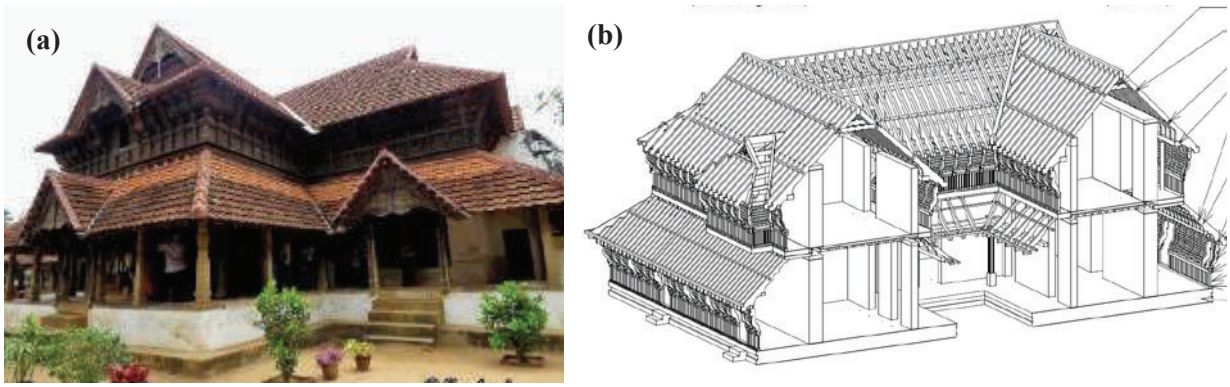

Figure 8. (a) Padmanabhapuram Palace (Source: Google images); (b) axonometric view, Thai Kottaram (Shah, 2018)

As part of a master's thesis in conservation, Mr. Keyur Laxmichand Shah has tried to bridge the gap between the disappearing knowledge from ancient texts and modern conservation principles by the use of information modelling. As he notes, many efforts have been taken in the past to record the architectural details of the palace, but unfortunately the documentation did not result in a very meaningful output in terms of documenting the timber joinery. In timber structures like these, many times the damaged elements are repaired or replaced by local carpenters without any involvement of conservation architects. This sometimes leads to a loss of valuable information on ancient joinery systems if they are replaced with new connections. The older arrangements have to be inferred from our old texts such as the *Mansara*, *Taccusastra*, *Tantrasamuchalaya*, and *Manusyalayacandrika.*

The term *heritage* in India has several connotations. It represents thousands of years of coexistence of communities, social customs, and religious practices. Understandings of this context are encoded in ancient Indian texts which are not fully deciphered. This knowledge needs to be examined in the context of modern conservation principles. With the fast pace of urban development, the gap between traditional knowledge systems and the modern architectural/engineering education system in India is continually widening. Stakeholders have their own challenges, in terms of the absence of guidelines and policies for heritage conservation in the Indian context. There are no in-house work forces in many of the relevant regulatory bodies, and secondly we cannot see any convergence between modern principles and ancient knowledge when people often lack the skills or expertise for understanding the historic materials and living heritage. The restoration procedures mentioned in traditional Indian canons are not compatible with international conservation norms on timber constructions. Hence, our conservation principles need to be redefined comprehensively, with religious views and cultural practices included as part of an interdisciplinary approach to bridge these gaps through concerted research, teaching, and heritage management practices.

[2] (https://whc.unesco.org/en/tentativelists/5897/, n.d.)
[3] (Shah, 2018)

Conservation of a Bolon house, Pematang Purba, Simalungun, North Sumatra

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Indonesia is an archipelago that has cultural diversity. Each island still consists of various tribes who have their own language, culture and customs. Among the traditional buildings, each tribe has a distinctive traditional house which adds to the cultural diversity of Indonesia. Traditional houses owned by each tribe use local materials available in their respective regions. The form, technique and manufacturing process embody local wisdom that has been passed down from their ancestors. Therefore, sometimes even adjacent tribes have different forms of houses and traditions.

Most of the traditional buildings in Indonesia are wooden structures. The wood used as the building material is the strongest wood in each area. The forms of the buildings are the work of indigenous peoples, which have been passed down from generation to generation and are influenced by culture, beliefs, mythology, and cosmology. In addition, the function and division of space in traditional buildings are also influenced by the culture and customs of each region. Therefore the construction process, from the search for materials, the determination of the location and direction of the building, the actual construction and even the manner of use after construction, will not be independent of the influence of the customs and traditions of each region. Traditional ceremonies will also sometimes be performed according to their respective traditions.

The Borobudur Conservation Office is one of the Technical Implementation Units under the Directorate General of Culture, Ministry of Education and Culture. The task of the Borobudur Conservation Office is to carry out the conservation and preservation of Borobudur Temple along with the Borobudur cultural heritage area. To carry out this task, one of the functions of the Borobudur Conservation Office is to conduct conservation studies on aspects of civil engineering, architecture, geology, biology, chemistry, and archaeology of Borobudur Temple and other cultural heritage reserves. Thus, in addition to research on Borobudur Temple, the Borobudur Conservation Office can conduct research on cultural reserves throughout Indonesia.

The problems affecting cultural heritage made of wood are quite complex. Wood is an organic material that is vulnerable to physical and biological damage, so efforts are needed to preserve and maintain such wooden heritage. The approach depends on the type of wood used, which affects the heritage building's strength and durability. The structure and construction techniques used also affect the durability of wooden buildings.

Some research on cultural heritage made from wood has been carried out by the Borobudur Conservation Office. Research that has been done concerns methods of conserving wood and the changes in those methods, as well as research on traditional wooden structures. This is because each region has its own traditional buildings and different types of wood, and also has its own traditional conservation methods. Research on traditional conservation methods conducted by the Borobudur Conservation Office include the use of tobacco, cloves and banana leaves for the conservation of traditional wooden houses. Other research on changing wood conservation methods involves the use of liquid smoke to preserve wood. Research on cultural heritage made from wood that has become carbonized or water logged has also been carried out for its consolidation. As for the building structures and the types of wood used, research has been done on traditional Joglo houses in Yogyakarta and Central Java, Gadang houses in West Sumatra, Tongkonan houses in Tana Toraja, South Sulawesi, Bolon houses in Simalungun, North Sumatra, and traditional Sumba homes in East Nusa Tenggara. Research on these traditional buildings concerns their construction, structure, and traditional conservation systems.

Research on conservation of the Bolon house, Pematang Purba Simalungun, North Sumatra

A Bolon house is a traditional house of the Batak tribe of North Sumatra. The term *Bolon* means "big," so it was a palace or residence of Batak leaders in the past and at the same time a symbol of the social status of the community. A Bolon house is a building constructed with a large stage-like floor which is a characteristic of the Proto Malayan race, such as the Minangkabau Gadang house, the Kalimantan longhouse, and the Tongkonan Tana Toraja of South Sulawesi. A Bolon house is a building assembled without using nails. The construction system uses bonding with mortise and tenon joints, and also notch joints.

One example of a complete Bolon house is the main structure of the Pematang Purba Palace complex, Simalungun Regency, North Sumatra. This house is owned by the Simalungun Batak tribe. In the palace complex, there are several houses besides the Bolon house where the king and his family live, which are named Balei Bolon, Jambur/Godang, Pattangan Sada/Raja, Pattangan Dua/Puang Bolon, Losung, Utteri Jungga/Jabu Jungga, and Balei Butu. Balei Bolon is a place where the king holds hearings and meetings, conducts court and keeps temporary prisoners. Jambur/Godang is a building for storing rice and for areas where guests can stay, as well as a sleeping place for unmarried youth. Sada/Raja Pattangan is the building where the king rests. The Pattangan Dua/Puang Bolon is where empresses do their weaving. Losung is a building where the women pound rice. Utteri Jungga/Jabu Jungga is where the commander and his family live. Balei Butu is a building for the palace guards.

Fig.1 Bolon house, front view (left) and rear view (right)

a. Bolon house structure

The Simalungun Bolon house is a stilt house with a floor height of 1.75 meters from the ground. The bottom of the house (beneath the floor) is used as a place to raise pigs, chickens and buffalo. The building is divided into two portions, namely the front (*jabu lopou*) and the back (Bolon house proper). At the front of the main building, the floor is supported by a structure of logs (*galang*) arranged horizontally. *Galang* beams rest on a base made of natural stone or concrete. Concrete bases, with a height of 0.5 m in the middle and 0.8–0.9 m at the edge, are not the original form of the base. The original bases used natural stone. At the back (Bolon house), the supporting structure consists of columns called *partogu* with a height of 1.85–1.98 m. The number of *partogu* columns is 20, but the primary item among these is considered to have strength and be the strongest column. The *partogu* columns do not rest on stone bases but are directly planted in the ground to a depth of about 30–50 cm. The base of each column is coated with palm fiber to keep it from directly touching the ground, so that the column does not stay moist and can be protected from termites. The construction system at the floor bottom uses a notch joint system combined with a mortise and tenon joint system. Mortise and tenon systems help the stability of the beams against shear forces.

The Bolon house plan is in the form of a rectangle with a size of 8.2 x 30.5 m. The area within the building is without insulation, and there is only a difference in floor height. Local wooden floorboards, made of *sambaho* wood, are placed on small *galang* beams to support the floor structure. *Galang* beams are arranged using a mortise and tenon joint system. The walls in the *jabu lopou* use woven bamboo while the Bolon house uses 5–10 cm thick wooden boards. The wall structure is not attached to the columns, but is bound to a wall plate. The wall structure also does not stand in perpendicular fashion, but rather is tilted. The joint system uses notches that are added to mortise and tenon joints, and is reinforced by ropes tied to rattan.

The roof of the Bolon house has a shape like a horse saddle, which is curved at the front and back, with the back being longer. The roofing material uses palm fiber and thatched leaves. Connections on the roof trusses use ties, but there are some that use a mortise and tenon joint system.

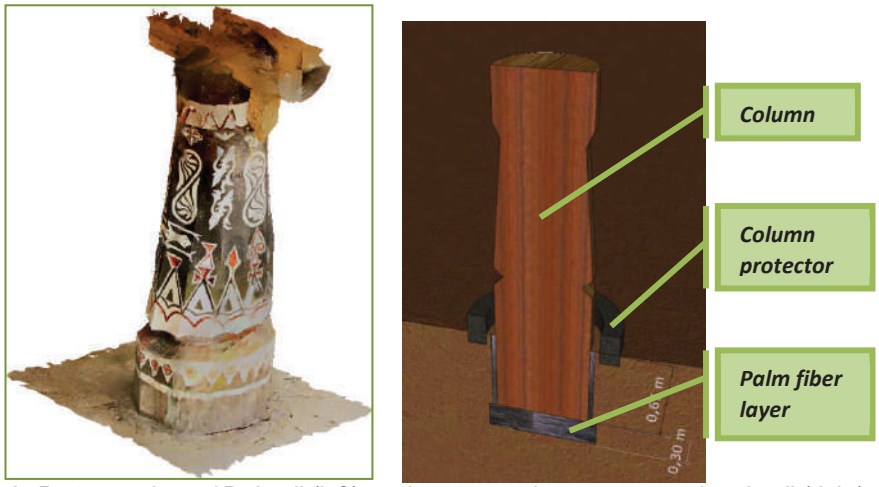

Fig.2 *Partogu* column 3D detail (left), and *partogu* column cross section detail (right)

Fig.3 Detail of the structure's bottom joint

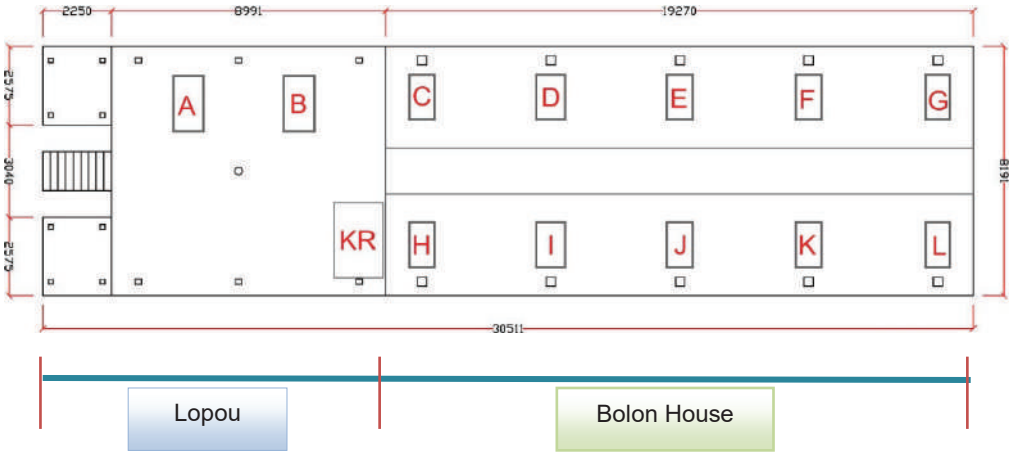

Fig.4 Bolon house plan

b. Material, structural, and architectural damage

As is generally the case for wooden buildings, damage that often occurs in these buildings is material damage. This is because wood is an organic material that is highly favored by insects, such as moths and termites, and by fungi. Some parts of the Simalungun Bolon house had suffered quite severe material damage, such as weathering in the columns, beam joists, ropes, bamboo woven walls, and some parts of the rafters. Weathering in these parts causes the wood to become porous and easily

destroyed. Weathering also occurs in pedestals overgrown by moss. Some of them were very fragile and peeled easily.

Other damage that is very substantial was structural damage. In the Bolon house there was vertical deformation from front to back, as the rear columns were increasingly sinking into the ground. This was due to the presence of moisture and water saturation conditions in the subgrade so that the carrying capacity decreased and could not function as a grading and load receiver. Therefore, the columns had become deformed so that there was a deflection in the *galang* beams, causing the wood to bend and resulting in fractures. Other structural damage was the occurrence of dislocation, namely changes in the positions of components due to shifts in the directions of the x-, y-, or z-axes. Such damage had occurred in almost all connections between the columns and the *galang* beams, which are the meeting points that must withstand vertical or horizontal loads in the form of shear forces. The occurrence of such deformation and dislocations made the loading less than ideal. As a result, some of the wooden members had broken at the edges. Some small *galang* beams, which are beams under the floorboards, are also prone to this structural damage, and had broken. This is because these beams are subjected to compressive and tensile loads.

Fig.5 Material and structural damage in the Bolon House

c. Material components of Bolon houses and environmental climatology

A Bolon house is a building that uses wood as the main material. Other supporting materials are fibers for roof components, stones for the pedestals, and rattan for fastening. From observations and experiments conducted by Swastikawati (2013), the results show that the wood used for columns (*partogu* columns) which are still original is *pokki* wood, better known as ironwood. Ironwood is a wood of the highest class in terms of strength and durability. It is resistant to termite attacks, although it is susceptible to such attacks after long periods of time. Ironwood is also rarely attacked by ambrosia beetles, but it is easily attacked by longicorn beetles and the chopped wood is easily attacked by powder beetles. However, the wood used for the replacement columns is *salagundi* wood (*Rhoudolia teysmanii Hook. f.*). *Salagundi* is also a wood with premier class strength and durability.

From the results of petrographic and chemical analysis of the sampled stone, it was found that the *ranggisgis* stone was a sandstone. Sandstone is a stone with a high level of porosity and a low level of hardness. Therefore, sandstone is a highly fragile stone that cannot withstand heavy loads, which will affect the strength and stiffness for receiving the beam load.

Another component that can also affect the stability of buildings is the subgrade. In the *jabu lopou* part of the building, the stone base was originally standing on the ground, but at the time of restoration it was coated with cement mortar. The part that is directly exposed to the subgrade is the *partogu* column, which is the Bolon house column. From the results of measurement of the soil pH around the Bolon house column and in the soil in front of the terrace and beside the building, the pH values were between 4.2–6.4. The pH level indicates the acidity of the soil layer and also affects the development of microorganisms in the soil. At a pH range of 5.5–7.0, fungi and bacteria promoting waste management will grow well. However, according to Jones & Eggleton (2000), neither high nor low pH will affect the presence of termites. Rather, what affects the breeding of termites is the soil moisture level.

In addition to the extent of damage and conditions of the material, climate and weather conditions also affect the sustainability of the Bolon house. From observations made by installing data recorders

placed inside and outside the building, the results show no significant temperature or humidity differences between the inside and outside of the Bolon house. The humidity at the Bolon house site is quite high, around 85.5%. This high humidity level affects conditions for the maintenance of the wooden building material. Humid conditions also affect the growth of microorganisms and weathering.

From the observations of the Bolon house, something interesting was learned about the remnants/traces left by the cooking process, namely soot. Wooden parts affected by layers of soot were found in better conditions of maintenance than those not exposed to soot. Soot is like a waxy coating that keeps the wood safe from termites.

Fig.6 Layer of soot on the beam above the kitchen

d. Conclusions

Based on the results of observation and analysis, several things can be concluded.

1. The damage that occurs in the Bolon house is mostly in the substructure because that part has the function of withstanding the greatest load.
2. Factors that contributed largely to the damage include inappropriate maintenance that was not in accordance with the rules of preservation and with restoration principles.
3. Conservation measures in the form of consolidation of several columns and the replacement of new columns need to be done immediately.
4. There needs to be an immediate environmental conservation program to promote the preservation of the Bolon house.
5. Local wisdom embodied in the Bolon house design indicates that the building structure takes advantage of a layered seismic control so as to protect the building from damage and collapse due to earthquakes.

e. Suggestions and recommendations

Steps that need to be taken immediately which can support the sustainability of the Bolon house include the following.

1. Restoration and conservation work must be well prepared and executed with proper handling, and needs to be conducted with supervision from experts.
2. There needs to be study for the development of non-destructive methods to determine the degrees of fragility and strength of the wooden material in parts that must withstand large structural loads.
3. One such non-destructive method is modeling using structural analysis software. To carry this out, it is necessary to study the local wisdom of traditional wooden structures to take account of their inherent earthquake resistance.

Country Report

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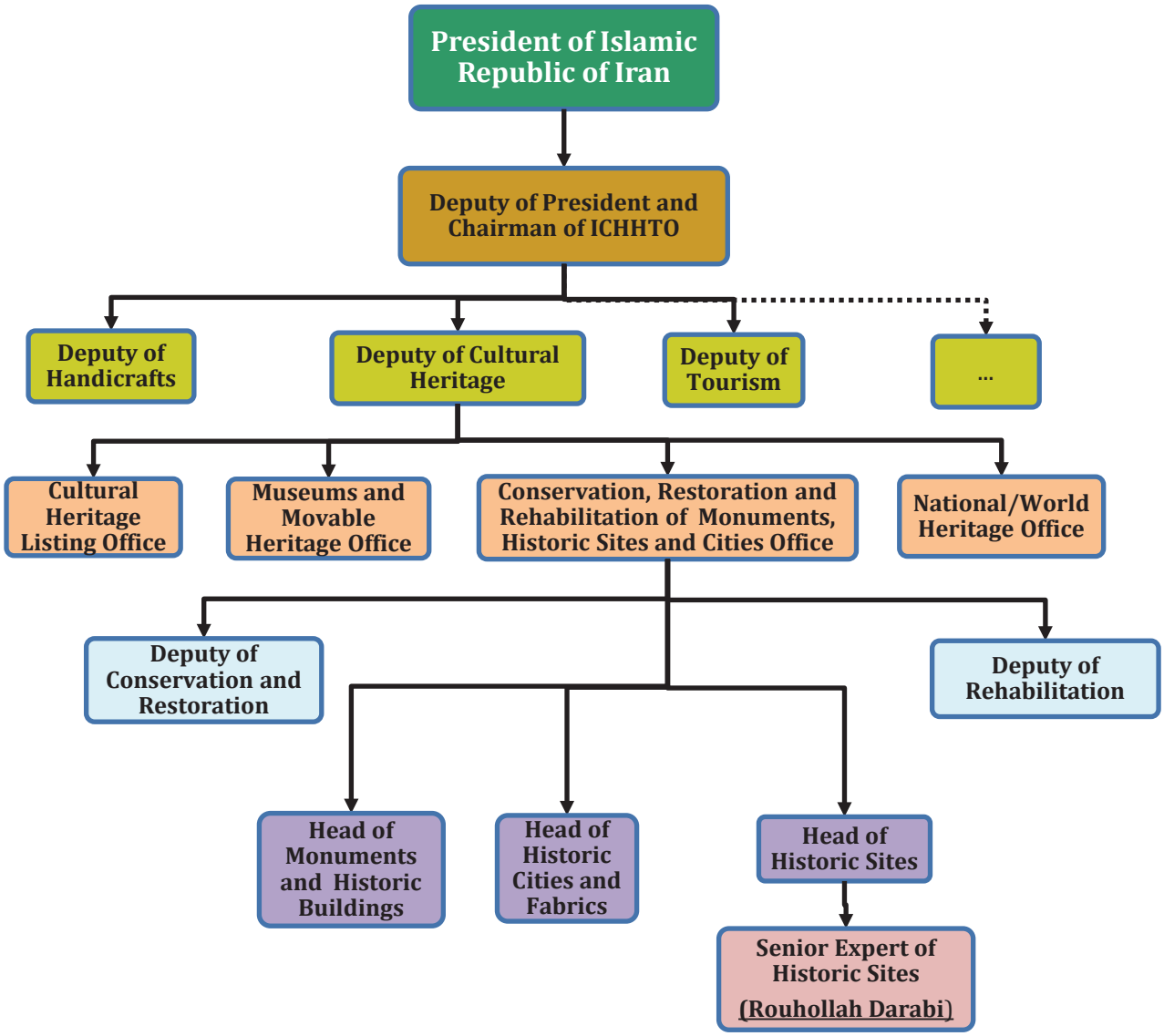

Fig.1 Organizational chart of ICHHTO

Initially, the activities of the Iranian Cultural Heritage, Handicrafts and Tourism Organization (ICHHTO) in the Directorate General for Conservation and Restoration began with expertise on the historical fabric of the country. At first, the identification and survey of historical cities was undertaken, and according to the available documents and information a list of historic cities was compiled, and aerial photos taken in 1335

(Gregorian year 1956), covering all of Iran as a basic document, were collected for documentation, and based on new Google maps and aerial photographs, in coordination with provincial experts, we have set the buffers for historical fabric areas, pursuing multiple conservation goals. But for the historical fabric survey detection and management of interventions at later stages of the historical fabrics, we will manage activities and interventions that happened through bad management and unbalanced development.

Comprehensive urban development plans were then guided towards sustainable development and preservation, and historic city buildings and monuments and their importance were introduced to citizens and local communities. About 785 historic urban sites were thus identified, and conservation work is in process.

The buildings are selected for the list of Iranian national monuments according to their cultural and historical value. The responsibility of my Department for these buildings is Conservation and Rehabilitation.

According to the province under supervision, staff experts review a province's proposed programs. After field visits, the necessary budget planning meetings are approved, along with a description of the executive operations.

The expert's job is to supervise and prepare guidelines for historic buildings, cities and sites. Once a project is started it is first done in the province and quality approval is made at headquarters, with visits to workshops and project control checks.

Historic sites are first identified and explored, and architectural remains found there are treated with traditional conservation methods such as a cover of special mortar (a plaster of clay and straw), then fencing, marking and signage are introduced and movable cultural objects are transferred to museums or protected at an on-site museum.

Wooden Structures and Buildings

Wooden structures are common in northern Iran, and elsewhere wood is used in columns, roofs, beams, windows, and ornaments. The importance of wooden monuments is such that in Gilan province, there is a rural museum near the city of Rasht where wooden monuments have been relocated from different places.

Fig.2 Gilan Rural Museum[1]

[1] http://www.gecomuseum.com/fa/default.aspx

One of the most important monuments of West Azerbaijan province is the museum of Baghche Jokh (Baqcheh Jooq) Palace, located in Maku, which was restored with the participation of local authorities who use the facility.

Initially, the bed was evaluated by a geotechnical and mechanical studies consultant, and then bed consolidation was performed according to the results. The roof is gabled due to the rainy climate, so wooden trusses are used. Also this building has wooden floors and interior components.

Fig.3 Location of Baghche Jokh and the city of Maku[2]

Fig.4 View of Baghche Jokh Palace[3]

[2] Emarat-e-khorshid Engineering consultant
[3] ICHHTO archives

Fig.5 Interior photo by Hossein Moammeri[4]

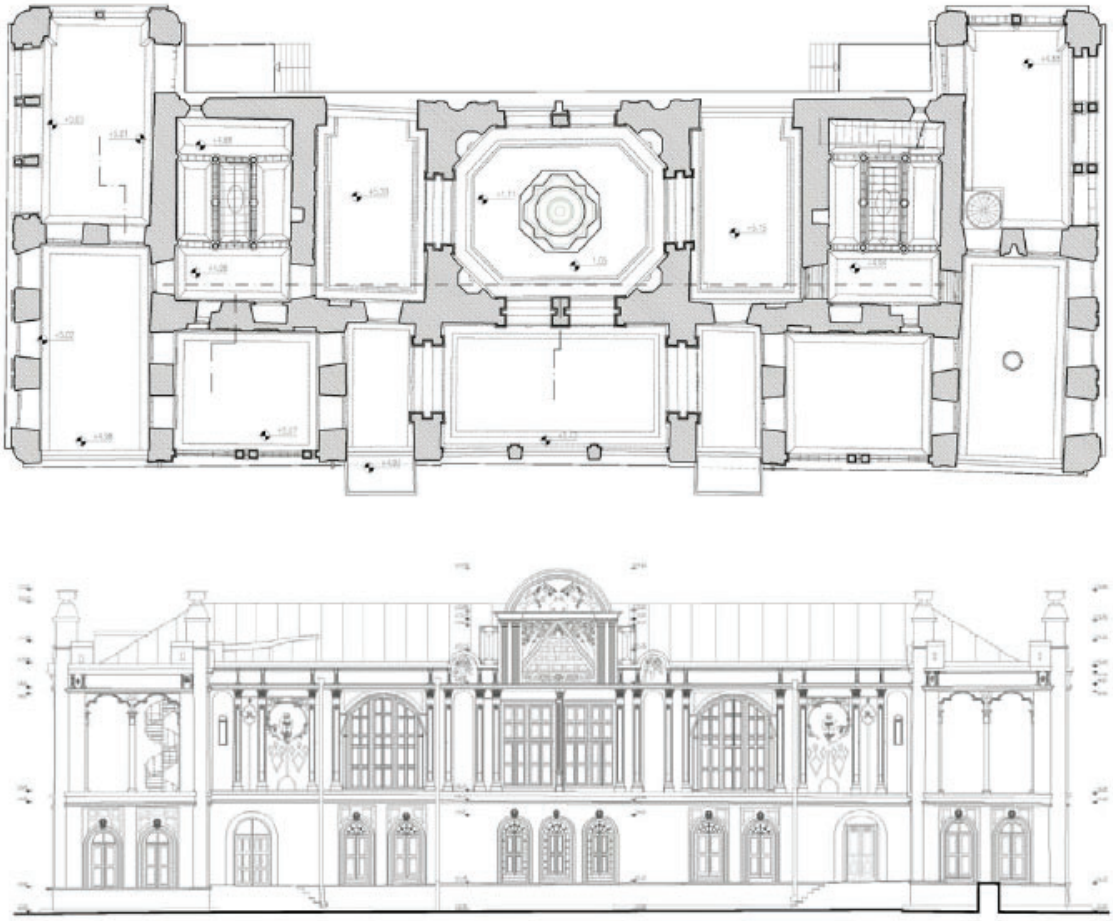

Fig.6 Floor plan and southern view[5]

[4] ICHHTO archives photo by Hossein Moammeri
[5] Emarat-e-khorshid Engineering consultant

Wood was used according to the original design for the restoration of the roof, for the trusses and beams, and the beams to be replaced or re-fitted with metal joints. Of course, prior to the execution of decorative detail and painting, which clearly distinguishes between Iranian and European methods, the paintings were protected with polyester and wooden sheets and metal rods.

Fig.7 Northern view

Fig.8 Roof

Fig.9 Roof details

Fig.10 Joints

Fig.11 Flooring

Fig.12 Joint

Fig.13 Termite damage

Fig.14 Consistency of wooden beams

Fig.15 New structure based on an original one.

The walls are load bearing and made of adobe, and due to the structural reinforcement of the roof it seemed reasonable to the technical committee to reinforce the walls as well, especially due to the high levels of using plaster adhesions and decorations in the rotary with anchoring and grouting techniques. The campaign was proposed and traditional methods of repair were planned.

Of course, the challenge of using modern materials in monuments is very important and needs to be studied with greater scrutiny.

Preservation and Development for Giving Added Value to Luang Prabang as a World Heritage City

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Laos (Lao People's Democratic Republic, or Lao PDR) is a country in the Southeast Asian/Pacific region. It is located in the center of the Indochinese peninsula, with a total area of about 236,800 square kilometers. Laos is a landlocked country, surrounded by borders with five neighboring countries: China to the north, Vietnam to the east, Thailand and Cambodia to the south, and Thailand and Myanmar to the west. Laos is divided administratively into 17 provinces and one capital city district.

Characteristics of Luang Prabang

Luang Prabang is one of Lao PDR's northern provinces located about 400 km from the capital, Vientiane. Luang Prabang's population is currently estimated as 475,000 inhabitants, consisting of 12 different ethnic groups. The provincial capital, Luang Prabang city, itself has a population of approximately 68,000 inhabitants. The protected zone of the Town of Luang Prabang World Heritage Site has 24,000 inhabitants and an area of 800 ha.

Luang Prabang was the former capital of Laos, and is one of the anciently established towns of Laos which has been preserved and has developed for more than 1,200 years. In the past Luang Prabang served as the capital of the kingdom of Lane Xang for more than a century, and has been called by different names: Muang Sua, Muang Xieng Dong, Xieng Thong. In 1358, the King Fa Ngum brought the Prabang – a sacred Buddha statue – from Cambodia to Muang Vieng Kham, and in 1489 the Prabang statue was moved to Muang Xieng Thong for worship by the Lao people. At that time the name of the town was changed from Muang Xieng Thong to Muang Luang Prabang, and has thus been named for the Buddha statue since then.

The city of Luang Prabang is situated on a peninsula, formed by the Mekong and the Khan Rivers, which is 300 m wide and 1 km in length, and surrounded by beautiful mountains. Particularly, one of these hills, called Phousi, is located in the middle of the town. It serves as a tower for the people to climb in order to look over the beautiful view of the city in all directions.

Evolution of the city of Luang Prabang

Luang Prabang was the capital of the kingdom of Lane Xang; the city is exceptional both for its rich architectural and artistic heritage that reflects the fusion of Lao traditional urban architecture with that of the colonial era. Its remarkably well-preserved urban landscape reflects the combination of these two distinct cultural traditions. Centuries-old festivities, rituals and traditions are still very much alive and closely intertwined in the livelihood of the people of Luang Prabang.

Outstanding universal value of Luang Prabang

- As a town with an ancient and long-lasting history and legends
- Having the pattern of its settlement and urban planning well preserved
- Its people having a coherent and gorgeous culture tradition maintained for many generations
- Having unique architecture and craftsmanship of the Lao nation
- Having a magnificent, charming and impressive natural landscape

Criteria for listing as World Heritage

The cultural criteria for accepting Luang Prabang as UNESCO World Heritage city were as follows.

- Criterion (ii): Luang Prabang reflects the exceptional fusion of traditional Lao architecture and buildings of the nineteenth and twentieth centuries of the European colonial style.
- Criterion (iv): Luang Prabang is an outstanding example of an architectural ensemble built over the centuries combining the sophisticated architecture of religious buildings, vernacular buildings and colonial buildings.
- Criterion (v): The unique urban townscape of Luang Prabang is remarkably well preserved, illustrating a key stage in the fusion of two distinct cultural traditions.

Integrity and authenticity

Integrity. The integrity of the designated site is linked to an architectural and cultural heritage located in a natural landscape that reflects its outstanding universal value. The set of significant elements, particularly the urban layout and main monuments (temples, public buildings, traditional houses), is safeguarded.

Authenticity. The landscape and urban layout retain high degrees of authenticity, with no major construction having disturbed the site. Religious buildings are regularly maintained; monks transfer restoration techniques for their heritage to novices. The Buddhist worship and cultural traditions related to it (rites and ceremonies) are still alive and practiced diligently.

Inscription as World Heritage

For the sustainable safeguard and development of Luang Prabang's heritage wealth, in 1993 the Lao Government proposed to place Luang Prabang under the aegis of UNESCO.

Luang Prabang was inscribed on the World Heritage list on December 9, 1995, at the 19th session of the World Heritage Commission in Berlin. Luang Prabang's value was recognized as follows: "This city reflects the exceptional merger of traditional architecture and European colonial urban structures from the 19th and 20th centuries. Its unique urban setting is remarkably preserved, illustrating a major step in the fusion of two different cultural traditions."

Preservation of Luang Prabang as World Heritage

The objective of Luang Prabang's preservation is to maintain the outstanding universal value of the city, and to safeguard its authenticity and integrity, in accordance with UNESCO requirements.

To preserve and highlight the natural and cultural heritage of the city of Luang Prabang and to control its development, in 1996 the central government established a national committee for the management of the national heritage, and Luang Prabang Province also set up a local committee for the management of the city and its development.

Laws relating to the protection of national and local heritage

- Prime Minister's Opinion No. 1037 / PM of 3 August 1996 on the Approval of the Decentralized Cooperation Program
- Prime Minister's Decree No. 158 of 24 August 1996 on the adoption of the Urban Plan of the City of Luang Prabang
- Prime Minister's Opinion No. 1037 / PM on the Establishment of the National Committee for Cultural, Historical and Environmental Heritage on 24 October 1996
- The Presidential Decree of Lao PDR on the Conservation of National Cultural, Historic and Natural Heritage, dated 20 June 1997
- The Provincial Order of the Governor of Luang Prabang Province No. 157 dated 10 August 1996, concerning the creation of the Local Heritage Committee
- Decentralized cooperation agreement between the cities of Chinon and Luang Prabang signed on 4 August 1997

- Prime Minister's Order No. 15 / PM on Increasing the Management and Inspection of Timber, Moving of Timber and Business of Timber

The protected area of the conservation plan (PSMV)

The area covered under the conservation plan (Plan de Sauvegarde et de Mise en Valeur – PSMV) is nearly 800 hectares, divided into 4 zones: ZPP-Ua, ZPP-Ub, ZPP-M and ZPP-N. The conservation area covers 29 villages**,** 610 inventory buildings, 443 civil buildings, 167 religious buildings and 183 protected wetlands. In addition, we also specified the creation of a buffer zone for Luang Prabang, as explained below.

The buffer zone and its importance

A buffer zone is promoted by UNESCO for supporting the development and conservation of World Heritage Sites. It plays the role of protecting against new development projects in the future, to avoid negative impacts to a protected site.

Aims. A buffer zone is desirable for the World Heritage site to achieve the following goals of sustainable urban development.

- To ensure the conservation of the Town of Luang Prabang World Heritage Site
- To ensure conservation of the environment
- To ensure socio-economic growth
- To fulfill UNESCO recommendations for heritage conservation

Conditions for consideration**.** The following conditions should be considered in creating the buffer zone.

- Simplicity of the zone, ensuring that it is manageable, and that its perimeter is related to the administrative zone
- Possible discontinuity of the zone, flexibility of the principle depending on particularities of each area (with their specific regulations) to enhance their locally defined values

Public awareness. After the boundaries of the buffer zone were determined, we broadcast the area's rules to the public to raise their understanding of the requirements of area, while also informing the monks and novices, government officials, military and police, tour guides, village Chiefs, design companies, educational institutions and universities, in addition to the local people.

Cooperation involved in preservation activities

- Cooperation with international organizations (Chinon district)
- Cooperation with the U.S. Ambassador
  - Restoration and renovation (U.S. Ambassador Fund for Culture Preservation)
- Cooperation with Japan's Tokyo Institute of Technology
  - Creation of a website and a heritage database for the preservation of Luang Prabang as World Heritage.
  - Launching of a mobile learning application
  - Application of remote sensing and photogrammetry
  - Expansion and update of GIS data for the entire protected area
  - IT capacity building for the Luang Prabang World Heritage office staff

Restoration activities completed

- Xiengthong Temple restoration projects (Nos. 445, 446, 447, 448, 449, 450, 452, 453, 454)
- River House Building restoration project (colonial style; No. 322)
- Xiengmouane Building restoration project (No. 119)
- Luang Prabang Primary School restoration projects (colonial style; Nos. 299, 300, 301)
- Vihan of Aham Temple restoration project (No. 524)
- Dwelling of Sop temple restoration project (No. 471)
- Dwelling of Xiengmouane Temple restoration project (No. 492)

- Pasa Secondary School restoration projects (colonial style; No. 138, 139, 331)
- Dwelling of Visoun Temple restoration project (No. 530)
- Vihan of Pahouak Temple restoration project (No. 511)
- Miscellaneous other projects…

Luang Prabang as a World Top City for tourists

Every year thousands of national and international tourists visit Luang Prabang in order to participate in numerous centuries-old festivals, such as the Lao New Year, the end of Buddhist lent, the boat race festival, etc. Traditional rites (morning alms to monks, *basi* ceremony, etc.) are celebrated with fervor by the locals.

The number of tourists has increased constantly and is expected to continue increasing in the coming years. During three consecutive years, 2006, 2007, 2008, Luang Prabang was elected the World Top City as a favorite destination of tourists by the British travel magazine *Wanderlust*, and this same award was gained by the city in 2010, 2011, 2012, and 2015.

Current problems and needs for cultural heritage protection and restoration activities

Problems. Problems that need to be addressed for the long-term conservation of heritage value include the following.

- Traffic jams in the town
- Lack of understanding of culture on the part of tourists
- Construction and store openings inappropriate to the protected area
- Cleanliness of the town
- Waste management
- Placement of objects covering public areas on footpaths
- Filling in of ponds on the heritage list
- Increasing the shop service along the river bank in the town
- Inappropriate decorations on stores
- Shortage of budget for the restoration of buildings on the list and for the development of engineers capable of heritage conservation for wooden construction

Sources of risk to heritage. Natural and human sources of risk include the following.

- Flooding, tropical storms, landslides
- Burning, development, tourism, commercialization

Strategy for cultural heritage protection. For the sustainable management of heritage preservation, the Luang Prabang authorities have outlined the following strategy.

1. Promotion of sustainable protection of Luang Prabang as a World Heritage City
2. Creation of Luang Prabang as a refreshing park, a charming city that is attractive and has a good environment
3. Promotion of Luang Prabang as a tourism center for its culture, architecture and nature
4. Creation of Luang Prabang as a research center on the outstanding value of Lao culture

Future activities. Activities aimed at future conservation include the following.

1. Conservation and promotion of the outstanding value of the traditional culture
2. Planning and infrastructure development
3. Construction management
4. Tourism management
5. Urban transportation management
6. Promotion of Lao handicrafts
7. Urban environment management
8. Advertisement and community awareness

9. Production of magazines, brochures, posters, CDs and other sources of information on the heritage of Luang Prabang.
10. Cooperation with concerned departments, foreign countries and international organizations in order to secure assistance in funds and experience on heritage management, in accordance with government regulations

Problems and Needs for Cultural Heritage Protection and Restoration/Preservation Activities in Nepal

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1. Introduction

Nepal is rich in cultural heritage. Its unique architectural, archaeological and historical heritage is very popular worldwide. This remarkable heritage is not only part of what makes Nepal a popular travel destination, but is also something that needs to be properly protected, maintained and preserved, so that future generations can enjoy and know their identity through it as much as we do today. Historic buildings and other types of cultural heritage are the backdrop of our lives and tell the story of the places from where we have come.

As the sole authority over the cultural heritage of the country, the Department of Archaeology (DoA) has been actively working to preserve these heritage sites across Nepal. Most of the traditional architectural and historical monuments in Nepal are wood and brick masonry structures made with mud mortar. In some structures wood is used for the main constituents or as the main structural members. Many monuments are made from only wooden members, like Kasthamandap. Therefore, knowledge about the conservation of wooden structures is most essential while working in the conservation of monuments in Nepal.

In the Nepal Earthquake of 25 April 2015 large amounts of cultural heritage, namely monuments, were badly damaged, with 891 monuments counted as having some damage. Since then, conservation and rehabilitation have been continuously in progress. Altogether rehabilitation work has been completed for 240 monuments to date. This massive program of conservation requires both skills and expertise. Even under the best of circumstances, the restoration of historic buildings takes time as it is a very slow, step-by-step process.

A survey taken in 1975 showed there were 888 important historical monuments within Kathmandu valley. Among them, 262 were in Kathmandu, 298 in Patan, 62 in Bhaktapur, and 166 in other areas. Data from the DoA show there are 1,872 monuments total for all of Nepal, as surveyed in 72 districts (now 74 districts), apart from the districts of Kathmandu, Bhaktapur and Lalitpur, and among these 799 have been classified. According to the classification 101 are in category A, 93 are in category B, 482 are in category C, and 123 are archaeological sites.

There are two World Cultural Heritage Sites in Nepal, which are (1) Kathmandu Valley, inscribed in 1979 and including the palace complexes of Bhaktapur, Hanuman Dhoka, and Patan, the Buddhist stupas of Swayambhu and Bauddhanath, and the Hindu temples of Changu Narayan and Pashupati, and (2) Lumbini, the Birthplace of the Lord Buddha, inscribed in 1997. There are various types of monuments, namely architectural buildings, historical sites, religious places, pilgrimage destinations, and archaeological sites and museums at places such as palaces, temples and shrines, stupas, monasteries, traditional rest houses, water fountains and ponds, locations of artistic images and sculpture, *thanka* paintings, wall paintings, and archives.

2. Objectives of this report

The general objectives of this country report are as follows.

1. To identify problems in the protection and restoration of wooden monuments/architecture in Nepal
2. To identify needs in the protection and restoration of wooden monuments/architecture in Nepal
3. To explore some solutions for these problems by analyzing the problems and needs

3. Conservation and management of monuments in Nepal

The Department of Archaeology is the sole authority of the government of Nepal which is responsible for the overall conservation and management of cultural heritage in the country. Some other individual organizations such as the Pashupati Area Development Trust (PDT) and Lumbini Development Trust (LDT) are responsible for their specific locations or monumental zones. Similarly, different municipalities and rural administrative authorities are also responsible for the conservation of the monuments in their territories.

On the other hand, the Guthi Cooperation and other NGOs and INGOs like the Kathmandu Valley Preservation Trust, and international organizations such as UNESCO are also helping in this field. The most important actors and stakeholders for the conservation and management of monuments are the local communities, and local clubs and different cultural groups.

4. Current practical issues regarding wooden monuments in Nepal

For most monuments, intervention is the main issue even when such intervention is minimal in scale. There are some social and local cultural differences in the practice of conservation that create problems and a lack of coordination between oversight agencies such as the DoA, and municipalities and *guthis* (local social organizations), but these difficulties in conservation are not universal and occur only in some cases.

The encroachment on heritage or heritage property by individuals using it for business purposes sometimes creates major issues which present significant challenges. The retention of traditional craftsmen, such as carvers and other workers in traditional jobs, is also a challenge for policy makers. Issues regarding the adaptive reutilization of monuments are vital in the field of heritage conservation. There is always debate over the materials used for foundations, and especially in cases of foundations for bodies of water, or in waterlogged or low bearing capacity soil areas. The use of modern materials such as concrete/cement in foundations in such cases creates conflicts between archaeologists and structural engineers. Sometimes the necessity indicated by structural analysis to enhance the safety of structures is ignored.

Accordingly, by following only traditional principles and techniques, in some cases structural safety cannot be achieved. Apart from this, the reutilization of disassembled traditional materials is a big concern. After the earthquake, in some temples carved elements and old brick have been used differently.

5. Problems in the conservation of monuments

Since restoration and reconstruction are very complex tasks, they require highly skilled expertise and can take a long time to execute. There is only a limited amount of traditional skilled manpower on the market. Young people do not want to continue the family professions followed by their ancestors, meaning they want to change occupations. Likewise the supply of traditional construction materials such as *ma apa* and *dachi apa* (traditional bricks) is insufficient because only a few enterprises produce them, and the lack of sal wood is also a big problem for monument conservation. Insufficient documentation also makes the restoration process difficult. Encroachment on monuments by local people is also problematic in some cases. A lack of periodic/routine maintenance practices also brings unintended harm to monuments as a minor problem.

We have experienced problems regarding the procurement system and tendering process from low-bidding contractors in some cases. We have seen cases of dampness causing decay in timber and creating other problems, even while using traditional technology and materials. Due to a lack of proper drainage, street runoff sometimes enters into monuments; feces/excreta of pigeons and other birds also cause the decay of wooden elements and brick walls. Oil lamps and incense sticks lit by pilgrims make surfaces sticky and oily. Sometimes a lack of sufficient expertise within the DoA or insufficient research efforts also create problems. The transfer of knowledge from senior skilled human resources to their juniors is lacking, a gap which causes the loss not only of skills but also of institutional memory, which both degrade the heritage.

Fig.1 Street runoff entering Patan Durbar square (left); grass/bushes on a monument at Patan (right)

6. Needs in the conservation of cultural heritage

Trained and sufficient manpower is needed for the conservation of wooden cultural heritage, and frequent refresher training is also necessary for staff personnel engaged in conservation work. Sufficient resources (budget allocated by the government) and logistics should be provided.

There should be clear provision for the adaptation of new technology as it makes conservation work easier in various aspects. Detailed and proper documentation is vital to conservation, so it should be done properly. Priority should also be given to significant monuments and also to entire heritage districts.

Comprehensive master plans for heritage districts are needed for proper conservation. The promotion of ethical principles for engineers and archaeologists is vitally necessary. Sufficient research in conservation work with organizational strengthening of the DoA is essential. The main stakeholder is the local community so proper coordination and community involvement is important in most projects.

7. Case study: Rehabilitation of Adinath Lokeshwar Temple, Chovar

Adinath Lokeshwar Temple is situated atop a hill called Chovar in a village of the same name, 6 km southwest of the city core of Kathmandu. This famous temple is revered by both Buddhists and Hindus. According to the available evidence the temple was built in the 15th century. Adinath Lokeshwar is venerated by Buddhists as a form of the Bodhisattva Avalokiteshvara, and as Surya the Sun God by Hindus.

There is a multi-storied (*shikhara*-style) shrine, which has a Shiva lingam, in front of the temple, and the three-storied multiple roofed (pagoda-style) temple is situated on the front side of the monastery courtyard. The temple's frontage is decorated with pots, pans, water jugs and other utensils, which have been hung there by young couples seeking to ensure a happy marital life. Although the temple was built in the 15th century, it was reconstructed in 1640 and has been renovated several times by the local community.

Fig.2 Adinath Lokeshwar Temple, Chovar, after the earthquake (25 April 2015)

The three-storied temple is made of wood and traditional bricks. The walls of the temple are made from structural *ma apa* bricks, and the outer veneer is made with glossy *dachi apa* bricks, using mud as mortar. The wooden posts, doors, and windows are carved with motifs of Nepalese traditional arts and crafts. The sanctum is in the middle of the ground floor. The roof is made with traditional clay roof tiles (*jhingati*) laid on a layer of mud over wooden planks.

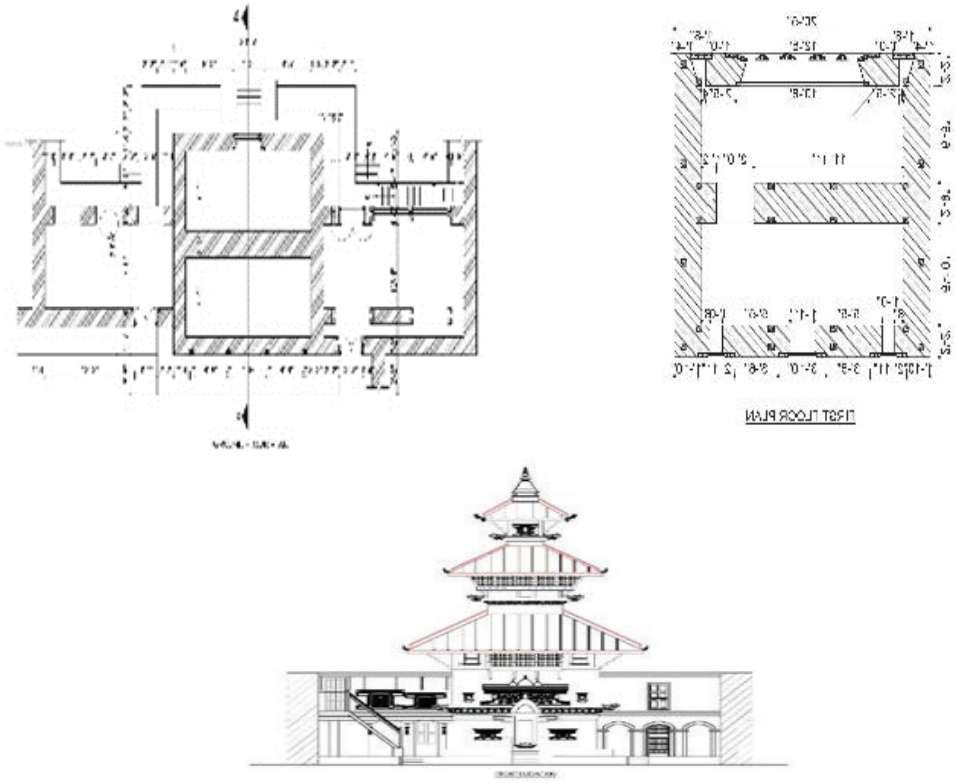

Fig.3 Drawings and details of the temple

The temple was significantly damaged by the earthquake. Accordingly a careful survey was conducted, with drawings, plans, sections, elevations and detail drawings prepared. After preparation of these documents the rehabilitation work was started in coordination with members of the concerned local community, who have been continuously involved in this project. During the disassembly of the bricks and wooden members of the walls, detail sketches were prepared, photographs were taken, the disassembled parts were stored and reusable members such as carved doors, windows, and wooden posts were separated and the required minimum interventions were done.

Fig.4 Disassembly in progress

Fig.5 Exploration of the foundation

Fig.6 *Thams* (posts) and *nidals* (beams) are erected

After disassembly, exploration of the foundation was done. The central main part, the inner sanctum where the icon of the main deity is kept (*garvagriha*), was protected so that no disturbance or distortion would occur during the conservation work.

Fig.7 Rituals continued while the reconstruction was in progress

8. Intervention/issues faced in Adinath Temple, Chovar

As mortar made with lime and *surkhi* (powdered burnt clay) is a traditional material, mud mortar was replaced by a mortar made with lime and *surkhi* sand for better performance in the monument. Foundation stones were used for load transfer. Timber structures (posts, horizontal and vertical members) are used as a lateral load resisting system. However some points for interventions and issues are listed below.

1. Lime *surkhi* sand mortar was introduced instead of mud mortar, due to evidence that the mud used as mortar previously in this temple was a risk factor.
2. Foundation stones were introduced for tightening the posts (*thams*), and wooden tie beams (*lakashis*) were added.
3. Wooden posts and bracing were carried out with consideration for flexible diaphragm action, achieved by inserting extra posts, joists and beams.
4. Connections were made between the *meths*.
5. Usable parts were reused and unusable parts of doors and windows were replaced, according to evidence of their viability.
6. The *jhingati* roof was replaced with copper sheets in response to community demand, in accordance with the Nepalese legal system and with approval of the DoA.
7. Relocating the icon of the deity was problematic, as regular worship needed to be carried out.
8. The open area in between the thams of the back side was enclosed with wall in response to community concern, as there was a chance of loss through theft of the icon.

9. Lessons learned

Detailed documentation should be carried out with proper listing and numbering, and complete drawings with details of the wooden joints should be made for the rehabilitation of any monument.

Photographs with high resolution should be taken. In the disassembly process special care should be given so that the bricks and timber elements can be taken out without any damage to items that may be reusable. Strong supervision should be done to avoid any irregular activities on the part of contractors. Research should be done continuously before, during and after the rehabilitation. Regular and frequent meetings should be held with members of the concerned community before and during the rehabilitation.

1. Proper documents and photographs should be well managed.
2. Lateral load resisting systems should be introduced for monument buildings.
3. Regular maintenance should be done.

The Old and the New – Merging Traditional Approaches and New Technologies to Aid Preservation and Restoration of New Zealand's Historic Wooden Buildings

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Located in the southern Pacific Ocean, New Zealand is a group of islands that was first settled approximately 800 years ago by Polynesian voyagers, who settled along New Zealand's coastlines and interior and became a distinct Polynesian culture, Maori. European arrival in New Zealand begins with exploration and mapping of the coastlines in the mid-17th and into the late 18th century, with a steady influx of European settlers through the 19th century, following the growth of industry around products like timber.

This report looks at work being undertaken in northern New Zealand on properties managed by Heritage New Zealand Pouhere Taonga (HNZPT), New Zealand's statutory heritage agency and the government entity responsible for the promotion, protection and preservation of New Zealand's historic and cultural heritage.

Product of engagement between Maori and Europeans. They utilise traditional styles of British architecture and construction methods but are rendered in materials local to the New Zealand environment. Under New Zealand's heritage legislation, these wooden structures are protected sites, and because of their role in early European and Maori relations, particularly during events such as the Treaty of Waitangi (New Zealand's foundational document), they are used as places to engage with the public in sharing New Zealand's national bi-cultural history.

Mangungu Mission
Built in 1838, the Mission House is the only surviving building from the original Wesleyan settlement on the Hokianga Harbour. As part of the original Mission Station, it was central to key events like the Treaty of Waitangi and bi-cultural engagement between Europeans and Maori through the 1830s and 1840s.

As this area was central to a number of local timber milling operations, including one which was being run from the property, it is very likely that timber was sourced locally and milled at the Mangungu Mission. Mangungu is unique in that the entire building was disassembled and barged approximately 300 km south to Auckland where it was reassembled and incorporated into a new site. In the 1970s, it was cut into sections and returned back to the Mangungu settlement. The building is constructed from native timbers, but its mixed life means that its construction methods span a period of almost 140 years, from pit sawn timbers and hand finishing through to machine milling, timber grading and uniformity of processing

Fig.1 Mangungu Mission, Hokianga Harbour,New Zealand(HNZPT)

Te Waimate Mission
Built in 1831, the Te Waimate Mission is the 2nd oldest European building in New Zealand and the only surviving part of the Mission Station that was constructed as a model English village. The settlement was established to engage with Maori through traditional trades and skills such as carpentry, masonry, wheelwrighting, blacksmithing, and textile production.

The house itself is constructed predominantly from local Kauri timbers, utilising other native species in some of the framing and flooring. These pit sawn timbers are often finely dressed and finished. Through much of the house, these original timbers are a key aesthetic in the experience of the building.

Fig.2 Te Waimate Mission, Bay of Islands, New Zealand (HNZPT)

Clendon House
Clendon House was a private residence constructed in the early 1860's with several additions over the following decades. As the home of a politically influential trader and magistrate, his local Maori wife and their family, the building is constructed predominantly from native timbers but during a period when New Zealand's timber trade is being industrialised. Timbers are mostly cut in local mills rather than pit sawn, and there is uniformity in the materials used in the construction. The multi—phase style of construction on this residence is also influenced by the fluctuating finances of the family.

Fig.3 Clendon House, Rawene, New Zealand (HNZPT)

Problem 1: Tools and Technology
These three wooden buildings date to the early to mid-19th century and in New Zealand's history, span the period between pit-sawing and hand milling of timbers through to the mechanized milling and bulk processing of logs.

This means that the buildings themselves are representative of some key elements in New Zealand's built heritage. They are traditional styles of British buildings but constructed using materials exclusive to New Zealand. The Te Waimate Mission House for example is a Georgian style building, it is wide but shallow, has symmetrically placed windows and a hipped roof, elements typical to Georgian architecture. However, the shortage of fired bricks and the abundance of timber in New Zealand meant the same styles were built using native timbers and features such as verandahs were added because of the New Zealand climate.

In a site like Te Waimate, the timbers were pit sawn and then planed and dressed which has created an exposed timber finish, where individual tooling and plane marks are visible in the timber surface. This finish is an aesthetic element of the building that helps create an atmosphere in the house for visitors but also provides an opportunity for HNZPT to talk about the development of the sites and cross-cultural engagement between Europeans and Maori through the construction trades.

These same building attributes however, also present problems when it comes to repairing or replacing timbers. Do you replace a hand-tooled piece of timber with a modern machined version, acknowledging that it is the history of the site that is most significant or do you attempt to replicate the original finish of the timber acknowledging that the sense of place created by these materials is a part of the narrative for the property? Our decision making process is guided by HNZPT conservation plans and policies including those that consider the Maori cultural values associated with these heritage sites, and the principles of the New Zealand ICOMOS Charter.

Problem 2: Access to materials
In the 19th century, the processing of timber was a significant part of the New Zealand economy. Initially, materials like Kauri were exported in vast quantities to Australia, America and the United Kingdom, but with the rapid growth of European migration after 1840, that timber was often used to build new settlements around New Zealand or simply burned to clear land for agriculture.

The timbers that were traditionally used to build these historic structures are now in very limited supply. Native tree species such as Kauri (*Agathis australis*), Totara (*Podocarpus totara*), Puriri (*Vitex lucens*) and Matai (*Prumnopitys taxifolia*) are often slow growing. The Kauri tree for example is an extremely long lived conifer that can live for 1000-2000 years and which can take 600-700 years to reach a diameter of one metre.

These three properties were constructed at time and in an area, where native timbers like Kauri were abundant and mature. A valuable resource for the construction of buildings at the time, but now these materials are in extremely limited supply. Under New Zealand legislation, they are protected tree species which means they are difficult to acquire. New timber is potentially available when trees are storm damaged or when they are removed for development (e.g. roading). Alternatively, suitable materials maybe available from demolition projects (primarily residential) and may be re-milled and processed to be used as replacement materials.

It is also important to consider how that timber is being used. At the time of the buildings initial construction they simply used the materials that were readily available, not necessarily what might be best suited to the purpose. As technologies have improved, some of the elements of the building may need to be replaced by materials that are less traditional more offer greater long term support for the whole structure, for example treated modern timber piling. In some cases, these modifications may also be regulatory requirements to bring heritage buildings up to current compliance standards.

Because of the way the buildings are used to engage with the public in appreciating New Zealand's history, there is a need to manage the balance between the aesthetics of the site created by the use of these native timbers, with the structural integrity of the building offered by some modern materials.

Problem 3: The Environment
The environment in northern New Zealand is classified as a sub-tropical climate which means moderate temperatures, high humidity, and high rainfall. Climatic conditions are one of the key planning elements in the preservation of these wooden buildings, especially the management and dispersal of rainfall.

Periods of heavy or sustained rainfall can directly impact the conservation work on these properties by:

- Causing a spill-over effect on overwhelmed gutters, drains etc. resulting in water ingress into the structure
- Surface flooding that can lead to soil erosion around structural elements (e.g. foundations) or saturation of the ground under the building resulting in increased moisture levels in the building environment
- Increase the effects of 'Down Hill Creep' on sites with clay soils by exacerbating the expansive effects of clay soils when wet. Rainfall may also hasten the 'slip effect' of clay soils over an underlying base of greywacke stone resulting in downhill movement of clay hillsides.

The specific impact might vary according to the local environments, but the overall effect is the same. Water left to its own devices shortens the life span of wooden structures by increasing the decay of external timber cladding, increasing moisture levels within the building structures and weakening the strength of the building foundations leading to structural movement and misalignment.

Protecting and Preserving for Another 200 Years
Current conservation planning is focused on:

- How different elements of the site interact with one other (e.g natural water movement)
- Methods for gathering data that generates meaningful information to assist in planning and
- minimises the need to modify heritage fabric in the future.

Fig.4 View over the Mangungu Mission and the Hokianga Harbour, a hilly landscape with high rainfall and high humidity because of the proximity to the coast (HNZPT)

- Information exchange and digital planning – how to make property management information accessible and utilise organisational knowledge.
- Monitoring the impacts of tourism on buildings and managing visitor activity to protect the historic timber fabric.

Ensuring that planning work is carried out in sufficient detail is key to allowing for a measured response when undertaking conservation work. Understanding not only the methods of construction and materials used but also the intended use of the original building element and its current use, can allow us to develop conservation plans that preserve the heritage values of these places of national significance.

Problems and Needs for Cultural Heritage Protection and Restoration Activities in the Philippines

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I. Introduction

The Philippines, with its natural resources and rich biodiversity, is blessed with a number of structures and movable items of heritage which are the artifacts of its rich history and culture. These structures and items, which constitute a fraction of the country's Important Cultural Property (ICP), are under the jurisdiction of cultural agencies, with the National Historical Commission of the Philippines (NHCP) being one of the implementing agencies for their conservation/preservation. The NHCP traces back as an institution to the 1933 Philippine Historical Research and Markers Committee whose sole goal was to identify and mark "historic antiquities" as the first step towards their protection and preservation.[1]

Conservation/restoration is a relatively new field in the Philippines, which started around the mid-1950s with the documentation and undertaking of minimal repair work on heritage structures.[2] More serious work and organization only started in 2009 with the passage of the Heritage Law and recent unprecedented events which severely damaged some of these historic structures.[3]

This report is an attempt to present the needs and challenges that the Philippines face in terms of cultural heritage protection and restoration activities, and deals mainly with (1) the limitations and needs faced by the cultural agencies, specifically the NHCP, in the implementation and enforcement of the National Heritage Law, and (2) the technical challenges in the course of implementation of conservation/restoration work. Furthermore, case studies are presented, illustrating these limitations.

II. Heritage conservation and protection under Philippine law

The protection, conservation, promotion, and popularization of the nation's historical and cultural heritage and resources are enshrined in the Philippine Constitution[4] and specified in the present Philippine Heritage Law. Passed in 2009, the Heritage Law currently in full effect is the latest legislative endeavor for the protection and conservation of the nation's cultural properties, which include among others significant movable and immovable structures, works of National Artists, significant objects, and important sites.

For the recognition, protection, and conservation of heritage structures, the law empowers the NHCP and the National Museum of the Philippines (NMP), with the National Commission for Culture and the Arts (NCCA) at the head.[5]

In general, the NCCA, as the lead agency, is in charge of the policy making and of the management and conservation of intangible heritage.[6] The NHCP and NMP, on the other hand, are the agencies in charge of movable heritage and immovable structures and their conservation. The NHCP is in charge of all matters relating to Philippine history and the conservation of historically significant structures, while the NMP is responsible for artistically, culturally and scientifically significant structures.

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[1] Executive Order 451 (1933), under the American Colonial Insular Government of the Philippines.
[2] Inovero, Reynaldo A., 2015, "Summary of NHCP undertakings in the maintenance and conservation of San Agustin Church in Paoay, Ilocos Norte," *Journal of Philippine Local History & Heritage*.
[3] Examples of these events include the Cebu-Bohol Earthquake (2013) and Leyte storm surge which damaged historic churches and civic buildings, the Batangas Earthquake (2017), and the more recent Pampanga Earthquake (2019).
[4] Art. XIV, Sec. 15 (along with Sections 14 & 16), The 1987 Constitution of the Republic of the Philippines.
[5] Republic Act 10066, An Act Providing for the Protection and Conservation of the National Cultural Heritage, Strengthening the National Commission for Culture and the Arts (NCCA) and its Affiliated Cultural Agencies, and for Other Purposes.
[6] Ibid.

The foremost need of the state in the protection of its cultural properties is improved public awareness and cooperation with the cultural agencies for the implementation of the law. At times, the roles and functions of the agencies are confused and overlap, or simply, some people are not aware of their functions and mandates.

The basic protection that the law affords heritage structures is from undue demolition or modification. To prevent this, it gives an automatic presumption of "Important Cultural Property" (ICP) status to structures built at least fifty years ago, and charges cultural agencies with the responsibility of evaluating such structures' significance, and of rescinding or confirming this presumed status.

In current practice, however, the limited manpower of the agencies, or at least of the NHCP, is insufficient for handling the growing number of heritage cases. While there are certain groups or organizations which seek the declaration and recognition of their old structures for consideration as Important Cultural Property, there are also those who would like to rescind the presumed status or even remove their state-recognized and protected heritage structures from the official registry, in favor of modification or demolition to allow construction of newer, modern, and profit-generating structures.

At a constant, the NHCP receives an average of 15–25 cases every month for requests alone, which present challenges requiring the NHCP to update the registry of important sites and structures. Further, there is also a need to monitor proactively and document periodically the state of its declared and marked structures, which is currently being addressed. At present, the action plan of the cultural agencies is to update and integrate into the heritage law the consolidation of common functions, principles, and management of cultural properties, and to localize heritage management by creating regional offices.[7]

III. Technical challenges in cultural heritage conservation /restoration activities

Endeavoring to be on par with international standards, the cultural agencies actively undertake efforts to improve their systems and processes for the protection and conservation of the nation's cultural properties, yet they are faced with limitations and challenges in the technical implementation of conservation or restoration work. The following are some of these limitations and needs, in brief.

Constraints on planning and implementation imposed by the budgeting system

Despite the financial support of the Philippine government, conservation efforts are still subject to the rules of the national budgeting system, which implements projects on a one-year maximum basis. Because of this, there is a rather hasty period of transition from the study and planning phase to project implementation, to meet this deadline. The scope of the planned work must either prioritize critical activities or divide implementation into multiple phases addressing the more pressing needs and requirements of heritage owners and the host community. Accordingly, there is an evident need to find and devise a more efficient way to program the required research and implementation of projects.

Enhancement and drawing up of common standards of conservation

Both the NHCP and the NMP subscribe to international principles of conservation according to their differing mandates, but they need to enhance, refine and agree upon common standards of restoration. Conservation work depends on the manner of presentation based on the relevant mandate. The NHCP engages in and prescribes the manner of restoration of historic structures[8] with conservation decisions firmly anchored in its mandate to promote Philippine history and conserve historic structures, taking care to present and interpret the history hidden beneath the physical fabric of the structure. The NMP, on the other hand, is guided by its mandate for the promotion and conservation of cultural, artistic and scientific importance.[9] Both agencies, however, are still in an active process of refining their guidelines

[7] Lita, Reynaldo S., Chief-Historic Preservation Division, National Historical Commission of the Philippines.

[8] Republic Act 10086 , 2010, "Strengthening Peoples' Nationalism Through Philippine History Act" or the "NHCP law," Sec.5-c: The NHCP shall "undertake and prescribe the manner of restoration, conservation and protection of the country's historical movable and immovable objects."

[9] Republic Act 11333, 2019, "National Museum of the Philippines Act," Sec. 4-f: "Extend technical assistance in the preservation and restoration of cultural properties of national significance."

and drawing up new protocols for conservation based on lessons drawn from their institutional experiences.

The need for a revival of traditional methodologies and a renewal of depleted material resources
A large portion of the heritage structures in the Philippines are products of its Spanish and American colonial periods (the 1600s to early 1900s), comprised of unreinforced masonry structures made with a variety of stone and lumber, or a mixture of both. With regards to wooden construction and building components, few examples have survived owing to the climatic context of the Philippines. Subsequent to construction, many wooden structures and components either gradually evolved over time or were significantly altered or replaced entirely with other materials for durability and as a practical solution to fit the given context, an example of which is the replacement of wooden components with steel or stone to provide resistance to severe typhoons.

By the mid-1900s, the climax of the spread of modern techniques, new materials, and rapid urbanization, the use of traditional methodologies had become rare. Preference was for the more convenient, stronger, and cheaper contemporary methods. Additionally, the supply of traditional materials (i.e., quality aged wooden planks and coralline limestone) had declined or vanished along with traditional construction or building techniques. Some contemporary laws or policies have even imposed a ban on the harvest of such endangered materials.[10]

Being under the framework of the National Government Procurement Law (RA 9184), the implementation of conservation projects is accordingly open for bidding and awarded to a very limited number of contractors specializing in the use of traditional techniques. This also imposes various technical limitations on implementation, as appropriate for each unique case of heritage structure.

IV. Case studies

The following are select case studies from the experience of the author as architect-in-charge of several conservation projects of the NHCP. The following projects have unique or pressing limitations in their implementation, illustrating the above-discussed limitations and needs.

Fig.1 Pre-restoration photograph of St. John the Baptist Parish Church façade, NHCP, March 2017

Fig.2 St. John the Baptist Parish Church façade after restoration, NHCP, May 2019

Restoration of Bato Church
The church of St. John the Baptist, located in Bato, Catanduanes (an island province located in the eastern part of the Philippines) is a 17th-century church located near a river estuary. This historically significant structure uses hewn coralline limestone and river stones for its unreinforced *mamposteria*[11] masonry walls. The structure was subjected to the destruction of its roof and loss of all of its wooden components due to several typhoons that hit Catanduanes.

[10] Presidential Decree (PD) No. 1219, 1977, "The Coral Resources Development and Conservation Decree," as amended by PD 1698, 1980, and orders mandating log bans making it difficult to source good lumber.
[11] Definition: A method of wall construction using river stones or other irregularly cut stones laid atop each other, held in place with lime-based mortar.

Periodic typhoons have acted as the structure's main agent of destruction, wiping out the original wooden trusses and other wooden components. Because the wooden trusses had been destroyed and rebuilt several times, recent efforts were undertaken by the parish using a non-traditional material (steel) for durability. Quality aged timber is very scarce, and may be extremely expensive or even unavailable. The NHCP allocated a budget and prioritized the conservation of the original stone walls while respecting the contemporary intervention by the community regarding the church's roof.

Decision-making limitation: Any effort to restore the roof using timber trusses, which had been historically destroyed and rebuilt several times, would have to be made without reference to the original design of the trusses, thus risking conjecture. The will of the community for perceived reasons of safety was to retain the newer trusses for protection from subsequent typhoons. This posed a dilemma for decision making, considering the perceived notion of the community, and the possibility of further study being impeded by the limited duration available for implementation.

Restoration of Tabaco Church

St. John the Baptist Church in Tabaco City, Albay, is a National Cultural Treasure and a Marked Historical Structure designated by the NHCP. The 18th-century church boasts square-cut black and red volcanic rocks, which bear marks of unique masonry. Further, it is one of the last surviving churches in the Bicol region (in the southern tip of the island of Luzon) to have preserved a majority of its original timber trusses and doors. The NHCP is engaged in the work of its restoration, which originally prioritized the cleaning of the walls, with exploration of the original timber trusses scheduled for a later occasion.

Sometimes towards the end of the conservation work, however, a typhoon hit the church and caused a great number of leaks in the roofing. The stakeholders of the parish decided on a change in priorities, calling for the whole roof to be replaced for the protection of the church interior and the trusses. Due to limited funding, roofing replacement was carried out while reinforcing the purlins but leaving the original trusses untouched.

Fig.3–4 Photos of Tabaco Church original timber trusses supporting the ceiling and wooden framing, Arch. Lorilla, 2018 August

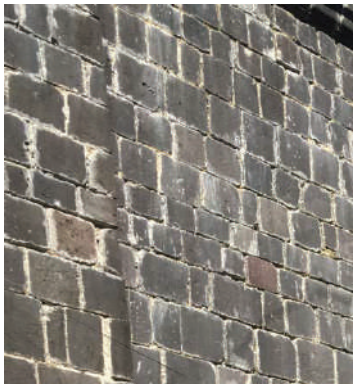

Fig.5 (left) Pre-restoration façade of the Tabaco Church, featuring hewn dark volcanic stones, NHCP, 2017
Fig.6 (right) Detail of the church wall showing dark and red volcanic rocks, NHCP 2018

Decision-making limitations and dilemma: Under the pressure of meeting the implementation schedule, a detailed exploration of the original timber trusses was put on hold and the roofing replacement was prioritized. The timber trusses were protected in principle, and given first-aid with minimal intervention. A more comprehensive and holistic study could have been performed beforehand but was limited by the deadline for implementation. This indicates the need to allow for better scheduling along with the need for holistic research.

Restoration of Sorsogon East Central School

Gabaldon Buildings are structures of the 1920s made mainly made of wood, which were designed and implemented throughout the country purposely as schools for basic instruction. Gabaldon Buildings exemplify the introduction of American construction technology and materials with a specialized design tailored to the Philippine setting. Gabaldon schools were recently declared important structures by virtue of RA 11194 which was enacted 7 February 2019,[12] which recognizes their importance and specifies their conservation and protection.

The Sorsogon East Central School is a simple school building which is one of the surviving Gabaldon Buildings located in Sorsogon City, Sorsogon Province. The school building was found to be in a deteriorated condition, with one of its annexes at risk of collapse. The structure posed a hazard for passing pedestrians, including school children. Measures to restore the original parts of the building were undertaken by prioritizing the original appearance, based on the architectural plans. Wooden members of an alternative timber material were used, but were cut to the same dimensions and style of the originals.

Fig.7 Pre-restoration panoramic view of the Sorsogon East Central School Gabaldon Building, showing the cramped site space

Decision-making limitations: Scarcity of material resources and the loss of traditional construction methods.

Fig.8–9 Dilapidated wooden components of Sorsogon East Central School FIGoogle photos, 2017

V. Conclusion

The above-discussed limitations and needs faced by the Philippines in the conservation and protection of its cultural heritage as illustrated by the case studies reflect the current efforts being undertaken by the NHCP in the performance of its mandate. Unifying efforts in organization, and much-needed refinements to the Heritage Law, are currently being pursued to bridge gaps and address the stated administrative and technical limitations and needs.

The transfer of new knowledge and technology made possible through participation in training and workshops focusing on the protection and conservation of cultural heritage, such as the program organized by the ACCU Nara office in Japan, provides highly instrumental input which will be of great help to our engagement with the discourse, development, and improvement of heritage work in the Philippines.

[1] Republic Act 11194, Feb 7, 2019, "An Act Mandating the Conservation of Gabaldon Buildings Nationwide, Providing Penalties for Violations, and Appropriating Funds Thereof"

Problems and Needs for Cultural Heritage Protection and Restoration Activities in Sri Lanka

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Introduction

Sri Lanka is an island enriched with cultural diversity, holding a written history of 2,000 years as demonstrated by World Heritage ancient cities such as Anuradhapura and Polonnaruwa. Sri Lankan culture has been influenced by the heritage of Buddhism which spread from India, and its legacy can be seen in the southern and central areas of the country. There is also a history of colonial invaders who influenced Sri Lankan traditional culture and life beginning from the year 1505. Although Sri Lankan traditional architecture has thus been influenced by more recent colonial architecture, the essence of Sri Lankan identity has been enlightened by Buddhism since the 3rd century BC.

Sri Lankan architecture, arts and crafts are represented in many forms originating from religious beliefs. In consideration of their Outstanding Universal Values, eight sites have been inscribed on the UNESCO World Heritage List, namely the Sacred Cities of Anuradhapura and Kandy, the Ancient Cities of Polonnaruwa and Sigiriya, the Rangiri Dambulla Cave Temple, and the Old Town of Galle and its Fortifications as cultural heritage sites, and the Sinharaja Forest Reserve and Central Highlands of Sri Lanka as natural heritage sites.

The architecture of ancient Sri Lanka displays a rich diversity of form and style from the Anuradhapura Kingdom to the Kingdom of Kandy, which was mainly based on religion and includes stupas, monasteries, temples, Buddha image halls etc. Over the ages, the materials of those buildings have varied as stone, mud, clay, brick, timber, limestone, and wattle and daub. Historical records indicate the presence of timber structures since the early period. Some of those buildings have either totally decayed by now or are in a ruined state. Timber was extensively used as a construction material during medieval times.

Applications of timber in heritage buildings

There are examples of early timber construction methods still surviving in relatively well preserved states for building types such as *tampita vihara* (shrines on pillars), *devala* (shrines dedicated to deities), *ambalama* (resting places for wayfarers), and *mandapa* (assembly places for administrative routines).

Wood was the best medium for expressing the craftsmanship of traditional builders. It was used not only for image houses but also for the type of structure known as *ambalama*, a place constructed for pilgrims, traders and travellers to rest while walking towards a destination. These are simple structures designed to shelter those people. Some of these *ambalamas* and all *tampita viharas* were constructed on stone pillars about a foot in height to prevent damage from insects and environmental factors.

Fig.1 *Tampita vihara*, *mandapa* (audience hall), *devala, ambalama*

The properties of any structural material will change with the passage of time. In the case of timber, this is highly relevant since variation in the considerable moisture content of timber affects its strength, durability, stiffness, shrinkage and swelling, shape stability etc. The surrounding environmental conditions related to water, such as atmospheric humidity, rain water, and capillary water action, thus pose a variety of risks to the durability of timber structures. In addition, biological degradation due to fungi, insects and bacteria also threaten the structural integrity of timber. Apart from these internal conditions, there are external factors such as wind loads, settlement, and thermal effects that can affect structural stability.

Historical timber structures exhibit some extraordinary sectional joints to transfer forces from one member to another. The joinery methods adopted in medieval Sri Lanka timber constructions include the following.

- *Pekada* – This is an intermediate structural element used for connecting beams with columns (pillars). It is a separately carved capitol or bracket. This bracket is made of two pieces, fit together in a crossed manner to comprise a four-faced bracket assembly. The top of the pillar itself is mortised into the bracket through the centre of the crossed parts.

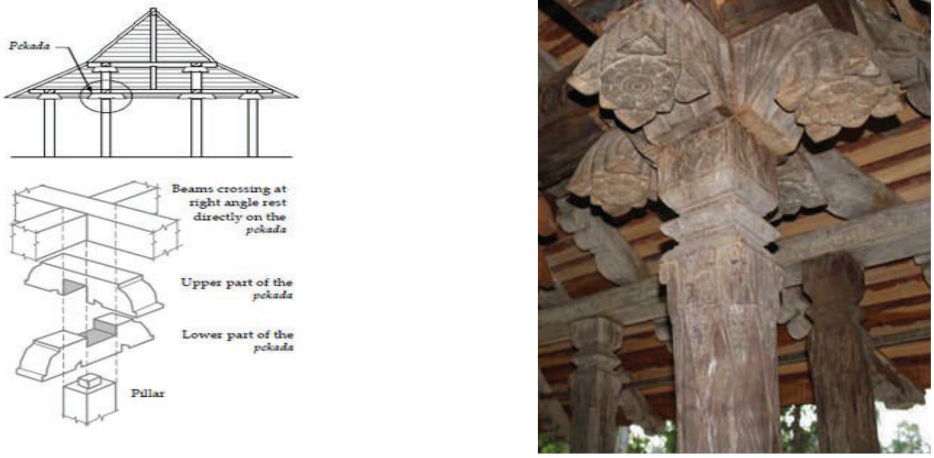

Fig.2 (Left) Section and isometric view of *pekada* (Right) Carved *pekada* at Panavitiya Ambalama

This arrangement prevents the transfer of internal stresses, due to thermal expansion or settlement, from the beams to the columns. It also enables the transfer of lateral as well as vertical loads from the beams to the columns without inducing high local stress at the joints.

- *Madol-kurupawa* – This is a structural element seen in medieval buildings provided with hip roofs. Rafters of the lateral and end sides are gathered at a pinnacle by a timber boss known as *madol-kurupawa*. This provides structural compression between the rafters and ridge beam without any mechanical joinery.

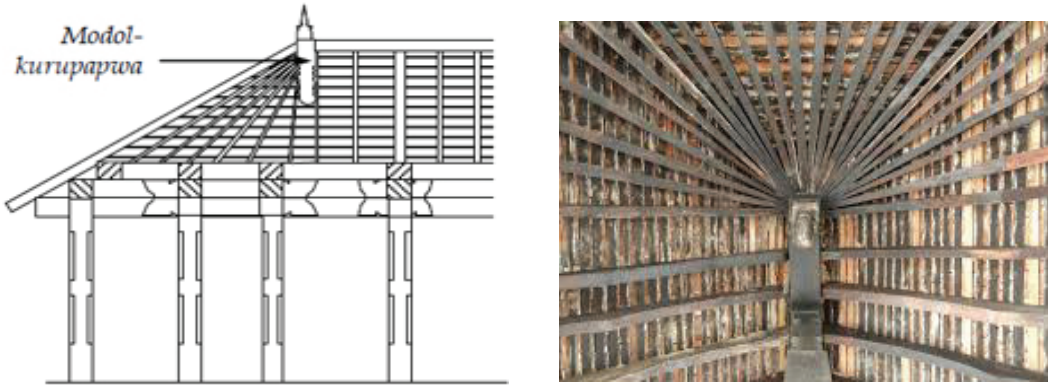

Fig.3 (Left) *Madol-kurupawa* section (Right) *Madol-kurupawa* at Embekke Devale

Due to this arrangement, the forces exerted by the rafters on the ridge beam are converted to compressive forces rather than introducing bending moments. This is another example of traditional, indigenous joinery in timber construction which differs from the mechanically fastened or glued carpentry connections that are standard in modern timber engineering.

Problems and needs for cultural heritage protection and restoration

Present challenges for tangible values

Heritage sites and monuments of different types bring a variety of new challenges and issues to the guardians, users, authorities and governments. Like other types of heritage, Buddhist heritage is facing challenges for its survival and continuity. Most of these sites fall into the category of living heritage as defined by the continuity of religious practices and festivals conducted by community groups. The bonding of religious beliefs and rituals to a physical structure tends to multiply the demands made with regards to the site. To cope with such increased demands of the users, various facilities and infrastructure often have to be developed.

As an example, *tampita viharas* are Buddha image halls which are proportionally small in size. Temple guardians or custodians tend to make new, larger image houses, or make alternative structures to the originals, to accommodate greater numbers of people at a single occasion. Gradually the original image houses are abandoned or closed to the public due to underutilisation (Figure 4). This increases the moisture content inside and promotes biological degradation.

Fig.4 (Top) Abandoned original *tampita vihara*; (Bottom) New image halls

Figure 5 shows another example of a *tampita vihara* which has been modified as an enclosed building by covering it with masonry walls on all sides. While this was done by the temple custodians to protect the image hall from environmental changes, the increased moisture content resulting from enclosing the space provides a comfortable space for insects and promotes early degradation.

Fig.5 Modified *tampita vihara* and its current interior condition

Wood decay is caused by a combination of moisture, fungi, and temperature. To prevent decay it is necessary to know the nature of the fungi that attack wood and the conditions necessary for their growth. When moisture cannot be controlled or wood has to be placed in wet locations, adequate treatment for the wood should be done to control decay. When we have to restore wooden pillars or roof structures with delicate carving, it is essential to know the methods to be used to preserve both the aesthetic and structural values step by step. The pictures below show the conservation steps taken when conserving and restoring a famous *panavaitiya ambalama*. Some wooden portions were replaced using new timber beams, and replicating the carving was a difficult task.

Fig.6 Conservation steps and final appearance

Embekke Devale is a complex of shrines dedicated to the god Kataragama and contains delicate carvings on timber pillars. This was originally a drummers' hall for a colourful festival in the month of August, followed by the main festival at the Temple of the Sacred Tooth Relic in Kandy. The maintenance and repairs have traditionally been carried out by skilled craftsmen who live on temple lands and used materials provided by the lands, while the village community has rendered their services to repair and restore the buildings, structures and roads before the annual festival. This system has continued for more than 600 years and the building and other structures have been maintained in the best possible way while protecting their artistic, architectural and historical values.

After enactment of the Antiquities Ordinance in 1940, this site became an archaeological monument and conservation was mandated to be carried out with professional involvement using government funds. Subsequently, community involvement became dramatically reduced and the socioeconomic system bound up with the temple collapsed. Skilled local people migrated to the city and engaged in other professions. Accordingly there were extreme issues in finding skilled carpenters to restore the buildings and the extraordinary carvings. This suggests that the local community and professionals would all benefit if the local people continue to provide tangible contributions while the professionals are involved in the form of guidance, so that the two groups work together in symbiosis.

Challenges for intangible values

"Living religious heritage is expressed in cultural material: the tangible structures, objects and works of art created to support forms of worship within particular faiths and in associated intangible rituals, celebrations and devotional activities. In all cases, the tangible and intangible manifestations of the heritage carry intangible values, expressing the significance of the heritage for the communities who consider it important."[1]

Most of the ancient *tampita vihara* in Sri Lanka can be seen in the districts of Kandy, Kegalle and Kurunegala. Among these, there are several *tampita viharas* which need immediate attention to be conserved and restored for further worship. Painted layers can be seen inside the image hall on every possible surface of the walls, which are made of wattle and daub, on timber ceilings, and sometimes on the outside walls as well. These paintings depict stories of the Lord Buddha's life and were made to enhance

[1] Herb Stovel, "Introduction," in *Conservation of Living Religious Heritage: Papers from the ICCROM 2003 Forum on Living Religious Heritage*, ed. H. Stovel, N. Stanley-Price, and R. Killick (Rome: ICCROM. 2005), p. 9. Available: https://www.iccrom.org/sites/default/files/ICCROM_ICS03_ReligiousHeritage_en.pdf

the spiritual devotion of the people. The paintings belong to the Kandyan era, and most of them have been attacked by white fungi. Therefore chemical treatment should be given to remove the fungi, followed by work to reintegrate the paintings.

"Restoration and renewal of objects of worship and structures to regain their symbolic form and meaning, and the need to appreciate them in their completeness, are among the most significant value systems attached to Buddhist heritage."[2] The images in the top row of in Figure 7 show a decayed timber ceiling which may have originally been painted with traditional artwork, and the entrance view of the same abandoned *tampita vihara*. The photos in the second row show a completely restored image hall for a comparison of the spiritual atmosphere.

Fig.7 (Top) Image hall scheduled for conservation; (bottom) A well conserved image hall and paintings

These living heritage structures carry high degrees of spiritual value after being completely restored to their former glory with the use of traditional designs, similar materials, and traditional craftsmanship. Therefore it is important to secure them as platforms for worship, rituals, and beliefs to enhance the spiritual values of the people, in order to maintain these places as living heritage. Local community involvement providing continuity of the original utilisation is the best method for the management and maintenance of monuments of this calibre to prevent them from being abandoned. Since all the examples given are not located in popular areas or World Heritage sites, continuous oversight for these monuments can only be done by the local community by ensuring they are living heritage.

As mentioned above, the Antiquity Ordinance came into law in 1940 as a legal framework to protect all archaeological monuments and sites. Thereafter the management and maintenance of such heritage fell under the purview of the Department of Archaeology. In administrative reports it is emphasized that less attention and interference be given to heritage monuments in order to avoid unnecessary damage. But the most important factor is to promote the spiritual feelings of the local community while valuing their skills and knowledge, from generation to generation.

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[2] Gamini Wijesuriya, "Introduction," in *Asian Buddhist Heritage: Conserving the Sacred*, ed. G. Wijesuriya and S. Lee (Rome: ICCROM, 2017), pp. 3–4. Available: https://www.iccrom.org/sites/default/files/2017-11/asianbuddhist_web.pdf

Problems and Solutions for Cultural Heritage Management in Thailand

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Thailand of the present day originated from many different historic cultures, such as the Lanna Kingdom in the north, Lanchang and Lopburi to the northeast, the central kingdoms of Sukhothai and Ayutthaya, and Srivijaya in the south, resulting in a great variety of cultural heritage, both tangible and intangible, in the country. There are many benefits from this wealth of heritage. At the same time, it presents a number of problems related to its utilization and management. This essay will mention some of the problems and their solutions that have been required for cultural heritage management in my own experience.

To begin with, I have officially worked for the Fine Arts Department since 2014. My first posting was to the 7rd Regional Office of Fine Arts (Nan), which is in the highlands of the north and has responsibility for an area of 36,878 square kilometers in the four provinces of Nan, Phayao, Phrae and Lampang. About 500 archaeological sites have been found in that jurisdiction, with only eight officers, two administrators, three archaeologists and three technicians working there. The problem of understaffing became more evident when I moved to Ayutthaya and worked for Ayutthaya Historical Park, which is under the 3rd Regional Office of Fine Arts (Ayutthaya). Ayutthaya Historical Park also has authority over the district of Phra Nakhon Si Ayutthaya, which has 130 square kilometers including the 7.7 square kilometers of Ayutthaya Island, of which 2.9 square kilometers is the World Heritage Site of the Historic City of Ayutthaya. There are seven officers who take responsibility for this area, which includes 500 archaeological sites. The persistent problem is an imbalance between the number of appropriate personnel and the scale of the work.

A second problem, resulting from this workload, concerns the planning that is necessary for cultural heritage management. The latest edition of the Master Plan for the Historic City of Ayutthaya has eight component plans: (1) archaeological study and research, (2) monument conservation, (3) development of ancient roads and canals, (4) controlling land use and involving the community, (5) landscape improvements, (6) support for public relations and tourism, (7) increasing community income, and (8) reducing the effect of disasters. But even if the current ideas are adequate, recently the concept of cultural heritage protection has changed considerably, calling for conservators to respect a monument not only as a building but also as the object of religious faith. Along with this extra burden it brings for management, the spiritual aspect can also be a source of added value, so the planning should incorporate understandings of stakeholders' beliefs and their religious involvement in the heritage before any archeological procedure is carried out.

As a third problem, archaeological research must rely mostly on historic annals for background on Ayutthaya. These past two years, there have been five projects excavating sites that are unrelated to each other. This is problematic because the archaeological results and the annals cannot explain the context of

Ayutthaya clearly, which is the reason for proposing a plan to study the context of Ayutthaya systematically based on archaeological evidence alone, as provided by archaeological procedures of surveying and excavation. The greatest challenge for this proposal was how to prove that such research is a better approach. To that end, I compiled and managed the database of archaeological sites because I believe such a database can help the archaeologist analyze more easily. I also believe that scientific techniques such as observations using X-rays and scanning electron microscopes (SEM), and absolute dating based on thermoluminescence (TL) or accelerator mass spectrometry (AMS) measurements of ^{14}C, make archaeological research very advantageous. This has heightened my interest in scientific techniques because of the certainly they can provide in dating the evidence. But they also pose problems regarding the correct way of collecting and choosing samples suited to each scientific approach, which can be sent to the laboratory and give the best results. For example, I sent four samples from the same area at the Santiphap archaeological site in Nan province, where human graves and kilns for making tiles were found in the same location (Fig. 1), for dating by AMS. The first sample was a piece of coral, the second was shell, the third was human tooth and the last was charcoal. The results were disparate (3,608 ± 30, 4,560 ± 30, 320 ± 30 and 1,690 ± 30, respectively), which was quite confusing.

Fig.1 Santiphap archaeological site, Nan Province

As a fourth problem, there are many ways of protecting cultural heritage, with restoration as one mode of caring for any property, and it is likely that many of the structures and remaining traces such as the old palace and principle temples of Ayutthaya had been restored in the reign of King Rama V. This presents problems for choosing a method of cultural heritage protection and development, which should be decided and carried out by specialists. The lack of specialists with understanding of the context as well as the scientific methods possible for conducting research is as extensive a problem as the lack of personnel with the necessary traditional skills.

Further, solutions to these problems should provide benefit for the protection and conservation of heritage, even while balancing a need for development and the effects on community life. Similarly, public relations are important because the sympathy of the masses has power. In a good way, it can provide income and improve community life in the manner of the influence brought by the Thai TV series *Love Destiny* (*Bupphe Saniwat*), a historical drama which used the ancient temples in Ayutthaya as scenic locations,

especially Wat Chai Wattana. Increasing numbers of visitors subsequently came to Wat Chai, reaching more than 10,000 people daily, and as traditional Thai dress also became more popular, many establishments across from Wat Chai have thrived up to the present day from rentals of Thai costumes. In contrast, regarding the owners of cultural heritage, in many cases they have showed a lack of understanding and inattention to these properties. Due to the legal status as a monument conferred on Ayutthaya Island by an act of Parliament, activities there must be approved by the Director-General of the Fine Arts Department and follow the Department's rules and procedures to obtain permission for building construction. These rules divide the island into three areas, the first on the west side where the most important monuments are situated, the second in thecenter and the last to the east where the old and modern cities overlap. Limits have been set for each part regarding roof patterns and heights, with the latter set at 8, 12 and 15 meters for the three areas, respectively. Not only personal buildings, but also government buildings that represent the biggest projects have been controlled by this rule. Currently problems arise when construction takes place on or close to a monument's location. In addition to the work for the duration of the contract, the builder's responsibilities include proving archaeologically that the activity will not affect the heritage value of the property. For example, in developing a flood protection system project, carried out by the Public Works and Town and Country Planning Office of Ayutthaya, on Chao Phraya river's blank where the U-Thong Road is located, it was determined from old records that this road originated from the wall of Ayutthaya city which was leveled around 120 years ago. For that reason, archaeological excavation was carried out and the outside of the wall was found, being a brick construction 3 meters thick and more than 1.5 meters in height (Fig. 2), and now a new plan is in process for a dam to protect this wall.

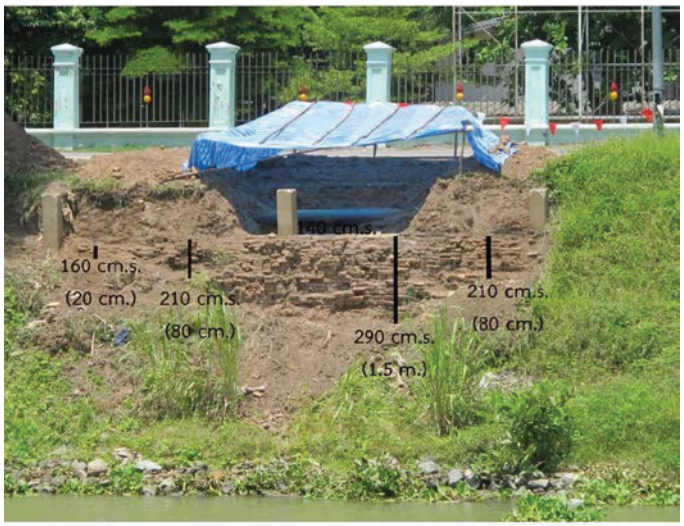

Fig.2 Ayutthaya city wall

To summarize, as we can see there are many problems for cultural heritage protection which divide into three main areas of trouble, the first being a deficiency of public officials and specialists, the second requiring systematic processes for heritage planning and management, and the last involving participation of the people and their relations with public officials. For all of these problems, human resource development and creating understanding are necessary.

Common Problems and Needs for Cultural Heritage Protection in Uzbekistan

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Uzbekistan is located in the central part of Central Asia. It borders on Kazakhstan to the north, Turkmenistan to the southwest, Kyrgyzstan and Tajikistan to the east, and Afghanistan to the south. Uzbekistan attracts visitors from all over the world with its ancient, unique and beautiful cultural heritage sites and traditions, which play a vital role in the Uzbek people's life.

At present four historical cultural heritage sites of Uzbekistan have been inscribed on the UNESCO list of World Cultural Heritage. They are Itchan Kala in Khiva (inscribed in 1990), the Historic Centre of Bukhara (1993), the Historic Centre of Shakhrisyabz (2000), and Samarkand – Crossroads of Cultures (2001).

Khiva, located in the Khorezm region, is considered to be one of the gems of world culture. The Khorezm region is home to various wooden objects, representing the following.

- Archaeological finds (e.g., wooden objects as parts of doors and shelters). These archaeological findings date back to the end of the third millennium and the beginning of the first millennium BC. Some of them belong to the ninth–twelfth centuries AD.
- Architectural objects (e.g., doors, gates, columns, roofs, shelters). The oldest architectural objects date back to the tenth–thirteenth centuries AD. The majority of wood carving examples belong to the thirteenth–nineteenth centuries AD.

The wood carving art of Uzbekistan is a part of its Central Asian artistic heritage, the origin of which goes back to antiquity. From time immemorial, carved wood has held great popularity in the territory of present-day Uzbekistan.

Making geometric forms from wood and as decoration on wooden doors and columns began from the seventh century. During the Timurid period, wood carving started to develop very rapidly along with other folk art. Woodcraft continued to be produced in the same spirit later as well, in the sixteenth to twentieth centuries, in combination with Islamic architecture. In the traditional architecture of the nineteenth and twentieth centuries, as original examples illustrate, carved wood was at times the sole element used for decorative purposes. Examples can be found in the doors and windows of the Shah-i-Zinda Complex, in Registan (in Samarkand), in Bukhara, in numerous mosques, and in madrasas in Khiva. It was used as an important element of design, for instance in columns, cornices, doors, ceilings, lattices, etc.

The use of carved wood in everyday life was paramount. It was possible to see it in furniture, household items, and so forth. In making such objects the basic material came from local wood such as the plane tree (*Platanus*), elm, nut trees, fir, mulberry, apricot, poplar, willow, pear tree, quince tree, *djida* (wild olive, *Eleansus hortensis*), etc.

Fig.1-2 Tash Hauli Palace in Khiva (Uzbekistan, nineteenth century)

Wood is an important material in traditional Uzbek buildings, which have proved efficient in resisting earthquakes and other forces of nature. As an organic material, however, wood is easily perishable when exposed to weathering and tends to deteriorate over time. It is also highly combustible.

A structure built with wooden components is considered safe, energy efficient, dependable, affordable, and environmentally superior. As wood is widely available and easy to work with, it is used from the simplest and most basic structures to the most elaborate and intricate architecture. The tapering wooden columns used in traditional buildings are quite interesting, and are a typical example of Uzbek architecture. These columns support the principal beams (*dung*) and joists for achieving a larger space inside.

A basic and distinctive characteristic of a great majority of permanent buildings that are wooden structures is that they are not comprised of monolithic blocks, but compounded from separate units which can be disassembled and re-assembled. This peculiarity of wooden structures allows the execution of some processes not readily feasible for permanent stone block constructions, for example, complete or partial dismantling for solidifying, treatment for preservation, or replacement of separate components, etc. Thanks to this feature, the building of architectural/ethnographic reserve museums of national architecture has become possible in many countries of the world. Decorative parts and other units of a timber building may be restored easily if they have survived in sound condition, but not if they are badly decayed or destroyed. In the latter case, genuine component parts can not only be samples for study through techniques such as architectural drafting, but also serve as direct models for craftsmen in preparing suitable items to use as replacements.

Artistic monuments of Uzbekistan built of wood are simple but distinguished by the extreme carefulness of their execution. Therefore great attention should be paid to their structural elements, and architects engaged in the restoration of artistic monuments should begin by scrupulously studying the ancient construction methods, otherwise serious errors can be easily made, destroying the nature of the architecture.

Architects need to follow special procedures for disassembly when it is necessary to relocate a monument. First of all, a system of marking should be developed so that each separate member is properly recorded. The marking system should be accurate and simple. All component parts are marked, including those which may need to be replaced due to their state of preservation, since they can serve as models for making exact copies.

One of the most representative examples of wooden art in Uzbekistan is Djuma Mosque, which is situated in Itchan Kala in Khiva. The historic center of Khiva is known as Itchan Kala (which simply means the Inner Town—as opposed to Dishan Kala, or Outer Town). Surrounded by thick earthen walls some 8 to 10 meters high, it remains to this day a coherent, well-preserved example of traditional Muslim architecture of Central Asia, and for this reason it was inscribed on the World Heritage List as nominated by the Republic of Uzbekistan in 1990.

For the example of Djuma Mosque, it is possible to trace the procedures executed as measures for the structure's preservation. It is a unique archaic multicolumn mosque of Central Asia.

Fig.3-4 Entrance door and interior of Djuma Mosque in Khiva

Ancient carved wooden columns for Djuma Mosque were brought together by inhabitants from all over the Khanate of Khiva. A total of 212 pieces were placed at distances of 3.15 m from each other. Of these, 25 originate from the tenth–sixteenth centuries. Others originating from an ancient mosque include 16 carved wooden columns from the eleventh–fourteenth centuries, 14 columns of the seventeenth–eighteenth centuries, and 135 areas of the building, including pillars (except for eight columns which are in a museum of history of the people of Uzbekistan), plus carved wooden doors on the northern face, and single-leaf carved wooden doors on the southern and western faces of the mosque, have been preserved. One of the masterpieces of wood carving art in Khorezm is the entrance door of the mosque.

Back in 1952, after repair and restoration work on the ceiling had been performed in 1947, it became obvious that the small-scale repair works being carried out at the mosque could not save the monument with its ancient carved columns. Also, the roof was in bad condition. The area of the roof was large, so to restore it and make it modern made no sense.

In light of a theoretical problem about the restoration work conducted at Djuma Mosque, it is necessary to view the present materials in relation to an actual production history of design proposals, directed at saving the surviving architecture of the monument. For saving the columns, various proposals were offered such as the following.

1. For saving on site, bars should be placed on all four sides of a column to keep it from contact with the grain being held in storage.
2. Removing the columns and transporting them to a museum.
3. Collecting the columns in one place and making a roof over them.

After lengthy discussion, it was decided to take measures for disinfection, preservation, and strengthening, while leaving the columns in place.

According to written sources the monument was emptied of its stored grain, research was conducted on the structure, and minor repairs were made on the roof. However, the question of preservation of the ancient columns remained unresolved.

A solution to the problem was decided only in 1981 after architect J. M. Sanochkin conducted research at the site and carried out extensive historic surveys of archival and bibliographic materials. He collected together the majority of the surviving data on the archaeology and the history of construction of Djuma Mosque. According to Sanochkin, the mosque was built originally in 1666 and its currently existing borders result from an initiative by Abdurakhman Mekhtar in 1788. The general structural condition of the ceiling, roof and ancient wooden columns was extremely urgent. All wooden members of the monument, including the ancient columns, had been significantly damaged due to storage in the mosque of raw cotton and grain which exposed the wood to fungus, causing it to be gradually destroyed. Bearing beams and girders had sagged and in some places (in the southeastern and southwestern parts) collapsed under the weight of the roof.

The main reasons for such an urgent condition of the monument was the lack of reliable roof and ceiling structures (i.e., protection from precipitation), and an inadequate degree of slope in those structures for the discharge of precipitation from the monument.

Thus the main task of the restoration project was to restore the ceiling structures, preserve the ancient carved columns of the mosque, and restore the original appearance of the building, taking into account its historical development, and giving new life to the unique architectural monument as a museum of ancient architecture and folk art of Khorezm.

To solve these problems, it was proposed to perform restoration work that would replace the wooden ceiling structure completely with new traditional lumber. The complete replacement of the mosque ceiling was due to the fact that in 1947 the ceiling was completely repaired without reference to the old structure in the process. A structural diagram had been preserved. Beams with a cross section of 200 by 180 mm were set upon brackets to cushion their load on the columns, and on top of these the joists were fit and covered with the *vassa*, a board ceiling. The slope of the covering was created by a difference in the heights of the columns; the heights of the ancient columns were taken as a basis. The slope was distributed from the center of the mosque continuously to its outer walls, thereby creating a natural slope of 2%.

The roof was proposed to be multilayered with the use of modern roofing materials, which according to the authors would prolong the term of its service and would significantly facilitate the overall load on the columns.

A layer of reed mats or *berdan*, mats woven from reeds, was laid on top of the *vassa*. Then it was proposed to lay a thatch and clay coating of 3 cm, then a filling of clay to expand to 15 cm as insulation, above which was a cement covering of 6 cm, then two layers of roofing material on bitumen mastic, and finally a layer of a complex solution mixed with waterproof cement at a thickness of 3 cm. As an outer protective layer for the roofing structure, it was proposed to apply a pavement of square bricks, followed by the pouring of a complex cement solution into the joints. The total height of the roof was not to exceed 39–40 cm. Gutter trays were to be sealed in a parapet structure as a single monolithic form having waterproofing in common with the roof.

In 1981 restoration work on the site began with the bulky roof and ceiling structures. When disassembling the roof, it was found that it consisted of the following layers: wooden framing (chipped boards, poplar poles, *tala*), reed mats, earthen filling, and multiple layers of clay coating. In some places, the thickness of the roof reached up to 60 cm. Supporting beams, trimmed on four sides from round logs, and girders of circular cross section were almost all damaged by wood fungus and not suitable for reuse.

The mounting of the wooden columns, meaning the installation of the wooden columns and the superstructure, was started from the southeast part of a mosque. The team of carpenters/restorers under the guidance of Salaev Ruzmat was engaged in the installation of these columns, the manufacture and installation of the surmounting brackets, main girders, lintels and other units of construction of the ceiling.

Three carved replicas of the octagonal pads that were bases for wooden columns of the tenth–fourteenth centuries, with 3/8 of the design based upon preserved samples and an additional third on an ancient carved pad under column J-5, were made by the master woodcutter Sapayev Kuzi. Unfortunately, the initial copy was not used in the restoration at one of the original locations. At present it is kept as a reserve item.

All wooden bases, brackets, and columns of the mosque were cleared of dust, dirt, and were impregnated with cotton oil, and the supporting beams, joists, and board ceiling (*vassa*) were painted with antiseptic solution and a coat of varnish.

From 2007 the spread of termites from the directions of Turkestan and Transcaucasia was observed in Uzbekistan. These termites caused damage to many buildings and structures, including objects of cultural heritage of our republic.

In the historic city of Itchan Kala there are 57 structures designated as cultural heritage. Termites were found in 31 of these. It was impossible to rid the wooden structures of termites relying only on conventional methods (spraying with powdered or aerosol insecticides).

From 2008 the Institute of Zoology of the Academy of Sciences, in cooperation with the Ministry of Culture, began implementing the project “Development of an effective system for the protection of objects of cultural heritage of Khiva and nearby territories against damage by termites.” Currently specialists engaged in this project are trying to rid the termites with toxic bait. They continually try to monitor the prevalence of termites. Since the affected territory is huge, controlling the situation becomes very difficult. All of the activities for the preservation of wooden structures depend on funding. Furthermore there are other sources of damage, apart from insects, or problems in conservation for wooden structures of Uzbekistan. These include the following.

- Rising damp: Most monuments and historic buildings are affected by too much dampness due to lack of sunlight, and thus they absorb water all year round. The historic mosque city has been affected by rising damp (absorption from the ground by capillary action).
- Problems of rainwater disposal and lichen growth: Rainwater disposal, both away from the buildings and in their environs, is almost non-existent.
- Lack of instruments, equipment and techniques for analyzing materials before conservation.
- Human activity: Man is another agent causing the deterioration of cultural heritage. Anthropogenic causes and activities include continued occupancy; lack of knowledge and skills for proper treatment; lack of scientific research and storage systems and incorrect conservation practices; vandalism, theft and a lack of security; lack of funding; and lack of proper and scientific digital documentation.

The Ministry of Culture of the Republic of Uzbekistan in cooperation with the Academy of Sciences is trying to preserve our national heritage and create the means for the effective restoration and protection of

our cultural resources. It is a fact that managing anything requires funding and a substantial, appropriate infrastructure. The following measures should be taken in order to preserve cultural heritage in Uzbekistan.

- Policies should be updated and implemented.
- International cooperation should be improved.
- Cooperation with governmental and non-governmental organizations, and with scholars from various universities, national libraries, research libraries and museums should be developed.
- Human resources should be developed.
- Awareness programs through workshops, seminars and courses to safeguard the rich cultural and documentary heritage of the country should be arranged.
- The necessary infrastructure should be built for the preservation of cultural properties.
- There should be a modern laboratory equipped with the latest technological facilities required for effective conservation.
- Local communities should be encouraged to participate in the preservation and monitoring of the heritage.
- For the efficient monitoring of archaeological sites, the number of observation posts should be increased at the protected sites.
- Funds should be increased for carrying out archaeological activities such as excavation, exploration, conservation, restoration, and maintenance of cultural heritage.
- For more effective management in safeguarding the national cultural heritage, a special center dealing with research activities for conservation should be created, since preservation of such unique objects is extremely important for any society, specifically for the aim of studying its own history through such material historical heritage, and for preserving it for future generations.

The Challenge of Balancing Conservation and Development

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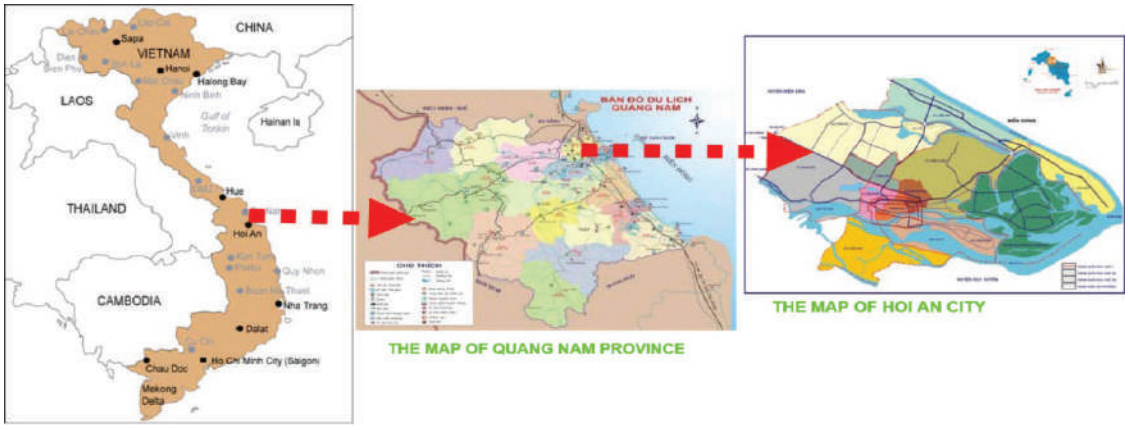
The economy is developing strongly, improving people's lives. Sadly, this also leads to many mistakes in repairing and transforming houses and other heritage. New technologies, materials and building techniques are being popularized with cheap prices making many owners avoid using traditional materials and techniques when repairing houses and heritage.

1. Outline of Hoi An

Hoi An, located on the lower section of the Thu Bon River in Quang Nam Province, has a city center (its core zone, the World Heritage Site of Hoi An Ancient Town) at a latitude of 15°53' N and a longitude of 108°20' E, and lies about 30 km southeast of the city of Da Nang.



THE MAP OF VIET NAM

THE MAP OF QUANG NAM PROVINCE

THE MAP OF HOI AN CITY

The total area of the city is 6,146.88 ha (accounting for 0.58% of the province's area), of which 74.53% is on the mainland, with the remainder consisting of islands. The population of 121,716 residents is divided among 13 communes and wards.

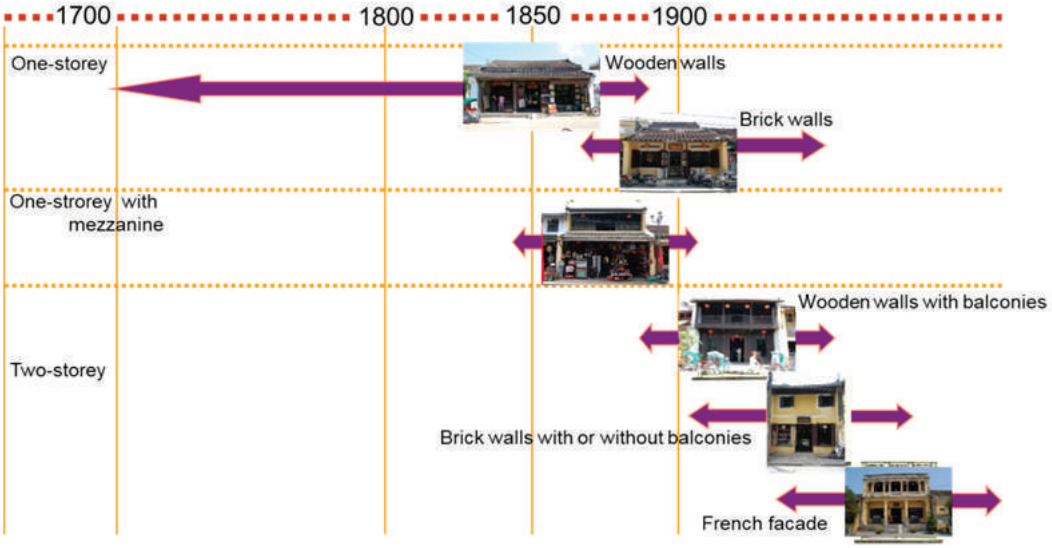
The Ancient Town (core zone) has three main streets running east–west in parallel to the Thu Bon River. The first street by the river is Bach Dang (dating from 1878), then Nguyen Thai Hoc street (1841) and Tran Phu (which extends further west as Nguyen Thi Minh Khai street). Some of the streets running north–south are Hoang Dieu, Tran Qui Cap, Hoang Van Thu, Le Loi, Nhi Trung (alley), and Chau Thuong Van streets. In addition to carrying traffic as their main role, some small alleys running north–south also serve for ventilation, rainwater drainage and other functions. In addition, there is a system of old trees distributed throughout the Ancient Town.

2. The architecture of Hoi An Ancient Town

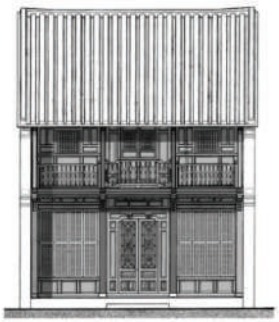
There are about 1,360 standing items of architectural heritage (in addition to architectural or archaeological heritage underground), including those briefly described below.

Residential heritage: Pipe-shaped shop houses as the majority

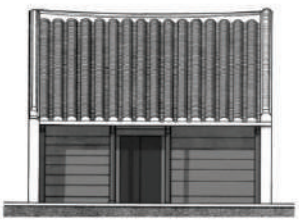
Shop houses with wooden architecture occupy a large percentage (more than 90%) in the architectural complex of Hoi An Ancient Town, typically on a corridor plan ("pipe-shaped" or "tubular") with buildings and interspersed yards placed in sequence on long, narrow lots. Due to differences in the time of construction, the structures of old houses are not similar (especially for the façade). Survey results indicating the typical types of architecture are illustrated below.

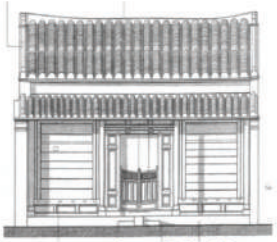



Two-storey with eaves

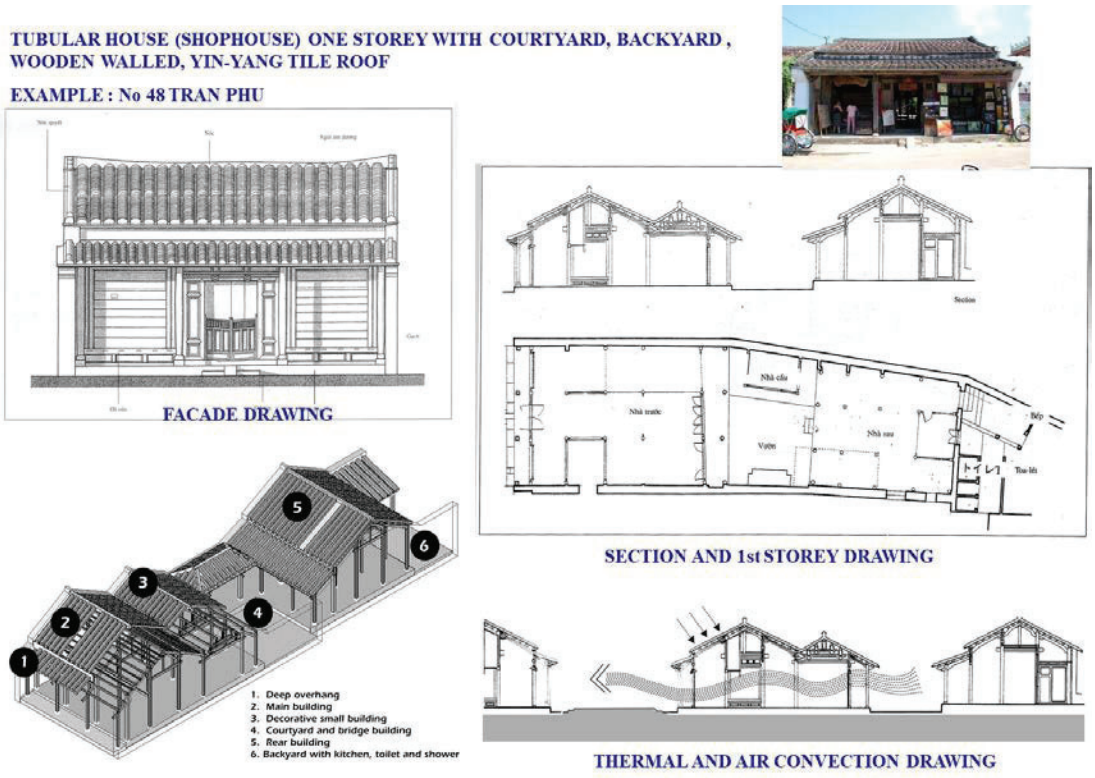

Two-storey wooden –walled with balcony


Two -storey colonial style


One-storey wooden-walled


One-storey wooden-walled with eaves


One-storey colonial style



Drawings and photos by Hoi An Center for Cultural Heritage Management and Preservation (HACCHMP)

The figure above introduces a traditional shop house in Hoi An, showing the façade and layout of structures on the town lot.

Religious and other heritage

Other noteworthy heritage structures include a Japanese covered bridge, communal houses, pagodas, temples, shrines, assembly halls, family chapels, markets, Cham architectural relics, and the tombs of French, Chinese, and Japanese residents.

Photos by Vuong Phuc Tu Tuoc

3. Challenges in wooden architecture conservation

Indirect factors

One indirect factor posing a challenge to conservation is a cultural imbalance being introduced by the development of tourism, and the invasion or adoption of elements of modern and especially foreign

cultures. If too many people visit, trade, provide services, do business and live in the ancient town, this can cause an overload leading to difficulties of waste, drainage and traffic management. The risk of damage to the surviving heritage rises in proportion to such increases in pressure on the urban infrastructure system.

Another indirect factor is climate change. Sudden increases in rainfall, storms or prolonged drought do not follow the natural patterns known for hundreds of years.

Photos by Vuong Phuc Tu Tuoc

The most pressing problem is the flooding that occurs every year. Water and mud from the river damage the lower parts of houses (both inside and outside) in the Ancient Town, and when the interiors of houses become immersed in water, this causes deterioration. Wooden structures in particular are vulnerable to damage and some of their heritage value is lost every time flooding occurs. Risk management for wooden heritage is limited, and preventing the yearly flooding inside the houses is nearly impossible.

Though not visiting the area every year, typhoons are also a problem that can cause severe damage.

Direct factors

As a more direct challenge to conservation, many artisans with traditional skills are getting older and leaving almost no successors among the younger generation.

Also, deforestation and indiscriminate forest exploitation lead to the depletion of indigenous wood as a material for renovation. At present, we are using imported wooden materials from Africa and Malaysia for renovation.

As wood and other highly inflammable materials are used as building materials, the outbreak of fire is a huge risk. This potential problem is exacerbated in many old houses and restaurants by the use of gas for cooking, and as there are many inflammable materials inside the houses the fire cannot always be extinguished quickly and contained. Additionally, fire prevention measures are not at the highest standards.

Fires at heritage structures (left to right, photos by HACCHMP and Vuong Phuc Tu Tuoc): 134 Tran Phu, 09/2013; 76 Nguyen Thai Hoc, 02/2017; Fukien Assembly Hall, 10/2017

Finally, termites also cause considerable damage, especially to wooden members inside the houses, as illustrated below.

II. Group Training Course

II. Final Reports

Group work on making restoration plans at Tenman Shrine

Bhutan

Introspecting and enhancing the existing system of documentation and identification of values of heritage sites in Bhutan

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The protection of heritage sites in Bhutan is now in the important juncture; in the threshold of the past and towards the systematic approach through legislative protection, as Bhutan endeavors to enact the Cultural Heritage Bill (CHB) - 2016, the first ever legislative document of heritage sites protection in the country. The current juncture is imperative, as it not only endures to see through the introduction of new system of protection and concerted effort with it, but also linking the protection system and approach in the past to the new system. The CHB do build on the existing approach and practices on the cultural heritage protection but sometimes, the introduction of new law is deemed as additional enforcement and restriction and therefore, appropriate transition needs to be carried out, so as to convey that the law is not restrictive and focuses on integrated approach through value based protection. My "country report" submitted as part of this training course highlights on two main issues in heritage sites protection in Bhutan; (1) identification of heritage value of the sites, specifically the religious living sites and with that the resultant protection methods and (2) segregation of cultural heritage property and traditional buildings for different protection methods. The latter will be covered while resolving the first issue.

In due consideration of the issues stipulated in the country report and with the understanding of heritage sites protection system and practices in Japan through this training course, the goal of my action plan is **to introspect and enhance the existing system of documentation and identification of values of heritage sites in Bhutan.** The legislative system of protection of cultural heritage of Japan and its chronology of amendment and introduction of new system provided broad understanding on inclusive approach of protection and exploration of wider range of cultural heritage over the course of time. It was stipulated that the development of legislation is based on the experience and requirement in the field, carried out through proper scientific approach and in consideration of societal requirement. I believe that many things can be achieved with the law as an overarching guiding document but as a practitioner, I feel that what we do in the field is crucial in heritage protection endeavor and therefore, utmost attention and importance should be given to the documentation and evaluation of heritage sites.

Fig.1
Left: Tenman Shrine used as case site for documentation and evaluation during the training course
Right: Evidence of change (survey of traces) seen in the base of pillar.

The training course was generally divided into six themes. All the themes are important for the protection of heritage sites and should not be viewed as separate entity but rather as inclusive effort in protection of heritage sites. However, in the interest of relevancy to the nature of the work, I would like to directly link my action plan to the three themes which focuses on the documentation, evaluation and protection system of heritage sites. Documentation is the most important part of conservation or restoration process, as it is the point of reference for all future actions. Through documentation, we not only understand the dimensions of the structure but many other things such as historical information, transitional phenomenon and architectural specificity, which will determine the value of the historic structure. The standard method applied to documentation of monument in Japan was intriguing with series of activities leading to the evaluation of values and appropriate restoration methods. The restoration methods differed from case to case but to arrive at that decision, the standard methodology is applied. The engagement of community/owners from the initial stage and involvement of private partners in the course of documentation was well noted. With this general understanding.

I propose my short-term goal to review the current documentation process applied in Bhutan and enhance it with some of the relevant methods learnt from the training course in documentation of a Buddhist temple, Hontsho Trashigang Goenpa under Thimphu District in Bhutan.

Fig.2 The front view of Hontsho Trashigang Goenpa, the case site for the short-term goal of the action plan

The temple was founded in 1786 and has served as the center of meditation for the monks. The temple is proposed to be restored in the 12th FYP through the Thimphu district's budget allocation. The custodians of the temple have clearly indicated the need for major change in the historic structure through the project as the structure is deemed unstable and I have been assigned for preparation of restoration proposal which is to be completed by December 2019. For this work, the methodology adopted for documentation will be based on the process learnt through this training course and adapting to the nature of structure of Hontsho Trashigang Goenpa and the existing methodology applied in Bhutan. The main objective of this short-term goal is to carry out documentation to understand the values associated with the temple structure not only for the people working in the field of heritage protection but also to the custodians of the temple. The monks living in the temple is the important community and custodians of the temple and the lessons from community centered approach of protection in the training course can be useful during the process. The workflow chart shown in figure 3 will be used for the work, which is little different from the existing workflow (the comparison with the existing workflow is also shown in the figure).

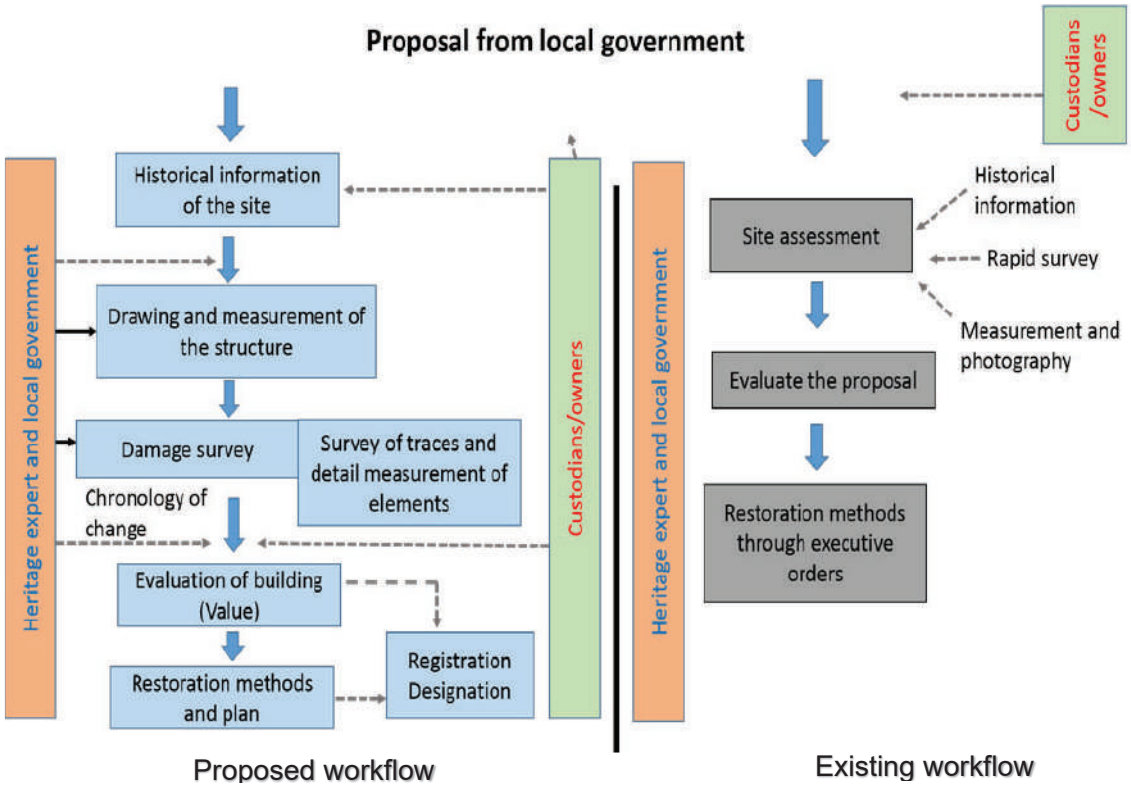
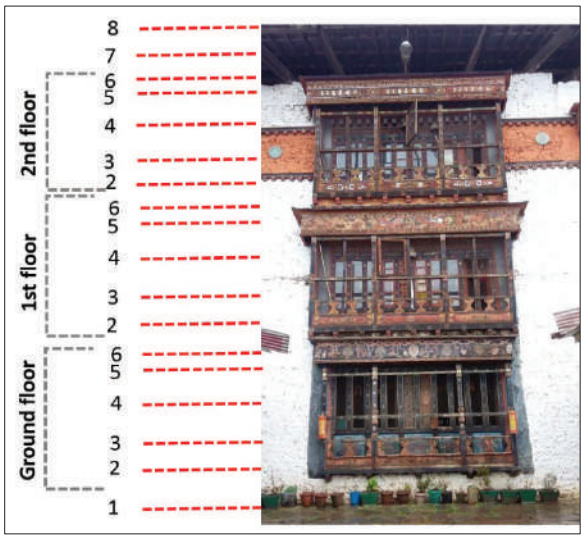


Fig3. The workflow for documentation to achieve the goal of the action plan (left) and existing approach (right)

The Department receives application for approval of restoration works of heritage sites from the local government. After the application is received the concerned focal official is assigned with the work. The concerned official carries out basic scientific studies and recommends for the restoration measures based on the findings. Regarding the existing practices, I would like to propose for enhanced approach of documentation as shown in figure 3.

After the application is received from the local government, the owners/community will be engaged from the starting point of documentation. The documentation will be carried out in series of stages as shown in figure 3.

The recording of the structure at different level in the practical training course not only provided the information of the damages in the structure but the information on the chronology of change in the structure. It is important to understand the chronology of the structures not only to correlate with the architectural specificity but to link to spirituality and sacredness of the structure. The different level is as proposed in figure 4 for the site. With proper understanding of the change and involving the monks in the process, the heritage practitioner and the custodians can discuss on values. The changes in the structure are mostly carried out by historic figures in the past and respecting such changes can be veneration of that person. Through this process, the architectural uniqueness of the building and spirituality can consent on the shared values. The consensus might happen or it can be contradictory one too. However, the emphasis is more on the process and to provide a platform for dialogue between the parties.



1. Foundation level
2. Floor level/s including floor boards
3. Structural wall and pillars
4. Windows
5. Beam (Dhung) level
6. Joist (Cham) level
7. Truss level
8. Roof level

Fig.4 Identification of levels for recording damages and traces

The existing documentation practices in Bhutan hardly focus on documenting individual elements of the building and understanding the craftsmanship and tools used to make the element or part of the structure. Consequently, many important elements, particularly wooden elements are lost in the process of restoration. The lesson on understanding of the craftsmanship and tools used during the training course conveyed the importance of such work to determine the age of the elements and the techniques of the olden times. Therefore, the documentation of Hontsho Trashigang Goenpa will also include the detail study of elements of the structure.

The experience of this short-term goal is expected to contribute to the long-term goal of standard practice of documentation to identify the values of the site in Bhutan. This in turn is expected to contribute in defining the restoration methods applicable based on the identified values. The documentation approach can be standardized but the values will differ and consequently the restoration methods. However, the documentation and identification of values is the basis of the intervention required in the site and following such standard practice will also contribute in enhancement of conservation measures in Bhutan. The CHB emphasizes in the value-based protection of the heritage sites through the system of designation and registration, and the documentation and identification of values will be pivotal in determining the protection scheme of the site. Carrying out such documentation is also expected to contribute to understanding the history of architecture of Bhutan and the chronology of changes in the architectural practices in the course of its history.

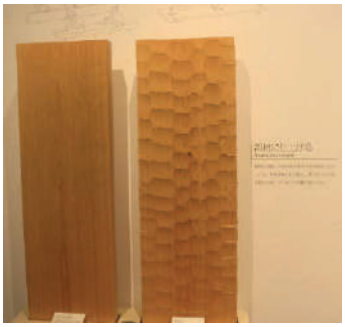


Fig.5 Difference of surface finishing using two different tools, as shown in Takeneka Carpentry Tools museum

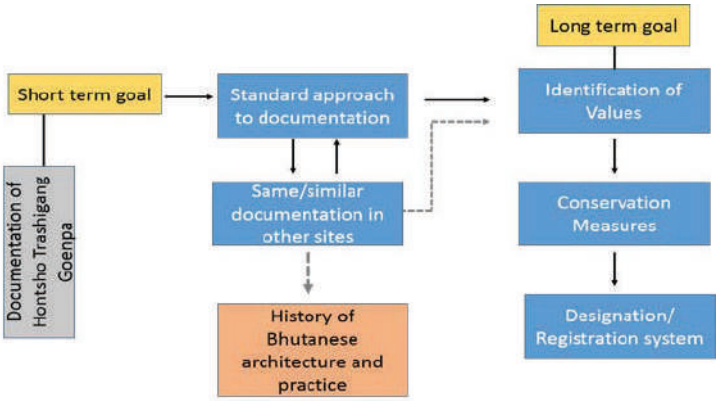


Fig.6 Connecting short term goal to long term

Final Report on Group Training Course on Cultural Heritage Protection in the Asia-Pacific Region 2019

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Ministry of Culture and Fine Arts

I. INTRODUCTION

This course was organized by the Culture Heritage Protection Cooperation Office, Asia-Pacific Cultural Center for UNESSCO (ACCU Nara Office), from 4 September to 3 October 2019. There were 16 participants from 15 countries, namely Afghanistan, Bhutan, Cambodia, China, India, Indonesia, Iran, Lao PDR, Nepal, New Zealand, Philippines, Sri Lanka, Thailand, Uzbekistan, and Viet Nam.

This report focuses on the outcome of the training course. It was good opportunity for me to join in it with people from 15 countries. I could learn so many things from them and we could share the differences between our respective cultures. Also we could learn the methods of the conservation and management of wooden structures by each country through our presentations. Moreover, I learned a lot about the classification of cultural properties and the management methods for the protection of cultural properties in Japan that promote strong link between the national government, the local community, and people as a whole. I also learnt the problems affecting cultural properties, joint technique for wooden structures, restoration and conservation of wooden structures, and practical way of documentation.

This training course provides the participants with the chance to enjoy special visits to the heritage sites not only in Nara prefecture but also some other prefectures such as Gifu (Takayama city and Shirakawa village), Kobe (Takenaka Carpentry Tools Museum), Nagano (Narai and Kiso Hirasawa,) etc. The participants also had a chance to visit a working site for restoration and conservation of wooden temple, which would normally be a prohibited area for tourists.

II. DISASTER PREVENTION MANAGEMENT FOR THE CULTURAL PROPERTIES IN JAPAN

As Japan is the country which experiences many time of the disaster that can easily damage to the cultural heritage such as typhoons, earthquakes, fire, flood, etc., Japanese people had a lot of knowledge and good laws. They are so friendly and understanding each other. We know that most of lands of Japan are mountains and surrounded by ocean, which easy to get disaster. However, Japanese government and Japanese experts try to prevent people from the disaster. They are also ready for protecting cultural properties from the disaster with a lot of experts, effective systems such as anti-seismic reinforcement, fire resistant, fire fighter system, devices for prevention from lightening etc. So, in order to protect cultural properties we need to think about not only the restoration and reconstruction of the buildings but also the systems which can be against the upcoming disasters.

III. RESTORATION, CONSERVATION AND MANAGEMENT OF WOODEN STRUCTURES

We had a lot of lectures about wooden structures such as the current Issues and global perspective on conservation, protection system, documentation, restoration, and management (risk management, succession of conservation techniques, community-centred management of historic towns).

Beside the lectures at the ACCU Nara office, this programme also provided the chance for participants to have on-site observation at many different World Heritage monuments such as Toshodai-ji Temple, Todai-ji Temple, Yakushi-ji Temple, and the preservation districts for group of traditional buildings such as Takayama city, Shirakava village, Narai, and Kiso-Hirasawa,and as well as the practical training at Tanaka Family Residence and Tenman Shrine.

O-site observation

During the on-site observation, we have learned many things about the management work of the sites and the assessment of damage which could cause natural and artificial factors such as rain leakage, insects damage, inclination, deterioration of the components, structural defects, and missing components. The complicated wooden structure, the technique of building dismantlement, the jack-up system, and the roofing concept were

explained by the Japanese experts during the site visit. Most of the heritage monuments and traditional building are provided with wooden components, stone baseman, and clay mortar wall with bamboo. It is incredible that many structures of those building and temple built in early times still survive after more than a thousand years.

Moreover, we can see the different types of wood used for different functions due to the characteristic of each type of wood. I am really impressed with the technique of the structure of wood joints in Japan since this is the first time for me to see this special technique. I admit that such a technique is unique in the world and I also hope to learn it more and apply it to my future work.

Practical Work Session
We have learned a lot about how to make an accurate section sketch, drawing, and measurement at the Tanaka Family Residence as well as practical method of the classification and risk mapping at Tenman Shrine using some special instruments under the instruction of the Japanese experts. Also, we learned how to take photos with a good camera for documentation at Tanaka Family Residence.

Management, Restoration and Conservation Work
The conservation and restoration work for the wooden temple is supported by the Japanese government. As we know, Japanese government has their own good policy for management of cultural properties.

By observing the building and the remaining document records, the architect conservator can start to make the master plan for the restoration and conservation work. Before they start the restoration and conservation work for heritage building, the architects or experts have to focus on documentation to collect all related data. After the discussion on the budget for restoration and conservation work, the government approves the projects.

In the meantime, when the historical building in Japan is reconstructed for the interpretation at the historical site, the traditional techniques and materials are used. The craftsmen who know the tradition technique of chopping wood and using the traditional tools have been encouraged in Japan.

IV. CONCLUSIONS

Through this training course for one month in Japan, I gained a lot of practical knowledge and learned about Japanese culture, lifestyle, high technique, restoration and conservation methods for wooden structures, and the cultural properties protection system. I also realized the government of Japan is trying to promote their heritage to next generation and encouraging the local people to maintain their traditional way of life and the traditional techniques. I am very interested in cultural landscape and group of traditional buildings. It is a valuable new idea for me to start thinking about this kind of cultural category in my country. Cambodia also has many this type of cultural properties, but they are not well protected yet.

In my opinion, this training course is very useful because most of the contents of the course are related closely to the work which I am involved in nowadays and I will share knowledge that I have got from this training with all my colleges in Cambodia.

Finally, I would like to say many thanks to all the organizers: Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU Nara Office), Agency for Cultural Affairs, and National Research Institute for Cultural Properties (Nara&Tokyo).

Fig.1 How to use technique tool at Takenaka Carpentry Tools Museum (Kobe city)

Fig.2 observation Restoration and field study at Toshodai-ji Temple (Nara city)

Fig.3 technique joint tool at Nara Palace Site (Nara city)

Fig.4 Roof structures at Shirakawa village,Gifu

Fig.5 Practical to classification and Risk mapping on Tenman Shrine (Nara city)

Fig.6 façade of group traditional building, Shiojiri-shi Narai ,Nagano

Cambodia

Group Training Course on Cultural Heritage Protection in the Asia-Pacific Region 2019 Conservation and Management of Wooden Structures

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I. Introduction

I would like to hank Cultural Heritage Protection Cooperation Office, Asia-Pacific Culture Centre of UNESCO (ACCU Nara Office) for giving me a good chance to join in this training course. One-month training course from 4 September to 3 October provided not only the knowledge of preservation and management of culture heritage but also good life experiences in Japan, visiting World Heritage site such as Toshodai-ji Temple, Nara Palace Site, Shirakawa village, etc., so that I could know about Japanese living style including food and good taste of tea.

I hope the lecturers from Japan and many countries to give ideas to some problems in my work field after this course ended. Participants from 15 different countries who are very kind and friendly shared a lot of knowledge from their own country and heled me improve my knowledge. I could learn more about conservation work in not only Japan but also 15 counties and understood the different problems as well as the same problems that we are facing in the conservation work. Some problems are not seen in Cambodia but it is clue for me; how to prevent what would happen in the future and how to take care of it. I am more interested in my job after this course.

II. Knowledge

What have I learned and got from this training course? First, I learned about many problems in conservation work that we had met and will meet and problems that had happened in other 15 countries. Second, I learned what cultural heritage is and in what system they are protected in Japan. The cultural properties administered by Japanese government are categorized into tangible cultural property, intangible cultural property, folk cultural property, monuments, cultural landscape, and group of traditional buildings. I also learned the importance of the community in the conservation work and there is the network between owners of cultural property, local government, and central government. Community is involved in the protection system of cultural properties in Japan and playing an important role.

After I learned about the value of culture heritage and its importance, I notice that the value is main point of conservation work and we can decide which building, which zoon, or which traditional technique should be protected depend on each value. Different categories of cultural properties have different values. If we know the value of each cultural heritage, experts can decide the parts and styles to be restored or conserved.

Learning Japan’s conservation measures for wooden structures, techniques, and tools is amazing. Although all the structural type and tools are not same as those of Cambodia, observation of wooden structures is very import. It was very interesting to visit Takenaka Carpentry Tools Museum, to observe the traditional Japanese carpentry tools, and to learn about Japanese carpenters

Funding for conservation work is most important in my country. Write a proposal requires the necessity to understand a hazard for the heritage and some ideas to convince community to involve in the conservation work. The difference in the work process between Cambodia and Japan is small, so this training course provide many good ideas that I can apply at my work place.

When I return to Cambodia, I am going to make careful observations of the buildings of the National Museum before we start discussing the plan for conservation and restoration. We also need to raise community awareness for museum buildings and museum collections; how important they are to the community as well as encourage them to participate in the conservation activities. I will try my best to share this idea with my coworkers and discuss with my director again as much as I can. Additionally, I will take pictures of the culture heritage building as daily work using the techniques I acquired from the practical training, which is important for documentation and writing reports and proposal.

III. Conclusions

The conservation and protection system for cultural heritage in Japan is very amazing although my county has not reached this point yet because of lack of fund and experts, insufficient community awareness, and low level of conservation work. My work place also has a big problem in funding to conserve and restore the museum buildings and collections and in community awareness at provincial level. I will try my best to work on these problems by find some subsidy, inviting experts from Japan to be involved in our conservation work, and so on. In addition, I also do hope that I will have another chance to come to Japan so that I can learn more about conservation work.

Overall, this training course provided me and my work place with useful knowledge and skills such as techniques of restoration wooden structures, prevention measures from natural disaster, conservation work using modern technology and methods, documentation method, and good ideas for planning a proposal. I will apply what I have learned from Japan to my work place as much as I can. I will share these experiences with my colleagues in my work place and other provincial offices in Cambodia if I can. I am grateful to participate in this training course. I would like to say thank you very much for all organizer, Culture Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU Nara Office); Agency for Cultural Affairs, Japan; and National Research Institute for Culture Properties (Tokyo and Nara).

Final Report, Group Training Course on Cultural Heritage Protection in the Asia-Pacific Region 2019

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Over the past month, I was offered the greatest opportunity to comprehend the preservation system and restoration technique of timber structures in Japan. The consecutive series of lectures was a full embodiment of the advanced preservation philosophy demonstrated in the Nara Document on authenticity and Nara +20 Document. It triggers the contesting views towards the definition of values, with a mind-blowing shift from monument-centric preservation approaches to people-centric ones. In my previous work, the judgements towards authenticity has been rather limited to the tangible forms. From the instructions of the training course, I came to realize that not just the tangible forms of heritage are of importance, but the people who inherit the traditional skills, those who live their lives as a continuity of the past and those who formulate delicate preservation systems make heritage preservation work meaningful and sustainable. With such considerations in mind, I came to formulate plans in hoping to improve some of the heritage preservation conditions in my country.

Short term plans:

- Formulate training plans for young conservation practitioners

Like most of my colleagues, I was a design architect before joining my institution. Before coming to Nara, I have never received a systematic professional training on preservation methodology. I was inspired by the training programs offered by the Japanese government that engage with experts in different preservation fields. I find it necessary to pass on what I have learned from the training course to my colleagues, and endeavor to help my institution to formulate professional training programs for young conservation practitioners to understand value assessment, protection system and philosophy, documentation and restoration methods, as well as conservation management. As we have a large volume of challenging and complex projects, it is important to build up a strong team with sufficient knowledge foundation.

- Support the restoration work of Foguang Temple (佛光寺)

Meantime I will offer support to my institution to prepare for the restoration work of the East Main Hall of Foguang Temple, the second oldest timber structure in China constructed in 857 AD (Tang Dynasty). The buildings of Toshodai-ji, Horyu-ji and Yakushi-ji from Asuka and Nara period present great examples to understand the construction techniques during the time when Foguang temple was constructed. From the lectures of Mr Hayashi Yoshihiko and Mr Kondo Mitsuo, I learned about the Japanese methods for observation, survey, documentation, and restoration plan. The on-site study to Nara Palace Site also offered me cutting-edge restoration knowledge that combines the traditional wood carpentry and modern wood processing technology. The design of the protective shelter of the South Gate enables a well-organised workflow for restoration work that is both efficient and delicate. As we do not have much experience to handle such an antique and complex building as the Foguang Temple, the resourceful materials and case studies from our training course are invaluable to our institution.

Long term plans:

- Restore the intangible values of relic sites

Inspired by the concept that "a reconstruction may embody in tangible form the many intangible values of the place"[1], I realized we shall put more focus on the study and preservation of intangible values to improve our current heritage interpretation methods, for the purpose of making the heritage values legible to the public. The Japanese museums often exhibit vivid interpretation of the relics based on careful study of the living intangible heritage. Most of the museums I worked with in China, however, offer very little information to explain how the relics were constructed or used. The experts worried much more about formal

[1] Cited from Dr. Gamini WIJESRIYA lecture slide

authenticity than the intangible values have been lost. One of the effective solutions is to uncover and document the still existing construction craftsmanship in China and formulate preservation plans for the craftsman to pass along their skills to the young generation. The other is to conduct comparative study among international building typologies and craftsmanship to understand the traditional techniques that has been lost in our country but preserved elsewhere.

- Promote community engagement

From the lectures of Mr Watanabe Yasushi, I was amazed by the capacity of local community to support heritage preservation. Our Important historic districts are governed by the central and provincial governments. Currently it is hard to persuade the government to pass the right of decision making to local communities. The people who live in the heritage site have almost no knowledge of how to preserve the values of their community, and their livelihood and needs often give way to tourism demands. In addition, the government offers much more support to the costly rescue protection or significant restoration than to the routine maintenance that is both effective and low cost. As preservation experts, we need to develop training courses for local community to understand how to protect their hometown from potential hazards and actively express the needs of local community to the government to preserve their livelihood.

India

Traditional Knowledge Systems in India: Case of Dravidian Style

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As an architect and a heritage enthusiast, I work on sustainable development of cultural heritage with a structural safety-centric interdisciplinary approach. While most of my work experiences have been on brick and stone masonry conservation, my experience with conservation of timber structures has basicaly been exploratory. Hence, this 'Group Training Course on Cultural Heritage Protection 2019' program was definitely a value addition in my academic and professional upbringing.

This was an exposure to a global experience on the current state of knowledge and practice in the field of timber conservation. Learning the science in an Asian-Pacific context was implausible experience with my fellow participants having similar cultural background owing to our shared history with strong socio-cultural-religious exchange in the past.

Currently, cultural heritage protection in India faces great challenges due to an enormous stock of built living heritage, alongside spiritual beliefs, rituals and community involvement, in the face of rapid development and modernization. Preservation of the tangible and intangible components of heritage remains a challenge due to shortage of expertise and resources, coming from a lack of focus on these aspects in mainstream education. Fundamental and applied research on this subject is also in its initial stage in India. There are many gaps in the implementation of the international principles on 'fire safety or disaster management for cultural heritage protection'. Thus, learning these subtleties in Japan, a country which has developed robust risk mitigation strategies for cultural heritage, was an unmatched opportunity.

The program also introduced me to a new domain and provided learning opportunity on the aspects of community-centred conservation and management of historic precincts and raising community awareness, which I had never engaged in before. This was also an opportunity to develop my network of technical personnel and professionals from Asian counterparts. Apart from the theoretical knowledge and on-site observations my personal visits to historic structures in Nara, Himeiji Castle and Kobe city revealed how the ancient and the modern forms of architecture thrive alongside each other with a fine and unmatched balance. I utilised the opportunity in collecting some meaningful information on construction mechanism and earthquake resistant nature of traditional and modern structures i.e. traditional dwellings, pagodas, temples, high rise buildings etc. It is interesting to notice how various construction typology such as the temples built with timber and castles siting on high mound stone platforms both have proved their effective survival from earthquakes.

A fruitful visit to Himeji Castle- understanding Japanese tradition of periodic maintenance of the structures which is generally considered as a continuous process to monitor and prevent the decay of the materials. The horizontal and vertical distortions were monitored every 20-30 years, and necessary reinforcement or repairs are done. Acquired a detailed understanding on restoration procedure in Showa and Heisei Era as explained in or lectures.

Port of Kobe Earthquake Memorial Park illustrates the painful event of the Great Hanshin-Awaji earthquake (January 17, 1995), recovery and the restoration process of the Kobe Port which was one of the busiest container ports in the world before the disaster. Overwhelming to see how the city developed in just two decades where the people of Kobe united and still working towards disaster resilience education and improving regional disaster preparedness.

Future plans to utilise and develop the outcome of the training course in my country
Short term action-

- Implementation of disaster management plans and risk mitigation and preparedness in my professional work：training myself and others on the usage of fire extinguishers. Installation of fire-fighting systems and group training for emergency scenarios in cultural heritage properties
- Sharing the acquired knowledge and experience in my country through training program and educational research (also long term)
- Utilising the on-site case studies examples for the repairs and retrofitting wherever applicable. Examples: steel reinforcement in the Great Buddha Hall (*Daibutsuden*) of the Todai-ji Temple, introduction of dampers in gable roof (not original) in *Daigokuden-in* (south gate) under reconstruction at Nara Palace Site etc.

Long term strategy-

As part of my current research on traditional knowledge systems, I am examining the concept of *Jeernodharana* (rejuvenation) in *Dravidian* temples, which lies encoded and not fully deciphered in ancient Indian texts. This knowledge needs to be examined in the context of 'modern conservation' principles. The *puranas* and several ancient treatises discuss about constructions in timber including temples, palaces, dwellings, sculptures, idols and vernacular constructions providing protection against extremes of weather and calamities. We had a well-developed tradition of wooden temple architecture for Hindu temples in India, but owing to the perishable nature of this material, none of the early structures have survived, with few remaining with an explicit use of timber, while others lying endangered.

With regard to *Dravidian* temple architecture and construction techniques, the program has provided a deeper understanding of the traditional material conservation techniques, and connect with the subtleties and practical challenges in historic precincts and built living heritage in the Indian context. With the fast pace of urban development, the gap between traditional knowledge systems and the modern architectural/engineering education system in India is ever-widening. The restoration procedures mentioned in traditional Indian canons are not comparable to international conservation norms on timber constructions. The learning from this training program would help me develop a comparative study and find a convergence between ancient and modern philosophies of conservation of traditional construction materials and seek a solution relevant to the Indian context.

According to Japanese system, an effective preservation of historic buildings can be achieved by preserving the historic techniques of craftsmanship and vice versa. In order to keep this living traditions of techniques of craftsmanship and the continuity, it is important to form a multi-disciplinary team for conservation work with modern and traditional knowledge systems.

Analysing and making a comparative study of the traditional carpentry systems in India and Japan and incorporating protocols on the preservation of the construction techniques and joinery systems are also required. As one of the challenges in India, the architectural documentation of timber structures is not meaningful in terms of recording the joinery systems. Many times the damaged elements are repaired or replaced by the local carpenters without any involvement of conservation architects. This sometimes leads to losing the valuable information on ancient joinery systems if they are replaced by new connections. This has to be co-related from our old texts such as *'Mansara', 'Tachusastra', 'Tantrasamuchalaya', and 'Manusyalayacandrika'.*

We often have conflicts between the modern and traditional knowledge systems. From a structural point of view, the repairs in the vertical members are not recommended because splicing in a vertical member may snap under even a small lateral force due to non-uniform transfer of loads. Several such examples of traditional joinery systems and repairs can be compared to the modern principles with structural analysis results.

Regarding effort in finding solutions to conflicting approach to heritage conservation -what to conserve? Understanding the context of cultural heritage in Asian-pacific region and Indian temples where values in living heritage are associated with spiritual beliefs of communities. How to restore the historic continuity? Hence a paradigm shift is essential to find innovative solutions that do not isolate the communities, and yet ensure safety of the structure, while respecting the spirit of conservation. Hence, our conservation principles

need to be redefined comprehensively, where cultural practices and religious studies should be part of an interdisciplinary approach bridging gaps through concerted research, pedagogy and heritage management practices. Therefore, it is the time to frame specific guidelines for the conservation of *Dravidian* temples with our own Indic approach where there is a need to preserve the intangible heritage, which is defined by living traditions and knowledge systems.

Learning from the present government policies on subsidies or managing communities and making changes in social structure to solve the changing population pyramid where elderly population is more and younger people are no longer living in the historic towns and moving to urban settlements. Also, future planning for the availability of resources and construction material is indispensable.

Thus, awareness and active civic participation is must, and being a part of this social revival as a conservation architect is imperative.

The Future Challenges of Conserving Wooden Structures in Indonesia

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INTRODUCTION

Cultural heritage is a manifestation of the results of human thought, in the form of tangible and intangible, inherited from past generations, preserved in the present and bestowed for future generations. This is because in cultural heritage there are important values for the present and future that are worth preserving. One form of cultural heritage is a traditional wooden structure. Wood is a natural material that is not eternal. Therefore, many buildings with wooden materials have been damaged and need to be repaired. Likewise, traditional wooden structures, because of important values as cultural heritage, require maintenance, care and repairs so that they can be sustainable for future generations. Therefore, what we are doing now for the cultural heritage will determine the future of the cultural heritage.

NEW EXPERIENCE AND KNOWLEDGE DURING THE TRAINING

Participating in the Training Course for Young Professionals on Cultural Heritage Protection in the Asia-Pacific Region held by ACCU Nara Office in partnership with ICCROM and Bunkacho was new to me. First, I was able to come to Japan and also visit the places I had dreamed of (especially Shirakawa village). Second, this is the longest training I have ever taken. Third, this is the longest overseas visit I have ever done and also came alone without a team. Fourth, I can meet friends from 15 countries (Afghanistan, Bhutan, Cambodia, China, India, Iran, Lao, Nepal, New Zealand, Philippines, Sri Lanka, Thailand, Uzbekistan, Viet Nam, and Japan) who have a lot of experiences and challenges in managing cultural heritage in their own countries.

I got many things from this course. Starting from the knowledge given from lecturers, visits to sites under restoration, visits to museums, practices, and also study tours to historic cities in Japan. At Tanaka Family Residence, we learned how to document a wooden structure (measured drawing), how to identify both damaged and original materials, and how to apply appropriate photography techniques for heritage building. At Tenman Shrine, we learned how to identify damages and how to make a restoration plan. In that place we also learned how to manage risk and hazard towards cultural heritage.

In this training course, we coincidentally visited a museum in Kobe city, the Takenaka Carpentry Tools Museum. The museum building that looks like simple structure from the outside is new building combining modern and traditional elements. Affiliated to the museum, there is traditional Japanese tea house. Inside the museum there are various tools used by a carpenter. The most interesting thing is that visitors can touch some items on display. The visitors can understand the various types of wood by touching timber pieces and shaving as well as try the hands-on activity to combine wooden framings. With the workshop of the museum, the visitors can try to use various carpentry tools. This museum is very interesting for me as the museum really shows appreciation for work of carpenters as well as their soul with the exhibition of a wide variety of tools.

In addition, we visited Toshodai-ji Temple, Yakushi-ji Temple, Nara Palace Site, and Todai-ji Temple that are UNESCO World Heritage sites. Some places, such as Toshodai-ji Temple, Yakushi-ji Temple, and Nara Palace Site, are currently under restoration and reconstruction work. It is fortunate that we were allowed to see closely the restoration and reconstruction process carried out for some of the buildings. What is interesting for me is the process of the reconstruction work that is planned and implemented by architects and professionals using their expertise with a large budget. They have also built the shelter to cover the reconstruction work. Besides, the damage such as cracks of columns and beams is interesting for me. I knew that as they are not something dangerous, they don't need any treatment or measurement. Additionally, if the crack is covered with other materials such as resin, one day it will cause damage elsewhere.

For the on-site study, we visited Takayama city and Shirakawa village, Gifu prefecture, as well as Narai and Kiso-Hirasawa, Nagano prefecture. We saw wonderful traditional towns and beautiful landscapes. There I learned how they are prepare for fire hazard to the wooden heritage buildings and how they have built the

network with communities in the area. It is quite interesting for me to observe how they camouflage hydrants and other fire extinguishers with small wooden buildings in Takayama city, Shirakawa village and Narai, while in Kiso-Hirasawa they camouflage them with the small buildings made of aluminum painted in brown. In addition, what is interesting to me is how they preserve the landscape by hiding electrical wires and poles from the street.

Small building storing fire extinguishers in Shirakawa village

TRADITIONAL WOODEN STRUCTURES IN INDONESIA

Traditional buildings have been built by adjusting to the natural conditions, climate, availability of materials and the surrounding vegetation. The buildings have also been developed through the process of planning, drawing, and calculating in detail, that is not like in modern times. The traditional buildings in Indonesia were built through trial and error processes for decades, ancestors' mature considerations, and adjusting to surrounding natural conditions. However, some conservation techniques and method for traditional buildings are not well documented because they have been passed on to the next generation only by the oral tradition such as telling folklore, legends, and stories without detailed descriptions.

Just as Japan has traditional villages with wooden houses, in Indonesia there are many traditional wooden structures. Indonesia is an archipelago with a wide variety of tribes that have their own customs and traditional buildings from Sabang to Merauke. But now, modernity has entered even remote areas. On one hand it has positive impacts but there are also negative impacts. For example, the presence of electricity in remote areas. Unlike Shirakawa village, Takayama city, or Narai where electric wires and poles are not visible on the purpose of the preservation of landscape, some villages in urban area in Indonesia already have electricity but the installation seem to be less organized. The electric cables and poles, as they are not well-arranged, make the rural landscape irregular, disturb the view, and cause the visual pollution.

Visible electric cables and poles and satellite dishes damaging the visual landscape in Tarung village (left) and Waitabar village (right) located in the middle of the city in the West Sumba area, East Nusa Tenggara.

In addition, some traditional villages in Indonesia which have wooden structures do not have a landscape plan and prepare for facing fire hazards yet. The construction of traditional building is actually earthquake-resistant because the ancestors built traditional houses to adapt to the surrounding environment and nature. However, for the fire hazard, there needs to be preparation by the local government or the local community. There are many activities that can be fire hazard such as cooking activities using firewood in the house, irregular cables and electricity poles, burning garbage and more.

Fire in Tarung and Waitabar villages on October 7, 2017

CHALLENGES FORWARD TRADITIONAL WOODEN BUILDING CONSERVATIONS IN INDONESIA

Wood is a natural resource that can be used up if it is not renewed. Uncontrolled logging and forest fires can cause these natural resources to run out. Therefore, the price of wood has become increasingly expensive. Traditional buildings in Indonesia are mostly made of wood, especially some places such as Toraja, Sumba, Simalungun, Nias, etc., using a long and large wood. However, due to the high cost of wood resources, concrete is used for some traditional houses instead of wood materials. In addition, roofing materials such as palm fibre, alang, bamboo, or sago leaves are also increasingly difficult to be found. Because of the difficulty to obtain these materials and the limited availability around traditional villages, many local people are replacing traditional roof for cheap and easy-to-find roof, namely with zinc/asbestos roof.

Left: Traditional houses in Sumba using concrete instead of bamboo columns and beams
Right: Traditional buildings in Sillanan, Tana Toraja, South Sulawesi with zinc roof replacing the original bamboo roof

In addition, people's views of life have increasingly changed. Respect for ancestors is diminishing with modernity. Costs for maintenance and repair of traditional buildings are higher because sometimes it is accompanied by a series of traditional ceremonies. Carpenters who maintain their ancestral heritage are increasingly diminishing because there is no successor. This is because working as a carpenter that requires expertise and accuracy is underappreciated and considered as less prestigious. If such a situation continues, the traditional houses will disappear slowly over time in Indonesia.

CONCLUSION

Following are needs to be done immediately based on what I learned from this training course:

1. Documentation of the traditional wooden buildings: There are several experts who do the documentation so far but needs to continue the documentation and make integrated data of traditional buildings that have been documented in the past.
2. Forests conservation: For cultural heritage protection, forests should be conserved so that woods can be easily supplied for the restoration work.
3. Maintenance and preservation of the landscape in traditional villages: In this case, cooperation between local communities, non-governmental organizations, and government is necessary.
4. Preparation for facing hazards such as fire, flood, landslide, earthquake and others: Preparation or preparedness such as the provision of supporting equipment, training on risk management to deal with disasters, setting up the standard operating procedure or guidelines, etc. are required.
5. Efforts to involve local communities in caring for traditional buildings in their area and cooperation between local communities and both central and local governments: Some areas have local communities, but they still work independently.
6. Study of various kinds of wood: It is necessary to understand the strength and effect of each type of wood used for traditional building when carrying out the conservation work.
7. Consideration that Indonesia becomes a member of ICCROM: Many things can be obtained if becoming a member of ICCROM. For me, by taking part in the training course organized by ACCU Nara and ICCROM, I increased my knowledge and expanded my network with friends who work for the field of heritage in other countries.

Conservation and Risk Management of Wooden Structures (Japan 2019)

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Introduction

Iranian architecture and urban historic city are based on climates conditions and geographic situation, so Iran has much type of buildings, construction, and traditional skills to build. Mud architectures are in arid regions of centre of Iran, brick architectures in plains of southwestern Iran, wood architectures in forestal area of northern Iran, stone architecture in mountainous area western Iran.

Fig.1 Gillan Rural Museum

Fig.2 Brick architecture

Fig.3 Stone architecture

Fig.4 Mud architecture

Woods are used in any type of architectural buildings in Iran for structures such as pillars, beams, reinforcement to support other structural members, doors, windows, and ornaments. In addition, woods combined with other materials such as clay, brick, and stone need to be researched more as we need to diagnosis its behaviour and pay attention to the materials when we decide to restore the historical building.

Conservation System in Iran

Conservation system in Iran is based on scientific research and follows these processes:

1- Recognition and Documentation
2- Building's Pathology
3- Conservation Plan
4- Rehabilitation Plan

Fortunately, in Iran we have many professionals in conservation such as architects, conservation architects, archaeologists, civil engineering, traditional masters etc. They can conserve cultural heritage in true ways. The traditional masters artisan need to train more young professionals to transit the traditional technique to new generation.

In Iran, when cultural property is identified and it has values registered in the national list, it is protected with the principles, which designate the drawing zone and buffer zone. The plans and documents are made according to the principles, ratified by provincial branches under the ministry, and passed through the technical committees and counsels, and then, the budget is decided. After these procedures, the restoration and rehabilitation projects start.

Conservation/Preservation District in Iran

Iran has 785 historical fabric and 12,000 historic village. The process of conservation for historical cities and village are different from historical buildings. When ratifying a preservation district (168 districts ratified until now), the specialist from local government or other organizations are sent to review the district. They make special principles with engineering consultants such as a principal for landscaping in Japan as well as a criterion of action for all organizations and municipalities.

In addition, we conduct the excavation research at historic sites. The challenge before, mostly during, and after the excavation is how to conserve the remains.

In the preservation district, the site museum plays an important role to attract tourists and show how local community lived there in past and what the values and attributes of the site are.

This is a brief summary of how we preserve cultural property in Iran, but we have a big problem in some cases especially in preservation for large historic cities such as Tehran, Tabriz, Shiraz, and Isfahan. In these cities, there are no collaboration between local community and some municipalities, and the principles and urban design projects for development is becoming important approach. This approach would be changed although it needs time and education.

What I Learned from This Course

I learned the Japanese approaches to conservation of the cultural property: restoration, documentation (measured drawing and photography), and the survey method through the practical training at Tanaka Family Residence and Tenman Shrine. Especially, the combination between traditional technique and new modern technology for restoration work and the transition system for historical building are impressive.

Fig.5 Tenman Shrine

Fig.6 Tanaka Family Residence

Other subject that I was very interested in is on-site study at Takenaka Carpentry Tools Museum in Kobe city; its building design, how to exhibit the objects and old techniques, especially the hands-on exhibition

allowing visitors to touch the objects in order to understand wooden structure are interesting. Todai-ji Temple Museum also has such an education activity that visitors can experience using the traditional tools. The building of Takenaka Carpentry Tools Museum, I think, is a type of architecture that combines new and old techniques because I could see and feel the Japanese carpenters' spirit and intangible value of the woods.

Fig.7,8,9 Yakushi-ji Temple

Fig.10,11,12 Toshodai-ji Temple

Fig.13,14,15 Takenaka Carpentry Tools Museum

If I compare the conservation system of historic district in Japan to that in Iran, I can explain that they are very similar but the collaboration whit municipalities, local government and community is not enough in Iran though it is getting better. Landscaping, how to designate the buildings as cultural property, and theory of restoration practices in Japan are very similar to my country but we need to improve practical measures more.

Fig.16 Narai

Fig.17 Kiso-Hirasawa

Fig.18,19,20 Shirakawa village

What Can I Do for Iranian Cultural Properties?

1. Do practical measures to encourage further collaboration with local community. Produce guidelines and principles for the implementation.
2. Change and update the system of restoration by combining new technique and traditional one.
3. Update the information bank of traditional masters.
4. Update the instruction methods, guidelines, and principles for utilisation of cultural heritage.
5. Make guidelines, principles, and action plans on risk management to protect cultural properties from the hazards such as earthquake, flood, and fire.
6. Upgrade the documentation method.

Acknowledgments

I would like to express great thanks to ACCU Nara Office, Director and staff members as well as lecturers for supporting this course. I hope that such courses continue in future. I would also like to thank my classmates as I learned many things from them during the course period. I hope to see them soon in the future.

Conservation and Management of Wooden Structures

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I. Introduction

The Group Training Course for Young Professionals on Cultural Heritage Protection in the Asia-Pacific Region was held in Nara city, Japan from 4th September to 3rd October 2019. This course was jointly organized by the Agency for Cultural Affairs, Japan (Bunkacho); Asia-Pacific Cultural Centre for UNESCO (ACCU Nara Office); International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); and National Research Institute for Cultural Properties [Tokyo and Nara], in cooperation with the Japanese Association for Conservation of Architectural Monuments (JACAM); Japan Consortium for International Cooperation in Cultural Heritage (JCIC-Heritage); under the auspices of Japanese National Commission for UNESCO; Nara Prefectural Government; and Nara City Government. ACCU Nara Office hosted this course for participants from 15 counties: Afghanistan, Bhutan, Cambodia, China, India, Indonesia, Iran, Lao PDR, Nepal, New Zealand, Philippines, Sri Lanka, Thailand, Uzbekistan and Viet Nam. This training course is designed for young professionals and comprises comprehensive basic knowledge and techniques in the fields of investigation, conservation and management of wooden structures in the Asia Pacific Region, and then, the participants received the updated methodologies and technologies which can be applied and practiced in their counties.

The curriculum of this training course was designed so that participants are able to learn the overview of the process of investigation, restoration and conservation of wooden structures in Japan as well as the international principles and methodologies for heritage conservation from lecturers form overseas. The participants could upgrade their knowledge with the provided lectures, skill-based work session on documentation and analysis of wooden structures, and on-site study tours. Through the one-month course, the participants leaned new techniques for repair/restoration of wooden structures, principles and methodologies for conservation of wooden structures, knowledge of disaster risk management for cultural heritage properties, and so on. In addition, they had opportunities to share their knowledge and experience of heritage protection and to build networks among heritage practitioners in the region.

II. Activities and Lectures in this Training Course

- On 5th and 6th September, the "Participants Country Reports Presentation and Discussion" session was held, and after presentations, Prof. Inaba Nobuko (University of Tsukuba) presented a lecture on "Protection Systems for Cultural Heritage in Japan".
- On 7th September, Dr. Gamini Wijesuriya (ICCROM) presented a lecture on "Current Situation and Issues of Architectural Conservation in the Asia Pacific Region", and after that we had a group work on value assessment.
- On 9th September, Takeuchi Masakuzu (Agency for Cultural Affairs) presented a lecture on "Introduction to Wooden Structures in Japan" and Tanaka Sadahiko (Agency for Cultural Affairs) presented a lecture on "Conservation Practice for Wooden Structures in Japan".
- On 10th September, Hayashi Yoshihiko (NNRICP) presented a lecture on "Structure of Japanese Wooden Structures", and then Yamaguchi Isumu (Nara City Board of Education) presented a lecture on "Documentation of Wooden Structures". I learned structural survey and documentation methods.
- On 11th September, the participants attended the work session on "Documentation of Wooden Structures" at Tanaka Family Residence (Nara city). We learned the method of measured drawing and drew the floor plan.
- On 12th September, the work session on "Documentation of Wooden Structures" continued and the participants drew the sectional plan.
- On 13th September, Sugimoto Kazuki (Saidaiji Photo) presented a lecture on "Documentation of Wooden Structures (Photography)" and then, the participants had a practical training of photography.

- On 15th September, Kondo Mitsuo (JACAM) presented a lecture on "Restoration Systems and Project Planning Wooden Structures" at the ACCU Nara office in the morning. In the afternoon, he explained the overall process of repair work.
- On 16th September, Kondo Mitsuo and Hayashi Yoshihiko provided the orientation to the work session on "Survey on Damage and Making Restoration Plans".
- On 17th September, the work session on "Survey on Damage and Making Restoration Plans" continued.
- On 18th September, the participants continued to make restoration plans, and in the afternoon, they visited Yasumigaoka Hachiman Shrine, Yakushi-ji Temple and had site study on restoration of roof and painting, presented by Honda Yuchiro.
- On 19th September, the participants had group presentations and shared the restoration plans. In the afternoon, they visited Ichijo Shinden, Toshodai-ji Temple and received an explanation on restoration work by Takamiya Kunihiro (Nara prefecture).
- On 20th September, JIGYASU Rohit (ICCROM), presented a lecture on "Risk Management for Cultural Heritage" and in the afternoon, the participants had a group work on risk assessment and management plan at Tenman Shrine.
- On 21st September, the participants made presentations on risk management by groups. After that, Rohit JIGYASU (ICCROM) delivered a lecture on "Risk Management for Cultural Heritage".
- On 23rd September, On site visit to Takenaka Carpentry Tools Museum. Nishiyama Marcelo explained an overview of the museum and museum's learning programmes. The participants also observed the museum facilities and exhibitions and experienced the museum workshop.
- On 25th September, Miyai Tatsuya (Heijo Branch Office, Asuka Historical National Government Park Office) and Tani Toshimitsu (Shimizu cooperation) explained the reconstruction work at Nara Palace Site and the participants learned about preservation and succession of conservation techniques.
- On 26th September, Watanabe Yasushi (Shiojiri City Board of Education) delivered a lecture on townscape preservation and overview of Narai and Kiso-Hirasawa, the designated historic towns.
- On 27th September, Nishi Kazuhiko (TNRICP) presented a lecture on "Townscape Presentation with Local Communities and its Global Trend". And then, Dr.ANG Ming Chee (George Town World Heritage Incorporated) delivered a lecture on "Conservation of Traditional Building with Local Community: Experience from George Town World Heritage Site for Community-Centered Preservation and Management of Historic Town". The participants had a group work and discussions.
- On 28th September, the Participants arrival in Takayama City, Gifu And in the afternoon, Matsumoto Mitsuo presented a lecture on Community-Centered Preservation and Management of Historic Town III (Disaster Prevention). And on site study tour of preservation district in Takayama City,Gifu.
- On 29th September, the Participants arrival in Shirakawa village, Gifu. And then, Matsumoto Keita presented a lecture on Community-Centered Preservation and Management of Historic Town IV (World Heritage Management). And in the afternoon, visited to Shirakawa village Gifu.
- On 30th September, the Participants arrival in Shiojiri-shi Narai,Nagano on site study tour of preservation district in Shiojiri-shi Narai,,Nagano and in the afternoon, Watanabe Yasushi (Shiojiri City Boart of Education) presented a lecture on Community-Centered Preservation and Management of Historic Town V (Group of traditional Building). And on site study tour of preservation district in Shiojiri-shi Narai,Nagano
- On 1st October, the Participants arrival in Shiojiri-shi Kiso-Hirasawa,Nagano on site study tour of preservation district in Shiojiri-shi Kiso-Hirasawa, Nagano and in the afternoon, Discussion.
- On 3rd October, the Participants Final Reports Presentation and Discussion, and in the afternoon, continued to Final Reports Presentation and Discussion, and then, Closed Ceremony.

III. Conclusion

Following are the most useful elements that I learned from the training course:

- Value assessment of cultural heritage and its importance for heritage protection
- Skill-based work session for conservation and management of wooden structures (documentation and making a restoration plan)
- Principles and methods for conservation and restoration of cultural heritage
- Knowledge and techniques of photography

I could also improve my knowledge and skills through exchanging opinions and experiences with the participants from 15 counties and experts from ACCU Nara. I understood the history of cultural heritage properties in Japan as well as recognized many ancient sources of heritage.

This training course was comprehensively framed and structured to identify, analyze, and educate about cultural heritage protection and restoration activities. Also, this course was a wonderful opportunity for participants to upgrade their basic knowledge in all aspects of the current problems and solutions for cultural heritage protection and restoration activities in the Asia-Pacific region. I could understand the problems to be solved initially and learn new techniques and methods that I can implement for conservation and restoration work at my work place.

Recording/Documentation of wooden Structure and Restoration Methods at Tanaka Family Residence

Practice with Camera and Image Files at Tanaka Family Residence

Recording/Documentation, Restoration Methods and Risk Assessment at Tenman Shrine

Nepal

Conservation and Management of Wooden Structures

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Introduction

The country report submitted as the primary requirement of the course focused on the issue of rampant reconstruction after the disastrous earthquake on 25 April 2017. Nepal had not prepared for such level of disaster, particularly in the post disaster preparedness. The impact on the cultural heritage is manifold since mass reconstruction and restoration the monument are not carried out through proper scientific approaches due to the limitation of human and economic resources as well as communities' disregard for the old structures through the aftermath of the earthquake. Amidst such issues, for my office which has been involved crucially in restoration process of the heritage structures, the knowledge of the conservation and management of wooden structure is essential to work in accordance with the international as well as domestic laws and guidelines.

After taking part in this Group Training Course I realize that those types of training not only enhance the knowledge but also help participants develop their skills which can be directly utilized in the conservation fields. The course also helped me make my attitude towards the conservation field and broaden my mind. While I was listening the lectures in the class and observing at the field, I was always curious how I could apply those techniques, experiences, and approach to my own context. The international lectures not only imparted the experiences of heritage protection but also taught the international principles and methodologies, which helped me build up the professional confidence in the conservational fields.

Lessons from the Group Training Course

The initial objectives of this course was to provide participants with knowledge of skills based techniques for the documentation and analysis of wooden structures, knowledge of skills based techniques for the repair/restoration of wooden structures, knowledge of principles and methodologies for the conservation of wooden structures, knowledge of disaster risk management for cultural heritages, opportunities to share their knowledge and experiences of heritage protection and build networks among heritage practitioners in the regions.

Restoration site at Toshodai-ji Temple

Due to some religious restrictions we were facing some issues like conservation work in Agamche that didn't allow us to dismantle the upper structures of 4th floor. The restoration methodologies such as lifting and hauling the upper structure of the building observed in Tohsodai- ji Temple are the applicable examples for us.

This course curriculum was designed very nicely including current issues and global perspectives on conservation of wooden structures, protection system for wooden structures in Japan, documentation of wooden structures, restoration of wooden structures, and management of wooden structures. We were able to learn an overview of the processes of investigation, restoration, and conservation of wooden structures in Japan.

New Knowledge Acquired from the Group Training Course

From the theoretical lecture sessions as well as on-site observations, I acquired some knowledge and understandings. The designation system for cultural heritage in Japan which has three levels (national, prefectural, and municipal) is quite interesting and informative for me. I found it more realistic and applicable to other countries too. I also learned about the practices of disaster risk assessment, identification of vulnerabilities, and adoption of mitigation measures like fire fitting systems, well-managed hydrants, auto detection system, open drain for fire that I observed in the preservation district in Takayama city.

Firefighting implements and drain in Takayama city

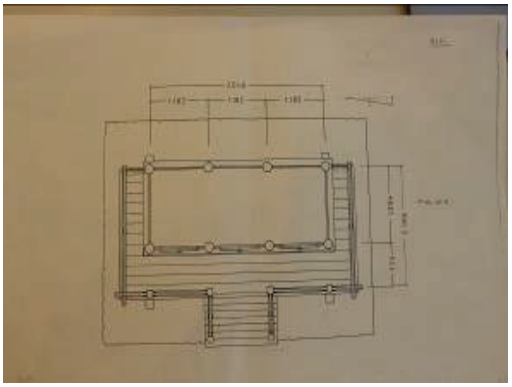
In the context of my country, there are many historic settlements which have unique vernacular architectural styles and values. The knowledge that I got from the on-site study in Shirakawa village can be applied to the conservation for these settlements although I understood that it may need adequate revenue source to preserve the historic towns and implement the practices like landscape management and parking managements.

Gatalang village, Rasuwa, Nepal (left) & Shirakawa village, Gifu, Japan (Right)

I learned the Japanese style of measured drawings and the knowledge of photography, that are the basic and key parts of the documentations.

Tanaka Family Residence

The practices on damage assessment survey and formulation of restoration plans for Tenman Shrine increased my skills and they are applicable to my work as well.




Tenman Shrine (right: floor plan)

The system appointing the head carpenters for conservation projects is certainly beneficial since main responsibility goes them. The training for young carpenters not only improves their skills but also helps the succession of traditional techniques and craftsmanship. At the reconstruction site of South Gate in Nara Palace Site, I observed traditional way of work using carpentry tools, preservation of craftsmanship, and the modern idea such as installation of iron dampers to mitigate the effects of earthquake and ensure the stability of structures. The installation of dampers is the most significant actions for me as the structure itself should be safe against earthquake or any disasters to ensure the safety of the public.


Iron dampers at reconstruction site in Nara Palace Site

Short-term & Long-term Action Plans Developed from the Training Outcomes

This Group Training Course was excellent chance for me to learn the techniques and methods practiced in the conservation fields in the Asia-Pacific region. The discussions and sharing experiences among the participants and lectures was a good way to understand and identify the significant problems and issues in the region. So, the knowledge obtained from this course will help me take appropriate actions for the future planning and execution of conservation work.


Cultural Heritage damaged by the earthquake on 25 April 2015 in Nepal

Currently, I am involved in the documentation of heritage sites, particularly in damage assessment and preparation for restoration plans. I am also responsible for supervision of the work after completing the plan. Through the Group Training Course, I could clearly understand the process of documentation. I will take back what I leaned in Japan and from the case studies of other countries to Nepal and particulary apply new knowledge on documentation to my daily work.

My understanding of heritage was usually from the perspective of an engineer and the structural stability was always my utmost consideration. However, through this course, I found the importance of balance between the structural stability and the heritage value, which enabled me to rethink my approaches to the heritage conservation.

Additionally, in the long run, it is sure that the knowledge will help me implement the conservation work in more systematic way. I would like to be involved in the heritage conservation improving my techniques, using modern technology, and cooperating with the different stakeholders.

Conclusions.

The participation in the Group Training Course was very informative and valuable experience for me. I could closely observe the landscape, heritages, people, and modern developments in Japan. The most amazing thing was the Japanese vernacular architectures and uniqueness of the monuments. I look forward to taking back and sharing what I have learnt with my colleagues in Nepal.

Finding Balance: The Art of Compromise in Heritage Conservation

Alex Bell
Property Lead Te Waimate and Hokianga
Heritage New Zealand Pouhere Taonga

After four weeks of training in the Japanese approach to the conservation of wooden structures, one of the underlying themes that has given me a lot to take back and consider in my own work are the ideas of balance and compromise. Heritage sites are complex, they are structures and landscapes that have evolved out of a myriad of cultural and environmental influences and we are tasked with capturing that social diversity and preserving it for future generations.

Balance and compromise come to play a key part in the conservation process as we:

- Work within the bounds of current heritage legislation, funding, and compliance,
- Manage the needs and interests of local, national and international communities,
- Make accessible the knowledge, traditions and histories of those who established these sites that have become significant to our sense of place and culture.

These two concepts are universal and they are applicable to all of our roles, but how we weight those tangible and intangible values is culturally specific. This final report is an examination of where I am focusing that balance in my own role in New Zealand and some short and long term outcomes I will be taking home from this course.

Whose Values?

The structure of heritage management systems tends to result in an emphasis on the conservation of the physical structure itself. The conservation need is visible, the results are visible, the preservation of heritage sites for future generations is visible.

But who are we preserving this heritage for? This question is one of the most challenging aspects of my role and one that I considered through each element of this training course. It plays such a significant part in the broader conservation planning and management of our heritage sites because it influences so many of the decisions we make in the conservation process.

Balance and compromise is an important theme here because each heritage site can have many overlapping and abutting tangible and intangible attributes associated with it. These can be derived from communities that may have con-currently used the site or who may have used the site differently across generations. It is a complex issue to unravel and understand what one heritage site might have meant to different communities.

From the perspective of this course, this is a long term issue for us to continue to address, picking up where there are gaps in our understanding of the heritage sites and then finding ways to fill those. There is no quick answer or applicable formula to identifying the values of our heritage sites and weighting them according to significance. It comes from working with those properties and with those communities and coming to understand what has made this place significant enough up until now that we made the decision to start allocating time and money to ensure its ongoing preservation.

Conservation Approaches

The training at Tenman Shrine and Tanaka Family Residence allowed for discussion about where different specialists placed emphasis during the conservation process. Through the investigation of the structural development and modification of these traditional Japanese buildings, one of the most useful outcomes was a better understanding of what specific information an architect will focus on compared to an engineer compared to an archaeologist.

At each stage, that group input is invaluable in understanding how the different aspects of the conservation process might affect the tangible and intangible heritage elements. It is in the coming together of those different approaches to conservation planning that the course really highlights its strengths. This was an opportunity to listen to ideas and approaches forged under completely different conditions and consider how they might have an application in improving our own approaches to heritage management and conservation at home. In this case, those key ideas of balance and compromise really shone through in our approach to the restoration of those buildings and how our different backgrounds influenced where we focused our restoration and conservation actions.

One of the repeating themes from other students was the constraints of time and budgets on the conservation process. It was chance to compare the bureaucratic and conservation processes of our home countries and where we could consider looking for efficiencies in our processes. Understanding what information is required by architects, archaeologists etc. is one way to look at refining that process, delivering the right information to the right people to allow each stage of the conservation planning and work to feed into each other. Money is one way to resolve some conservation issues, but improvements in the gathering and management of information could relieve some of the pressure when it comes to planning, consents and costing of conservation projects.

Community Heritage

Settlements like Shirakawa village,Gifu are excellent examples of how heritage preservation begins at the community level with a local interest in conservation of their own tangible and intangible heritage and how it can grow to international levels of recognition.

But as the recognition for these places increases, we need to ensure that we have plans in place for the ongoing engagement of communities in those heritage traditions. Maintaining relevance is difficult in heritage sites where we capture a snapshot of our national identity in the heritage structures, and collections and stories but have to operate in a society which is continually evolving. Community support is important not only for maintaining this connection, but also ensuring that at times we have a sufficient support network to allow us to manage, monitor and undertake the conservation of heritage sites.

There is also increasingly a need to address the engagement between heritage conservation and the tourism & retail sectors. Heritage sites have been and will continue to grow as stand out examples of a nation's cultural identity and will continue to be popular options for engagement in unique cultural experiences.

This interest also goes hand in hand with an increase in tourism experiences associated with the heritage site as well as a growth in retail opportunities at those locations. These are both elements that can be beneficial to the community associated with the heritage sites but they are also aspects that require planning and management much like the conservation work. If left unchecked, these elements have the potential to undermine the heritage values that local, national and international organisations worked hard to preserve in the first place.

Again, it comes back to balance and compromise, finding what works at that site to allow us to maintain the heritage values and preserve its cultural importance to but ensuring that there are ways to maintain community engagement and support for that conservation work.

Conclusions

The immediate actions resulting from my experience on this course are to critically review some of our own processes and identify where we can strengthen our approaches to conservation management. The long term results of this will hopefully be a more robust approach to the conservation of our wooden structures and ensuring their ongoing position and protection within our communities for future generations.

Final Report

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Ⅰ. INTRODUCTION

In order to have sound decisions in the management and choice of intervention works for the conservation of heritage structures, it is essential for conservation professionals to engage in continuing education and be exposed to the views, concepts, and approaches that may be applicable to their practices. The month-long Group Training Course on Cultural Heritage Protection in the Asia-Pacific Region 2019 with the theme "Conservation and Management of Wooden Structures" held by the ACCU Nara Office provides such opportunity to gain awareness of global perspectives and trends affecting heritage conservation and to learn new knowledge, in particular, the Japanese system and strategies for the protection and restoration of wooden heritage structures, among others.

As a participant of the training course, I can say that I have learned a lot of things and have gained a clearer concept of what conservation is all about, contrasting it with my experiences and the current issues that affects conservation in the Philippines. This paper shall serve as a final report for the training course and shall have the following objectives:

- To synthesize the learnings obtained from this training and present options to adapt it in aid of or for the improvement of the current practice of management and conservation in the Philippines;
- To formulate possible solutions to the problems and needs for the protection and restoration activities in the Philippines, as presented at the start of the training course, and
- To formulate short-term and long-term plans that will achieve the above-mentioned objectives.

Ⅱ. INVALUABLE LEARNINGS GATHERED FROM THE TRAINING COURSE

The following are five (5) major themes or key points learned from the training course:

1. The Primacy of VALUES in any decision making for heritage conservation

One of the most important points discussed throughout the training program is the primacy of value**s** in any decision making to be engaged with regards to heritage conservation. In essence, heritage conservation is the protection of attributes and the values ingrained in it. These attributes are components to which the people place attachment and meanings, which constitute the core of the importance of the heritage structure.

Throughout the course, values, as a baseline of the different approaches towards the protection and conservation of heritage structures allow us to explore the range of decision making that should be done to ensure any intervention work shall not impact or result in the loss of values.

2. Continuity and Living Heritage

With the importance of values in mind, the idea of continuity and living heritage should also be given importance. This theme introduced the concept that heritage structures are inseparable with the people and the cultural practice that it caters to. This is in a sense another major theme that affects decision-making in the form of prioritization of values with sensitivity to its current use.


Fig.1 Townscape of Shiojiri-shi Narai
Fig.2 Demonstration of fire hydrant at Takayama city

3. The reality of risks and importance of its mitigation to prevent or minimize the loss of value

Another highlight of the training program is the module on risk management which discusses the nature and reality of disasters impacting the values of a heritage asset. On this theme, the balance between ensuring the safety of both the people and the heritage structure while minimizing the loss of value is emphasized. In most cases, this is one of the most overlooked aspects of heritage conservation. This is a very strong asset of the Japanese way of conservation, specifically on the initiatives of people who themselves organized into associations, for protecting their wooden heritage assets. This laid the foundation for community-based conservation and management.

4. Heritage is a communal or multi-sectoral endeavor

Heritage is a communal or multi-sectoral endeavor. Heritage conservation's success depends primarily on the interest and awareness of the community that it belongs to and all other relevant sectors or stakeholders. Without the continued support and cooperation of each other, it would be a challenge to accomplish anything.

5. What we can learn from Japan's protection systems and conservation practice

Overall, we can learn a lot from the Japanese way of protection and conservation, and how organized, systematic and well-structured it is. In terms of financial and administrative support, the local community and government assume the first responsibility and follow a hierarchy that also extends support. This necessitates a very efficient system.

The documentation of heritage structures, be it in the form of photography or measured drawings is a prerequisite and is a very important document that will serve as the basis for the restoration plan, and a record of what the building went to for reference and use of the future generations. Therefore, as practiced in the Japanese system, due diligence and attention to detail should be considered in the documentation work.

In terms of damage assessment and survey, there should be a profound understanding of the history, material, and deterioration of the heritage structure in order to properly conduct a survey. The quality of the survey is crucial to the intervention decision to be applied, which relies on expert experience and holistic knowledge of the structure.

The systematic and organized implementation of every conservation work, may it be minor repair work or a major/full-dismantling and assembly work is a practice that I also admire with the Japanese way of conservation. The use and nurturing of traditional methodologies by hiring traditional/ specialist carpenters is also present. Fund support is not lacking and is an appropriate form of multi-level cooperation (i.e., a counterpart of national-prefectural-local with community support)

Conservation of forests as a means to safeguard the steady supply and availability of replacement materials in case of repair or restoration works is also a unique feature of the Japanese system/strategies.

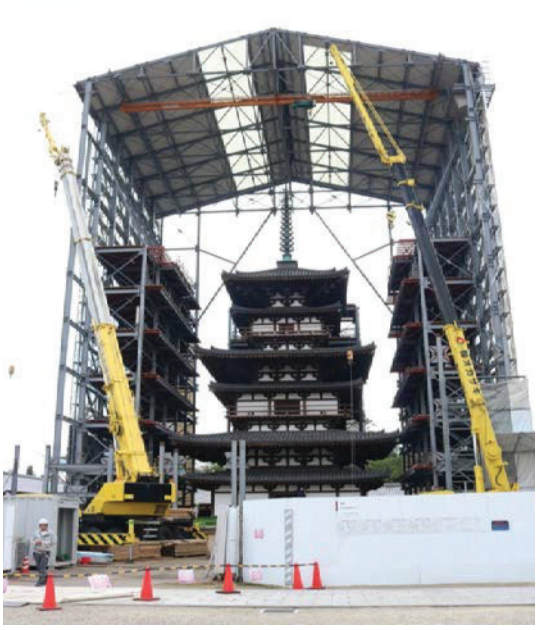

Fig.3 Well-organized restoration site of Yakushi-ji Temple original pagoda

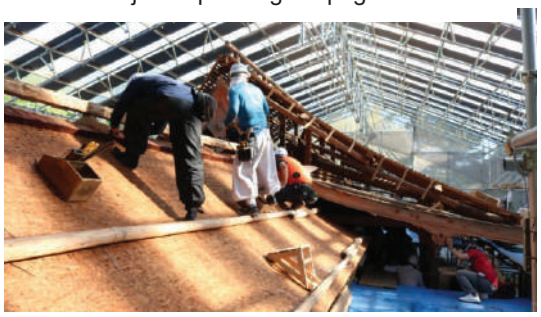

Fig Well-organized restoration site of Shinto Shrine at Yakushi-ji Temple complex

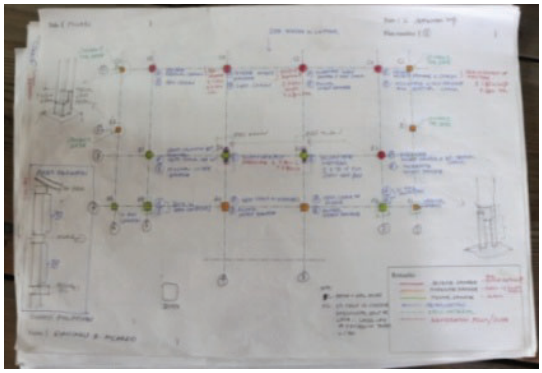

Fig.5 Survey plan of the posts of Tenman Shrine

Fig.6 Practical training on photography with Sugimoto Kazuki

Fig.7 Experiencing the *yarigana* with master carpenter at the Takenaka Carpentry Tools

Ⅲ. POSSIBLE SOLUTIONS TO THE STATED PROBLEMS AND NEEDS FOR THE PROTECTION AND RESTORATION ACTIVITIES IN THE PHILIPPINES

The Philippine government, as mentioned in the country report, is currently engaged in the refinement of the heritage law and addressing the challenges its administrative challenges specifically on the law's implementation. Upon synthesis of the key points learned from this training, the following are possible solutions to the challenges that may be a very valuable input in the Philippine government mitigation efforts:

a. Revisiting and strengthening the Philippine Heritage Law

The protection systems for the cultural heritage of Japan are closely similar to that of the Philippines in a sense that: (1.) there are levels of hierarchy or jurisdiction (National-Regional-Local), (2). the Philippines follow the same designation systems (Important Cultural Property-ICP/ National Cultural Treasure-NCT) and 50 years as the minimum heritage building age requirement and (3) the duration of application for the budgeting system. However, the major differences that may be adopted are as follows:

ⅰ. Engagement and close cooperation with private conservation professionals

The network and mutual cooperation and understanding between the association of practicing conservation professionals (JACAM, in Japan's case) and the government authority are well integrated into its system. In effect, each project starting from the assessment or survey works up to the actual restoration work is closely monitored or supervised by a heritage professional. This way, the quality of any survey, restoration plan or the actual implementation is ensured. Furthermore, the same association or pool of professionals has the

opportunity to compile all experiential knowledge and further research is possible. The cultural agencies of the Philippines may learn from this example in extending support the practice of heritage conservation in the Philippines and nurturing a good network and cooperation.

ii .Financial Support and Manpower counterpart on Prefectural (Provincial) and Local Government.
The subsidy system for restoration work in Japan is commendable in the sense that there are the other levels of hierarchy that constitute a share (i.e., a counterpart of national-prefectural-local with community support). Therefore, the appropriate budgeting is possible and conservation becomes a venue for cooperation, with the local government fully aware of its responsibility. Furthermore, each municipality and prefecture have their own conservation professional that can facilitate the proper protection policies and restoration works. At present, the action plan of the Philippine cultural agencies is the refinement of the Heritage Law along with creating regional offices. This option of gathering support from other agencies and ascertain their direct involvement can be adopted as an alternative consideration.

iii .Improvement of Implementation duration.
For nationally-significant structures in Japan, the duration of the implementation of restoration work is given adequate time which ranges from several months to years (5 to 10 years) depending on the needed intervention. This is one major solution that the Philippines can adapt to ensure that projects are not being rushed and therefore the quality of restoration works done is maintained.

b. Adopting ways to make conservation a multi-sectoral responsibility
In my opinion, much of the administrative challenges in the Philippines stems from the rather centralized approach to protection and conservation and limited mobilization of other sectors or agencies involved with it. From the modules on risk and community-based conservation and management, I learned that conservation is a multi-sectoral/ stakeholder approach sensitive to each function. The cultural agencies can tap into other agencies affecting the site.

Also, there should rather be a “people-centered approach” where everyone involved is given the chance to participate in conservation. Everyone willing can be enlisted and has a role to play. That way, we can also nurture a “sense of ownership” and “sense of community” as a way to strengthen the attachment and values to the community, and thereby promote its relevance.

c. Application and nurturing of traditional skills
One laudable effort that I think is very unique to Japan is its continued use of the traditional methodologies in building construction and its recognition and support for traditional skills (i.e. the “master carpenter”).

The support for the specialized craftsmen who pass on the woodworking traditional skills to the next generation is in itself conservation of the intangible. This not only ensures the survival and repair as the heritage structures need but also the survival of the perfected traditional knowledge.

Following this example and given the current situation in the Philippines, further research, documentation, use, and promotion of traditional knowledge may be a strong advantage to address the technical challenges in the Philippines. Furthermore, the determination and recognition of the traditional craftsmen/carpenters are also beneficial as a point for the conservation of the intangibles.

d. Conservation of resources
Much of the technical challenges not only in the Philippines but apparently experienced by other neighboring nations stems from the problem of scarcity resources. The example of Japan is leading and lays precedence on tapping its agency concerned with the environment to preserve areas for the protection of the trees. These trees, as a sustainable and refillable material, may be used for any repair or restoration works.

The Philippines should, in my opinion, follow the example of Japan for such endeavor, to ensure the availability of materials used for conservation. By doing this, other technical challenges (use of incompatible materials, etc) are minimized.

Ⅳ. CONCLUSION: LONG-TERM AND SHORT-TERM PLANS

Given the above-mentioned learnings and solutions, the following shall be my personal goals in achieving those ends as a conclusion to this final report:

a. Short-Term

- **Echo-seminar of learnings from the training program**

One of the ways that I can share the learnings obtained from the training-course is to cascade the information, techniques, and concepts or approaches by means of conducting an "echo-seminar" of the modules or themes of the training-program at the office and in other places in the Philippines. This might be in the form of technical assistance or information- dissemination as part of the NHCP mandate.

- **Application of the learnings to ongoing works**

The following are what I can do with the learnings on my ongoing or future works:

1. Technical

a. Employing VALUES as a lens for better decision-making of conservation decisions;
b. Adoption of documentation and survey technique on actual practice: attention to detail and being mindful of the traces of past interventions;
c. Improving knowledge of traditional skills through more research.

2. Management

a. Being sensitive to the needs of the community by hearing them out during stakeholders' meetings being done before, during and after any conservation work
b. Minimizing risks through integrating mitigation measures or interventions in the restoration plan and advocating disaster preparedness for heritage.

b. Long-Term

The following are long-term goals that are concerned with crafting general principles or guidelines that the National Historical Commission of the Philippines can issue as a part of its mandate. These are items which I can provide inputs from the learning of this training:

- Inputs on the crafting of unified principles and guidelines on wood conservation
- Improving valuation methods/ value-assessment by involving the community
- Research on traditional knowledge (techniques)
- Establishment of modules on the risk awareness mitigation for heritage structures
- Adopting community-based conservation (especially along heritage zones)
- Conducting seminars about wood conservation and management

Final Report

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INTRODUCTION

The training course on conservation and management of wooden structures was held from 04th September to 03rd October 2019 in Nara. There were 16 participants from 15 countries who have given me a great opportunity to learn the knowledge on cultural values of their own countries.

This training course basically contained lectures, work sessions, group work and presentations, and on-site study and all of them were very effective. Conservation practice for wooden structures in Japan, documentation of wooden structures, damage survey and making restoration plans, risk management for cultural heritage, preservation and succession of conservation techniques, and community-centred preservation and management of historic towns were the basic topics of this course that helped me develop my knowledge gradually.

The techniques for conservation and management of wooden cultural heritage in Japan is systematic and highly appreciable. The collaboration between professionals, carpenters, community, and government bodies; good management of documentation; adequate budget all together help me make a systematic approach to heritage conservation. There are many things that Sri Lanka can learn and implement in practical sense in order to protect and transfer our cultural heritage to the next generation.

DISCUSSION ON TRAINING OUTCOMES

The training was commenced with the participants' country report presentations which helped me widen my knowledge and identify the issues on cultural heritage in Asia pacific region. In my presentation, I emphasized the challenges that we are facing during the conservation, maintenance, and management process with reference to the wooden structures. I believe that the content of the training gave me a platform to tackle my issues which I have raised.

After the first lecture series I could realize the values, attributes, and negative and positive impacts of our own case studies regarding to wooden structures. Authenticity should be identified not only from the materials but also from the values, skills of crafts, presence of communities, use, context, traditional practice, and management system. Sometimes it makes debates in determining conservation measures in consideration of the authenticity of the cultural heritage materials specially when the authenticity is associated with wood.

It is important to understand the value of cultural heritage to facilitate decision making in conservation process. The lectures on Japanese system and international perspectives on conservation and management of heritage gave me an initial exposure to wooden architecture of Japan and systems for heritage conservation.

Comparing to Sri Lanka, massive structures of wooden materials can be seen basically in Nara, and those are still surviving without any major defects. That is mainly because of periodical supervision and maintenance by the authorized bodies or the community. That is one factor which I need to transfer to my country; to revisit the existing process of periodical inspection and restoration system.

Fig.1 Site inspection of restoration projects

In Japan, wood has been used for most of the constructions; temples, shrines, palaces, houses etc. It is also used in almost all the building structures such as columns, beams, walls, doors, windows, roofs, decorative elements etc. The wide varieties of wood species are used for the structures depending on the colour, fragrance, texture, weight, durability, properties, geographical variation etc. Commonly used wooden species are Japanese cypress and cedar. Since Japan has grown forests to source of timber, it is not difficult to find good quality same species wood. But in Sri Lanka, wood sources are not available in the country and the original timber is mostly being replaced by imported timber which is not the same quality as the existed one.

Lack of documentation is one of my issues in the conservation process in Sri Lanka. The two-day practical session at Tanaka Family Residence where we documented Japanese traditional house was a very productive learning experience for me. As an architect, I have documented buildings during my career but this session gave me more precise and accurate documentation skills. I learned it is important to observe each and every corner of the structure and make it into the drawing. The photography session also helped me sharpen my knowledge on photography that is one of my hobbies as well. As the photography is important evidence when making records of heritage sites and monuments, it is the aspect I have to improve for my work.

Fig.2 Measured drawing and photographic documentation at Tanaka Family Residence

The Tanaka Family Residence has been moved from the original location for the purpose of protection. Whether the relocation has destroyed the heritage from the view point of authenticity is debatable. Many lecturers said that there is no single answer to the heritage problems, and therefore, we have to develop our own way to protect our own cultural heritage.

The Nara Document on Authenticity was adopted in Nara in 1994, which expands the universal outstanding values and embraces various concepts and issues related to cultural heritage both theoretically and methodologically. Therefore, I think the Tanaka Family Residence will be one of the examples that Nara municipal government has experimented in relocation successfully.

The four-day practical session on damage survey and restoration plan was a systematic method to gather all the data onto a sheet and to make the restoration plan accordingly. That helped me identify decades of the elements and which elements have been changed because of series of restorations in the past.

To investigate the transitional history of the structure and select the best transition design with reference to the values is one of the debatable moment for me. The difficult part was to make a restoration plan using the concept of minimal approach to the original structure. In Sri Lanka, we rarely use the concept of total dismantling and commonly use repairing or partial dismantling.

“Risk Management for Cultural Heritage” is a novel aspect for my career relevant to conservation of monuments and sites in Sri Lanka. We have not implemented a proper risk management system so far. But after two-day presentations and group works on risk management, we were able to identify primary hazards, secondary hazards, vulnerability factors which could make potential impacts on a heritage site ultimately disaster risk. The analysis on Tenman Shrine which is a small-scale wooden building with mainly spiritual value and social value, and it is also a living heritage. I can easily apply the analysis to my case study which is exposed to the risk of flood and landslide in rural mountain area.

In order to make continuity of authenticity in wooden heritage, Takenaka Carpentry Tools Museum in Kobe contributes a massive input to the present and future generations. It is highly appreciated that their efforts to transfer the traditional knowledge through workshops and exhibition. It is important to preserve and succeed the tools, the spirit of the carpenters, and awareness of the tools and techniques used in repair of traditional buildings from master carpenters to young ones.

Fig.3 Takenaka Carpentry Tools Museum for learning on carpentry through workshop and exhibits

In Sri Lanka it is essential to carry out identification and documentation of traditional techniques and craftsmanship as we don’t have proper awareness of those and measures to pass to future generations. As observed in the museum, we are going to support and empower the carpenters and their craftsmanship to increase young carpenters who are really interested in cultural heritage through sharing knowledge with experts in the field. The museum provided a better solution for the fading traditional skills in Sri Lanka as well as some other countries.

There is less enthusiasm for heritage conservation among people especially young generation as a whole. It is more common scenario that many countries are coping with the development of modern technology. I visited the preservation district in Takayama, Shirakawa, Narai, and Kiso-Hirasawa where the local government have been making good efforts to develop the system in communities to protect and utilise the heritage. During the site visit, I realized that it is also very difficult to maintain the balance between people’s lives and heritage protection as they are living heritage.

Fig.4 Well-preserved townscape (Shirakawa village, Narai, and Kiso-Hirasawa)

According to the Antiquities Ordinance 1940, over 100-year-old constructions with heritage values are declared as ancient monuments in Sri Lanka. The traditional vernacular houses built over 100 years ago are included, but we don’t have preservation districts or towns such as the system of Japan. I hope that this on-site study at the preservation districts will help me develop a conceptual idea for preservation of villages in my country, which is my long-term plan.

ありがとうございました

Thailand

New Knowledge from Training on Conservation and Management of Wooden Structures that Can Utilize for Cultural Heritage Management in Thailand

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A lot of new knowledge and ideas which I had learnt from the training course are able to be applied and help develop the system of cultural heritage management in Thailand. This report will mention new knowledge and some possible solutions that can be developed.

I. New knowledge from the training course (3 main topics)

a. Realizing the Values of Cultural Heritage: Most people know "value" but how to realize it is unclear. Group work on value assessment provided me with the points that how we are able to interpret and presume values and what we will do and prepare for that situation.

b. Principles of Planning, method, and procedure for cultural heritage protection: The comprehensive way and steps to manage the site are taken in order of priority based on the emphasized values and the attributes and the action plan which suitable for each state is set up.

c. Community Connection: This topic let me know how important local people are, how to focus on the relationship with them, and how to work with them. I realize that the most attractive element of property is social dynamics. It is not only the building and structure but also the sentimental value. It may increase economic worth for the community and can make a circle of cultural heritage protection.

Ⅱ. Possible utilization to cultural heritage management in Thailand

a. Archaeological Research: I use the tool which Dr.Gamini Wijesuriya assigned us to work in group. That is the key concept of conservation that can be applied for Ayutthya island, the ancient city designated as World Heritage site. It is one of the world's largest and most cosmopolitan urban areas and a center of global diplomacy and commerce.

I will apply this concept in this fiscal year's project (1st Oct. 2019 - 30th Sep. 2020) that we are arranging for archaeological work at the Dhevasathan or Braman Temple which was the residence of the Brahmins who performed the important royal and religious ceremonies for the Ayutthaya monarchy.

Monument Site	Dhevasathan or Bramani Temple, Ayutthaya	
Values	Sentimental value	Symbolic to the royal monarchy in Ayutthaya period
To whom	Braman Family	Archaeologist
Attributes	Represent to root of Ayutthaya belief	
Factors affective	Abandon Site	
What would you do?	Archaeological work	
Benefit to?	Fine Arts Department (job duty)	
Guiding principles	Archaeological approach	

Table.1 The key concept of conservation that apply for Dhevasathan or Bramani temple Archaeological Project

In addition, I will create the framework of archaeological research in 10 years to realize Ayutthaya's social dynamics and answer to the questions such as where the fists king of Ayutthaya came from, how he established the kingdom, how Ayutthaya people managed water system, how they conducted supplying and trading, etc.

The long-term plan will include many different short-term archaeological plans that is challenging because every site has dissimilar contexts of history, present ownership, and neighbour. Besides, the biggest problem is no guarantee if the government will not appropriate the budget for the long-term project.

b. Cultural Heritage Conservation: Exactly I do not often document and measure the site by myself. Technician, architect, and engineer are in charge of these work. Through this training, I acquired better understanding of their work. The work session of documentation and planning for restoration instructed by Hayashi Yoshihiko, Yamaguchi Isamu, and Kondo Mitsuo at Tanaka Family Residence and Tenman Shrine were very useful for the participants working in the conservation field. These procedures, especially survey method, are good model for adapting monument conservation in my country.

Moreover, risk management is also useable topic as fire and flood often happen in Thailand. The easiest thing that I can apply in short-term period is setting up the fire protection system such as fire extinguishers at location of vulnerabilities and train and teach the officers how to use them. The fire protection system that we learnt from Takayama city is also possible to adapt to my site because there are many ancient canals in Ayutthaya island. To set up the fire protection system utilising these canals is the long-term plan.

Fig.1 Fire protection system in Takayama city

Fig.2 Ancient canals, Ayutthaya

c. Community Management: This topic is so impressive. There are many cases representing the community people's participation in heritage protection especially in the preservation districts in Japan. This case is rarely seen in my country. I think that this is the result from the efforts the Japan have been instructing and educating community people since they are young. In the contrast, laws and rules for control are used in Thailand, which makes people's participation quite difficult. I came up with an idea for these issues; trying or applying the anthropological method such as making good connection with community and interviewing neighbours about necessity of documentation of historic site as well as their needs.

In addition, system and consideration for landscaping and repairing like the cases in Narai are very interesting. Fine Arts Department of Thailand has similar consideration and rules for procedure and permission of building construction, but government officers hardly have the opportunity to counsel with community people and ask their needs. In Ayutthaya there are many cases reflecting this problem because this area contains the ancient city in which ancient monuments are maintained by Fine Arts Department and the living city managed by City-Municipal Office. Such a situation makes the issues very challenging but I learned some solutions to connect the people and officers.

Fig.3 Landscaping of preservation district in Narai

Fig.4 Landscaping, Ayutthaya

Final Report

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During the training course on cultural heritage protection in the Asia-Pacific Region "Preservation and Restoration of Wooden Structures," I had an opportunity to improve and broaden my knowledge and skills in the sphere of cultural heritage preservation especially wooden structures, which is new for me.

This training course gave me knowledge, hints, and points of improvement, even though it was such a short period of time. I especially appreciate every instructor giving lectures on theory, followed by practical sessions. The topics covered in the course were very broad and diverse, including cultural heritage protection systems, documentation through measured drawings and proper ways to photograph cultural properties, conservation and restoration, risk assessment, and management of cultural properties.

In fact, Japan has numerous wooden heritage buildings and always gives intensive care to preserve them. Japan began to establish a legal basis for preserving architectural monuments from 1897. Every practice to protect the existing cultural heritage here is governed by laws and agencies. Despite huge advances in technology, Japan has protected and remained its culture.

The inclusion of many different categories in the cultural properties register of Japan is an impressive way to ensure that the best conservation methods are applied for each cultural property.

Although it works effectively in Japan, it would be very hard to make it work in Uzbekistan due to differences between the Japanese system and the current system used in our country. We currently have one inventory detailing all the heritage sites in the country. We began to revise and update the list in the past, and this process is still ongoing. As mentioned above, we lack proper laws and guidelines on how to look after and protect our heritage sites. However, I obtained a lot of information and knowledge on many methods for improving the system in Uzbekistan. It may be possible to implement some aspects of the Japanese legal system in the sphere of cultural heritage protection in Uzbekistan.

Firstly, assigning responsibility to local governmental bodies for sites which are located within the territory of these local regions or areas. Strengthening both superior and local authority, developing special regulation, and ensuring a sufficient budget allocation will have an influence on building an effective system of control and monitoring by governmental bodies.

Secondly, creating and implementing specific guidelines for restorers and architects who are responsible for the preservation and restoration of cultural heritage. The development and implementation of new guidelines or instructions and regulations is very important to protect our cultural heritage in Uzbekistan.

Through site visits we were able to see how the sites were managed and utilised in Japan. For instance, our visit to Shirakawa village was surprisingly interesting. The local community plays a major role in protection of their cultural heritage.

But in the case of Uzbekistan, this role has always been played by the central government. The involvement of the local community is very important in protecting the cultural heritage of the country. Apart from these, there is no specific law or legal governing body to protect individual or groups of traditional buildings in historic towns and rural settings, which are occupied by people and form a part

of the tangible living heritage, where the ownership pattern is private. There is an urgent need to devise a strategy to protect these traditional buildings. Japanese system of preservation and management of group of traditional buildings is a good case study and reference material.

As a developed country Japan has contributed much to preserve and protect its cultural heritage. One approach that I found very interesting and probably the most useful to Uzbekistan is the government subsidy program. The extensive number and range of cultural properties protected by the governmental bodies of Japan benefit hugely from the subsidies provided annually, which can be as high as 80 or 90 percent.

But in Uzbekistan the funds for restoration of historically significant architectural buildings that are under private ownership have to be generated on their own. The government subsidy programme is an interesting approach and our organization as a consultant to the respective organisations in elaboration of legislation would like to work on the implementation of projection the subsidy programme in Uzbekistan. It would be interesting to gauge how such a system can be used for cultural sites and push heritage for tourism to the forefront.

Practical training in documentation of the Tanaka Family Residence was a very good experience for me. It was my very first time drawing a floor plan and cross-section of an old vernacular house. At Tanaka Family Residence we were also taught the importance of taking photographs and learned basic knowledge of photography for cultural properties, which was a good experience to know more about how to take detailed and precise photographs. As a culture specialist I will use these knowledge and skills for observation of future World Heritage nominations, reports and other documents. As part of our job we coordinate the projects on research of historic sites, and always need a good camera and good photography in recording and explaining the sites and artefacts.

Accordingly, from the site visits and on-site lectures during my training period with regard to risk management, I learned methods and approaches on how to take precautions against such disasters, how to assess damages after disaster, which I will share with my colleagues working in those sectors.

The water guns are one of many things that I found to be useful to Uzbekistan. It is the general preparedness and proactive approach rather than waiting for disaster before addressing it. The general planning and utilisation of practices is what I can incorporate into the general planning phases of a project. It is not only proved to be a well thought out plan but the implementation of the plan in sorting out the logistics and making sure that such countermeasures against disasters are also aesthetically pleasing and well placed and disguised. Such an approach would be beneficial to our country and can utilise some of the creative ways of hiding such important safety measures within reach but not so visible and make them blend in more with their surroundings.

Furthermore, information board in four languages we saw in Kiso-Hirasava and QR code to make the exhibit interactive are very important details of preservation and popularisation of cultural heritage properties.

The successful implementation of that ideology in Uzbekistan may take longer than in Japan, but working to promote this concept to the local public and the higher authorities in the government will be one of the priorities of my work in the future. I believe that these few criteria I have chosen could be something to start with on a small scale, as we are very limited in terms of budget, capacity, and logistical constraints to venture out on a larger scale.

I have found that all the approaches can be utilised and this is something I will be sharing with my colleagues and discuss all the materials I will be taking back with me. Also, I realised that my participation in the training course will significantly expand my collegial networks, will help me keep in contact with specialists from different countries of the region, to obtain access to their experience, and to share specific knowledge and techniques in my home country.

Viet Nam

Survey, Planning, and Training to Build a Team of Collaborators and Volunteers for Disaster Risk Reduction in Ancient Town

Vuong Phuc Tu Tuoc
Conservation Engineer
Department of Relics Restoration,
Hoi An Centre for Cultural Heritage Management and Preservation

1/ Background

In Hoi An Ancient Town total of 929 houses are in private ownership, 120 are collectively owned, and 205 are state-owned. Almost all of the wooden architectures meet the outstanding universal value. Numerous local residents live there continuing their daily traditional lifestyle. One good thing is that conservation shows good results every year thanks to consensus between local government and local people.

After restoring, the state-owned heritage buildings have been re-used for various purposes as museums and government offices, etc. and privately-owned heritage buildings have mainly been re-used as shops or restaurants, etc. The conversion of heritage buildings in the old quarter of Hoi An into commercial space such as shops and restaurants have been actively promoted by municipal authorities. While it has been successful in terms of generating tourist revenue, it caused the degradation of the integrity of the heritage assets. Very few traditional shops catering to the residents remain in the old quarter and family residents have significantly reduced.

1. 2 Challenges in Conservation of Wooden Architectures

1.2.1: Indirect reason:

- Cultural imbalance: development of tourism, cultural invasion
  Too many people visit, trade, provide services, do business and live in the ancient town, which is causing overload. The overload causes difficulties of waste, drainage, and traffic management. The risk of damaging the relics and urban infrastructure system is increasing highly.

- Climate Change:

+ The sudden increase of rainfall, storms, or prolonged drought does not follow the natural rule of hundreds of years.
+ The most pressing problem is the flood occurring every year. Water and mud from the river damage the lower parts of houses (inside and outside) in the ancient town; the interior of houses is immersed in water, which causes deterioration. Especially wooden structures are destroyed and relics are downgraded every time the flood occurs. The risk management of wooden relics is limited and preventing the yearly flooding inside the houses is nearly impossible.
+ Though it does not occur every year, typhoon is also a problem causing severe damage.

1.2.2 Direct reason:

- Many artisans are getting older and the young generation has almost no successor.

- Deforestation and forest exploitation indiscriminately lead to depletion of indigenous wood materials for renovation; today, we use the imported wood material from Africa and Malaysia for renovation work.

- As wood and other easily inflammable materials are used as building materials, the outbreak of fire is a huge risk. This is still a potential problem: many old houses and restaurant use gas for cooking. Although there are many inflammable materials inside the houses, fire is not always extinguished and handled carefully. Additionally, fire implementations are not at the highest standards.

- Termites also cause a lot of damage, especially to wooden structures inside houses.

2/ Action Plan:

Survey, Planning and Training to Build a Team of Collaborators and Volunteers for Disaster Risk Reduction in Ancient Town

2.1 Object:

+ Build, training collaborators and volunteers for:
  - Prevent, extinguish fire and mitigation natural disaster
  - Aid the victims in case of fire or natural disaster.

+ Action with slogan: "4 in places"
  - human resources in place
  - equipments in place
  - logistics in place
  - commander in place

+ Examine and upgrade fire prevents and extinguish equipment

2.1.1. Who join program:

- **Head and Deputy of the group population**
- **Officer of local ward.**
- **Volunteer** (who live in group population)

2.1.2 Agencies participating in the program:

- **Hoi An People's Committee**:
  General management
- **Local ward Committee**
  Administrative management residential areas
- **Police fire department**
  Training and join extinguish fire
- **HoiAn District Health Bureau**
  Training first aids
- **HoiAn Center for Cultural Heritage Management and Preservation.**
  Training to prevent degrading monuments
  Supervisor, Executive Manages team and collaborators

2.2 Task of Program:

2.2.1 Preparing for Action Plans:

	Activity	Parties	Subject
1	**Assessing actual situation prevent, extinguished fire and disaster reduction in population communities of ancient town.**	- HoiAn Center for Cultural Heritage Management and Preservation (HACCHMP) - HoiAn People's Committee. - Local ward Committee	- The situation damage of monuments - Awareness and knowledge of people in ancient quarter for disaster prevent - The infrastructure of ancient quarter for disaster prevent
1.1	Survey and evaluation of manpower	- HACCHMP - Local ward Committee	- Survey the current state of population and labor statistics for planning
1.2	Survey and evaluation of equipment and infrastructure		- Survey available equipment for disaster prevent (fire and natural disasters)

2	**Find and Build suitable solution**	- HACCHMP *(main duty)* - Local ward Committee - Police fire department - HoiAn District Health Bureau.	- Table plans for building collaborators and volunteer disaster prevent based on human resources are available in population quarters areas. - Purchase, upgrades and additional equipment missing and damaged.
3	**Submit for approval and funding for the project**	- HoiAn People's Committee. - HACCHMP	- Approving the plan and allocate funds for implementation

2.2.2 Developing for Action Plans:

	Activity	**Parties**	**Subject**
4	**Procurement additional equipment**	- HACCHMP - HoiAn Department of Finance and planning *(Supervisor)*	- Upgrade equipment for fire and disaster prevent. - First Aid Equipment
5	**Establish, Training collaborators and volunteers of population groups**	- HACCHMP - Local ward Committee	Establish a team of collaborators and volunteers in each population quarters area : **+ Head and Deputy of the group population, Volunteer** (who live in group population) **+ Officer of local ward.** **+ Volunteer** (who live in group population)
5.1	Training prevention and control collapse for relics	- HACCHMP - HoiAn District Health Bureau. - Police fire department - Local ward Committee	Training prevention collapse of monument in disaster.
5.2	Trainings aid the victims in case of fire or natural disaster.		Training first aids.
5.3	Trainings prevent and extinguish fire.		Training fire prevents and extinguish.
5.4	Trainings use equipments.		Training use equipments.
6	**Experimental and Deployment**	- HoiAn People's Committee. - HACCHMP - HoiAn District Health Bureau. - Police fire department - Local ward Committee	Test and deployment activities.

2.3 Timetable

(See attachment)

3. Finacial Support:

- Funds from the annual budget of the local.
- Funds from National Prevention Disaster program.
- Funds from the conservation program.
- Find more funding of equipment from other organizations and foreign governments.

4/ Conclusion:

In the time of the studying experience in Japan, I've noticed many similarities and common problem for the heritage buildings in Hoi An is similar to traditional buildings in Japan. Hoi An world heritage does not affected by the earthquake and tsunami like Japan. But the risk of fire to the wooden architecture, the impact of storms and floods every year is available. Although it is not too late, it is an urgent problem that we have the opportunity to prevent. Thus the construction of a concrete plan to link the prevention, mitigation, rescue and disaster recovery is necessary than ever.

2.3.1/ TIMETABLE FOR PREPARING:

		2019												2020												2021											
PREPARE		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1	**Assessing actual situation prevent, extinguished fire and disaster reduction in population communities of ancient town.**											→																									
1.2	Survey and evaluation of manpower												→																								
1.3	Survey and evaluation of equipment and infrastructure												→																								
2	**Find and Build suitable solution**													→																							
3	**Submit for approval and funding for the project**													→			→																				

2.3.1/ TIMETABLE FOR DEVELOPING:

		2019												2020												2021											
DEPLOYMENT		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
4	**Procurement additional equipment**													→																							
5	**Establish, Training collaborators and volunteers of population groups**															→																						
5.1	Training prevent and control collapse for relics																					→															
5.2	Trainings aid the victims in case of fire or natural disaster.																						→														
5.3	Trainings prevent and extinguish fire.																						→														
5.4	Trainings use equipments.																							→													
6	**Experimental and Deployment**																									→											→

III. Regional Workshop

Training Reports

Practical training on shooting stone inscription at National Museum of Cambodia

Chea Socheat
Vice Chief of Office Conservation
Conservation Office, National Museum of Cambodia

I have learned a high-quality photograph shooting on the artistic objects and the functions of the camera. Moreover, throughout the workshop, I am able to improve my shooting skills in order to shoot photographs with a proper exposure and brightness which is really useful in my daily work. I also learned how to properly store the photographs.

This is the first and only experience I can ever imagine. It is not easy to take a good picture as we have to find a proper position and creative ideas in order to present our ideas about each artistic object.

Von Noeun
Metal Conservator
Metal Conservation Laboratory, National Museum of Cambodia

I, Von Noun, am an official of Department of Museum, workshop and metal conservation ward.

After attending this training course on The Conservation of Cultural Heritage, I have gained a lot of knowledge and skills such as:

- Camera selection
- Position selection for photograph shooting
- How to install and secure tripod and lighting kits
- Lighting preparation
- How to use camera functions
- Data (photographs) storing in computer
- Camera cleaning and maintenance

As I have mentioned during the workshop, I have never received any training on photographing technique from any institution. I learned the techniques from other people. That is why my skills are limited.

After attending the training workshop, I know that my photograph shooting skill needs a lot of improvement, and the skills which I have learnt are the key points that I need the most in my daily work. After the training on The Conservation of Cultural Heritage, I will apply the skills and experience obtaining from this workshop to my daily work and improve my specialty as well. Also, I will share this knowledge on photography to officials in the relevant institutions and students who are interested in this skill.

Last but not least, I would like to extend my sincere thanks to the Management and relevant officials who conducted this training workshop as well as to thanks to professors and lecturers from ACCU for spending your valuable time to teach the cultural heritage photographing skill to all trainees, and thanks to the facilitators who coordinate the whole workshop to run smoothly from the beginning until the end.

Eng Sitha
Ceramic Conservator
Ceramic Conservation Laboratory, National Museum of Cambodia

I, Eng Sitha, am an official of Department of Museum, workshop, conservation and repair of pottery and ceramics object ward.

I have never received any training on photographing technique from any institution. I learned the techniques from other people. That is why my skills are limited. After attending this training course on The Conservation of Cultural Heritage, I have gained a lot of knowledge and skills such as:

- Camera selection
- Pre-photographing preparation
- Position selection for photograph shooting
- How to install and secure tripod for shooting artistic objects
- Lighting preparation
- How to use camera functions
- How to choose pixel sizes
- How to store photographs
- Camera cleaning and maintenance
- How to shoot small and big immovable artistic objects

After attending the training workshop, I know that my photograph shooting skill needs a lot of improvement, and the skills which I have learnt are the key points that I need the most in my daily work.

After the training on The Conservation of Cultural Heritage, I will apply the skills and experience obtaining from this workshop to my daily work and improve my specialty as well. Also, I will share this knowledge on photography to officials in the relevant institutions and students who intern in the workshop, conservation and repair of pottery and ceramics object ward in order to know how to shoot artistic objects that need to be repaired.

Last but not least, I would like to extend my sincere thanks to the Management and relevant officials who conducted this training workshop as well as to thanks to professors and lecturers from ACCU for spending your valuable time to teach the cultural heritage photographing skill to all trainees, and thanks to the facilitators who coordinate the whole workshop to run smoothly from the beginning until the end.

I would like to wish the Management, professors, lecturers and staff of ACCU a happiness, prosperity, good health and success.

Kong Kuntheary
Textile Conservator
Textile Conservation Laboratory, National Museum of Cambodia

Throughout the 6-day training workshop, I have gained new knowledge on cultural heritage objects photography which is the first and new training I ever received so far. The cultural heritage objects photography is difficult as it requires a high-quality photograph. To shoot a high-quality photograph we should:

1. Select camera types
2. Know how to use camera functions such as:
    - Aperture and shutter speed
    - ISO
    - Relationship between aperture and shutter speed
    - Proper exposure and Exposure correction, etc.

When we put this cultural heritage objects photography into practice, we must keep the original photograph without editing. To get a good shot, we must know about:

1. Focus
2. Lighting
3. Camera kits installation, etc.
    - Menu setting
        - Mode setting
        - Preview
        - White balance setting
        - Picture selection, etc.

After this workshop, I will properly apply the skills I have learned to my work as well as to teach my colleagues who have not attend this workshop. If there is something unclear, I can ask my friends or the professors for further explanation. The textile workshop is lack of camera specialists. While the workshop has only the low-end camera, which could not take good images, I will do all the best I can to properly capture the photographs.

Even though the lecture and the training were too short, as a conservator and the repairer of the cultural heritage, I must know how to properly shoot the photographs and store those photographs in accordance with the technical requirements in order to make it easier for the researchers and the next generation.

Last but not least, we, the trainees, would like to extend our sincere thanks to the Japanese professors and staff for sharing the skills needed for our team.

We wish the Japanese professors and staff a good health and success.

Sun Linada
Civil Servant of Education Office
Education Office, National Museum of Cambodia

Cambodia is still a developing country which need many human resources to help develop our country. In order to archive the goal, aids and supports from all country around the world is the crucial factors. Japan is one of great country who support us in nearly all sectors such as sport, education, etc. Culture sectors was also got a lots aids and support from them in many activities such as conservation project, excavation project, training and workshop, etc. Obviously, from 18th to 23rd November 2019, Asia-Pacific Cultural Centre for UNESCO of Japan and Ministry of Culture and Fine Arts of Cambodia co-organised a workshop for cultural heritage protection about "Photographic Documentation" to 15 Cambodian cultural officers in Phnom Penh, Cambodia.

I feel so honor to be selected for joined and learned many new techniques relate to photographic documentation that I never known before such as:

- Mechanism of camera: type of camera, knowledge of lens, sensor, knowledge of exposure (aperture, ISO, shutter speed), image quality, timer, image style
- Shooting setting: tripod setting, shooting technique
- Image: function of image, foundation of color, color temperature, knowledge of pixel, technique to set custom white balance with gray card to caught real color from artifact
- Lighting: how to set lighting, lighting reflector, knowledge of lighting reflection
- Shooting stage: setting of background, how to set stage depending on each artifact (ceramic, textile, stone, metal), size of artifact (small, big, unable to move), and direction of artifact (above, below, left, right)
- Media storing: Memory card (transfer only), HDD (3-5-years backup), CD-R, DVD-R, BD-R (easy to transfer to many people), Microsoft Excel (Note for easy to search)
- File type: RAW (able to edit and color correction with Camera Raw in PC), JPEG (color already compressed effect to quality), TIFF (color stability to long future)
- Building Shooting: Some technique about sunlight, focus and flash light
- Camera Cleaning: Sensor and lens cleaning, tools for cleaning, cleaning process

After participation, I can manage my work related to photography more suitable and technical. Exactly, nowadays I don't work directly with heritage photography but I can apply some techniques related to camera function with my photography skills to capture more quality and suitable images in workshop, exhibition, handover ceremony, etc. In addition, I can share my knowledge from the workshop to my colleagues who work directly with heritage photography in order to capture more professional images with international standard that could store as documents easier to manage, as evidences to file complain for illegal heritage trafficking in the future. Lastly, I hope to work directly with photographic documentation in the near future and I will try my best what I have been learned through the workshop in real-time job.

In conclusion, I show all my respect to ACCU team and the Ministry of Culture and Fine Arts for co-organized the workshop that provide not only knowledges but also experiences in real-life job to me as individual and all other participates as a whole. I determine to apply all knowledges that I got from the workshop for my daily occupation to develop my skills along with technology generation.

Khuoy Suosobranith
Government Official
National Museum of Cambodia

After attending this 6-day workshop, I gained new knowledge and skills on how to properly shoot artistic object photographs in accordance with the standard. This workshop is a key capacity developer for our officials in culture sectors to better register and record the data.

I will apply the skills I have learned from this workshop to my daily work with efficient and high-quality manner as well as to teach other officials who missed the chance to attend this workshop.

Hang Chansophea
Technical Officer
Angkor Conservation (Siem Reap Province), Department of Safeguarding Preservation of Monuments, Ministry of Culture and Fine Arts

When I had been participated in the workshop, I thinks very useful for my daily work. Because I work on inventories art objects at Angkor Conservation. It's large scale of national level have storage rooms for the art objects need to conservation and managements. Inventories of artefacts is my main task and responsibilities. Example, photograph before and after restauration, photograph artefacts before transfers to other institutions for the purpose of conservation such as Nara institute for restoration Western Top temple, National Museum in Phnom Penh, Angkor Museum and Preah Vihear Museum.

In the past, I had been tried many times to improve my shooting art objects for inventories purpose. when I got the photograph still poor condition. In later, after I joined this workshop I known and improve more skill than can be manage idea and tools to support in the period of shooting in next step at my working place. It's great skill for me to responsible at work.

Great times, met trainees from differences provinces and working place can be share experience and ideas in the training period. We can keep contact for next times for improve work situation.

I will bring all of my experience from this workshop to share with my team work at Angkor Conservation. Because the photograph of artefacts is a part of the evident of documents concern on national heritage value nee to preserve.

Most interesting experience was learned from the workshop is digital management doc and maintenance of photograph equipment tools. Digital managements system had been learned it is great concepts to me can me take as module for digital management system at my working place.

I am suggested that please continue workshop in the future because staff need to improve skill for sustainable development work on cultural heritage conservation. Because technology system were developments need to follow up in the purpose for protect value of culture heritage property.

Thank you for allowed me on the schedule than made me improve great skill to my work processing at Angkor conservation in current time.

Kheng Sokleng
Deputy Head of Bureau
Department of Antiquities, Ministry of Culture and Fine Arts

Throughout this workshop, I obtained some basic knowledge related to photographic techniques for cultural heritage. I would like to mention 5 points describing what I observed and learned during the training:

1. Basic knowledge on camera:

- Understanding the process of camera when using it.
- Understanding the two types of camera such: film camera and digital camera with memory. Camera is divided into two parts: lens and body. There are also interchangeable lens cameras and fixed lens cameras. The interchangeable lens cameras have more photographic functions than the other.
- Understanding some functions of the camera such as aperture, ISO, shutter speed, pixel, and colour temperature.
- Understanding the mechanism of photography

2. Photo scene setting:

Trainees learned about scene setting for photographing both moveable and immovable objects as follows:

- Using lighting accessory: understanding sufficiently lighting for photographing objects, lighting location, how to use light diffuser films to soften light and a reflection board light to reduce shade, etc.
- Two techniques of lighting: one is to use direct light without a diffuser to reduce brightness. It can take a clear photo of the sculpture depth particularly when photographing inscription and lower sculptures. The other technique is to use a diffuser to soften light from projection on to the object and so as to reduce the shadow over it.
- Equipment: understanding how to use the equipment for setting up the shooting table such as electric bulb, diffuser, reflection board, glass board, scissors, tape, blank paper, PVC pipe, background carton box, and other materials which can be used for the set. In addition, we have also learned how to keep the balance of equipment in order to prevent them from collapsing leading to damage of the important objects. The other important material for photographic work is grey card. Grey card has two sides, each of which is grey and white. It can help camera with setting the colour temperature of the item in any brightness location.
- Shooting techniques: there are many types of shooting techniques based on the objects to be photographed. In this training, I learned three types of them as follows:
    1. Front shooting: it is a shooting technique where the camera is placed in the front and the white background is set. This shooting is used for photographing objects that are small, medium and big and movable such as pottery and ceramic, statue and scripture. This shooting technique may also apply to a big immovable object such as big statue and stone inscription, etc., and in this case, the light may be projected directly onto the objects without using any diffuser to ensure the sufficient lighting or to make a shadow on the depth of the scripture or the inscription stones, etc.
    2. Overhead shooting: this shooting technique is conducted by placing the camera on the object and the background is organized in the lower part. This shooting uses glass board which is placed on their supports above the white underneath background so as to reduce the shadow over the object. This shooting is suitable for photographing small objects, photos, old documents, small inscription stone or other statues, etc. However, the lighting is varied to the actual status of the objects, for example, photographing

inscription stones, old documents or photos, a diffuser is not required to project sufficient light on the fixture and the format of the instruction letters to be clearly seen, while the location of the lighting is not different.

3. Horizontal shooting (textile shooting): This shooting technique is used to photograph clothes, silk, and ink rubbing paper of stone inscription which may be big or long. The lighting is required in this shooting technique to ensure the clear picture as per the actual colours of the objects and the preferences of the photographers. The background shall be grey in order to reflect the surface of the silk or inscription pieces that is white.

- Background: Background will be white paper or cloth but should not be in other colours that result in changes of the actual colours of the objects to be photographed due to the reflection of the colour of background. The black background should be avoided as well because it is difficult to detect the shadow of the object and it is also hard to distinguish the deference between the surface of the object and the surface of the background.

3. Setting mode:

Setting mode and functions of the camera are vitally important for photography in the heritage sector. During this training, I learned how to choose the correct setting mode and functions of the camera for photography in the heritage sector in order to produce a clear and high-quality picture. In taking photos, we have to set modes and functions of the camera (Cannon camera) as follows:

- Turn on the camera, then select mode "AV" and make sure that the camera's lens is taking on mode "MF" (AF-MF).
- Setting "Aperture": Select Aperture mode to the middle level which is between the smallest value and the biggest value (representing by F) according to each type of the camera that come with the different Aperture. For photographing an archive, we may set the Aperture to the big value so that the shutter speed will be ensure without any vibration so the good and clear photo will be taken.
- Setting ISO: Set the ISO to the lowest value representing by 100. The higher value of the ISO is set, the shutter speed will be faster, but the quality of the photo will be decreased.
- Image quality: The type of photo file is set according to our preferences, for example, RAW or JPEG, etc. In the training, we decided to select file "JPEG" for photographing.
- Picture style: For picture style, the mode "neutral" was selected.
- White Balance: For this setting, mode "custom" was selected.
- "Custom white balance": Shooting the white side of grey card to set the colour temperature on any location of the object. To do this, we have to place the grey card next to the object and set the lighting as we prefer, and then shoot very closely to capture the white side of grey card clear, avoiding the card from being blocked by the shadow. After shooting a grey card (white site), we have to set custom white balance, enabling the camera detecting the colour. We have to go to Menu and select on "custom white balance" and then select "OK" to confirm.

All above-mentioned points are the most important parts for me in the training. I want to use all training outcomes in practice to take a photo effectively.

4. Photographic Techniques

After setting the mode of camera, next step is to organize the photographing and detect the angle of the object to be photographed. To make a good shot, we have to check the camera stand and the balance of the camera. To make a clear shot, first we have to focus on the point of the object to be clearly photographed. For focusing point, we have to set the middle point of the front surface and the back part of the object to be photographed by pressing the zoom button. When a point of the object is well focused, the style or the surface of the object will be clearly shot. If the other points are yet to be seen clearly as per our preference, we may have to press a button next to the inner of the lens so as to view the clarity and check the Aperture.

When set of the focus is done, we have to return to the normal zooming position before starting to shoot. Before pressing the shooting button, the balance of the camera must be ensured because if the camera is

vibrated, the shot will not be clear enough. To ensure the balance of the camera, controlling code may be used on the camera or the shooting timer will be applied so that we don't have to touch the camera.

Moreover, when shooting a building, we have to set mode according to the description in point 3 above, but we have to use a flash to enhance the lighting so that the dark location will be clearly captured or to reduce the lighting from outside. For shooting the picture of object or building, camera setting depends on our preference or the actual status of the object to be photographed.

5. Data storage:
In this section, we learned how to store photo data of any heritage objects. We understood about the types of data storage devices that may be stored and compatible with computer and other operational systems. There were three data storage devices mentioned in the training.

1. SD, CF, USB
2. HDD
3. CD-R, DVD-R, BD-R

About these three types of data storage devices, we learned basic function, specification, and weakness of each type. The lifespan of these devices is 5-10 years and they have high risk of losing or damaging their memories.

Therefore, in order to protect the data from loss, the original data shall be copied to the other storage devices and copied them into more devices. We need to check the format of the photos in order to avoid damaging or losing the old photos or original files as well as store the original files in a separated location. To do this, we have to create a folder to store the data according to the type and put them accordingly to make it easier to be found in the future.

Conclusion
This workshop provided me with the opportunity to practice photographing. I practiced the front shooting of deity statue's head; the overhead shooting of fragment of pottery and ceramic, Phnom Da's Vishnu, Pre Rup temple's inscription stone, and ink rubbing paper of stone inscription; and the terrace of the Leper King's building. After the training, all trainees received the comments and feedback from the instructor Mr Sugimoto Kazuki who explained and instructed us to improve our knowledge of photographic technique through the practice sessions.

I am very pleased to attend this training on photographic technique for cultural heritage. Even though the workshop is short, it is very beneficial to build upon my existing capacity and useful enough to make my daily work more effectively. I will apply the result and knowledge I gained from this training at my work place particularly for the inventory of ancient artefacts that are unregistered yet and requires skilled and professional photographers for documentation.

I would like to take clear and proper photos for documentation so that the information of cultural heritage will be stored for a long-term period for our young and next generations. The new knowledge gained from this training will be useful for my personal capacity development and help me improve my present weakness. In addition, these photographic techniques and new knowledges gained from this workshop will be put into practice in my daily work and will be shared to other civil servants (colleagues) who were unable to attend this training, particularly those who are in charge of photographing and registering heritage objects at the heritage sector of capital and provincial departments so that they will have basic knowledge of photography for heritage objects.

Tol Marady
Technical Officer (Museum Office)
Heritage Division, Department of Culture and Fine arts, Kratie Province

I would like to extend my sincere thanks to the instructors and facilitators of ACCU Nara as well as the officials from the Department of Museum, Ministry of Culture and Fine Arts, Cambodia for your efforts to conduct this workshop. Even though the duration of this workshop is short, but I have gained new experiences. Below is the summary of what I have learned from this workshop:

Theories and techniques of using cameras:

- Principles and benefits of photography for heritage conservation works
- Types of cameras (film cameras and digital cameras)
  - For film cameras: The bigger the film size, the clearer the image.
  - For digital cameras: The bigger the pixel in the camera, the clearer image it can produce.
- Camera functions and roles (sensor, pixel, aperture)
- Advantages and disadvantages of files types such as:
  - RAW is an original image file which can be converted into other file types.
  - JPEG is an original image file which cannot be converted into other file types.
  - TIFF is an image file which cannot be compressed.

Photographic technique practical training:

- Exposure setting and the level of brightness that can produce a clear and high-quality image.
- Photograph scenes setting, studios and other location preparation for both indoor and outdoor shooting.
- How to securely store the image files and how to maintain the cameras.

I am able to apply the know-how gained from this workshop to my daily work as well as to deal with the challenges we have been facing during our works in the museum.

I am going to re-document the photographs of each ancient object stored in the museum since the previous photograph documentation contains low quality images, lacks of photographic techniques, does not deliver the details and key features of the objects. So now I know the importance of photography as well as the methods to securely keeps those photographs for a longer period.

Moreover, I am able to apply the know-how to my other works related to photographing special immovable heritage, ancient temples, and other historical sites exposed to the nature and human. I know how to properly use the camera now, so I can share my experiences from this workshop with my colleagues as much as possible.

Dy Keo
Technical Officer (Museum Office and Heritage Office)
Heritage Division, Department of Culture and Fine Arts, Battam Bang Province

As per an invitation No. 189 of the Ministry of Culture and Fine Arts to invite participants to attend the workshop on heritage protection, which was held on November 18-23, 2019. I arrived Phnom Penh in the evening of November 17, and on the next morning, I attended the opening ceremony of the workshop on which was presided over by H.E Prak Sovannara, the Secretary of State, representative of Her Excellency Minister of Culture and Fine Arts, accompanied by the Ministerial Delegates and instructors from Japan (ACCU Nara) as well as the trainees at the Angkor Wat Hall inside the Ministry of Culture and Fine Arts.

After finishing the event at Angkor Wat Hall, trainees went to Preah Vihear room for the workshop. At that time, all instructors and trainees introduced their names, positions, learning objectives and challenges in their respective entities. After that, the Japanese instructor explained the general knowledge on photography for cultural heritage as well as photographic mechanism as follows:

- Roles and photo types in the heritage section: Photography relates to work, research, and preservation and its role is to provide a documentation with good quality and detailed information of cultural heritage so that it can be kept for the next generation people.
- Camera types: film camera and digital camera
  - Film camera: the bigger the film is, the clearer the photos provided
  - Digital Camera: the bigger of the sensor and camera results in a good quality of photos
- Specification of digital camera: It depends on the specs, photos types, CCD, and its pixels.
- How to save digital photo: RAW, JPEG, and TIFF are the different types of data. When taking photos in RAW type, the data can be converted to JPEG and TIFF through computer.
- Photographing mechanism: When taking photos, we firstly need to understand aperture, shutter speed, ISO to adjust brightness of the photo. Use a fast shutter speed and wide aperture and high ISO for short and unclear item. Use a slow shutter speed and narrow aperture and low ISO for high and clear item.
- Lighting direction: Setting light at a correct angle is an important point for photographing good quality photos and documenting the information of cultural properties. There are three types of lighting: main light, side light, and back light, which can help improve the quality of the photos.
- Shooting plot: How to shoot the object changes according to the photo's concept and our needs and preference.
- Data storage: There several types of storage drives such as memory card, hard disc and optical disc (CD-R, DVD-R). For memory card, we should use it when storing photos and copying photos into computer, and we should not delete it because it can be damaged or the problem might be occurred. Hard disc is used for storing huge and big data as well as copying data from computer to safe storage. Optical disc is also a storage device which can be used for storing data for a short period of time because it is easy get damaged. In order to properly keep the data, we should keep it in a cool temperature and in many difference devices, not only in one device.
- Installing camera: For photographing cultural properties, it shall be done step by step depending on the brightness, focusing, camera installation in order to make the photos clear and can be kept for the next generation.

After attending this 6-day workshop, I aquired general knowledge as follows:

- Different types of camera: small cameras, film cameras, digital camera
- How to store the photo data
- How to set up the shooting platform

- How to set up lighting: It is important for improving the quality of image.
- Pre-photographing process: Set the camera as AV mode, check aperture at central point (9,10,11), select the Quality Image and photo size (18M), and select the Picture Style and Neutral. Then, take a photo of the blank white paper and select the Custom White Balance.
- Techniques of photography for movable and immovable cultural properties
- Installation of camera
- Camera functions

I will share new knowledge I leant from this training with my colleagues who didn't have opportunity to attend the training. Even though I don't understand the lesson deeply, at least it will become a basic knowledge for further study.

Lastly, I would like to thank the officials of the ministry, especially the Director General of the General Department of Heritage and Department of Museum for their cooperation with ACCU Nara to make this workshop in order to provide knowledge to all the trainees.

Khat Somorn
Technical Officer
Heritage Division, Department of Fine Art, Prey Veng province

Before attending the workshop, I didn't know how to correctly set the functions of camera and I simply used the default setting (auto mode). For photographing, I have never compared the quality between the picture seen by eyes and the taken photo. I only focused on how to make a sharp photo.

This 6-day workshop is also helpful for my daily work. I am now able to choose a camera that is suited to me and the degree of quality that may be used for generic purpose. Moreover, I have learned about how to use the functions of camera and many other things as follows:

- How to set aperture and ISO according to the standard and type of camera in order to take a high quality sharp photo.
- The mechanism of white balance: It is very important for photography to reproduce the correct colour (R.G.B). Before setting the custom white balance using a grey card (white side), I need to first check the place of lighting and the object to be taken.
- Required equipment for photography: For example, in a case where there are not enough professional lights for photography, we need to use electric light bulbs and stands. Light diffuser films will be required to soften the brightness of the light.
- Lighting: It is essential to take a clear photo with enough brightness. Lighting adjustment depends on the purpose and type of photos to be taken, angle of the photo preferred to be seen in detail, the position of the object to be photographed, and so on.
- Background: It is significant for any particular photo as well. The background cloth or paper in grey or white colour which is not too refractive is required for photography.
- Position of the object to be photographed: I should ensure the safety when deciding where to put the object to be photographed and avoid any danger from happening. Lightning adjustment also depends on the position of the object.
- Focusing: When starting to photograph after setting the aperture, ISO, shutter speed, and white balance, as well as organizing a place for the object to be photographed, background, and lighting, we need to adjust the focus to ensure the clear depth of the photo. The dimension of the focus depends on the aperture.
- Storage: We also need to understand the storage location of shot photos.
- Defining a place to be photographed and selecting the time of photographing: Since some places have natural light, it is difficult to photograph at the specified spot at a particular time.

This workshop is very beneficial for professionals in the heritage sector to extend their knowledge on documentation. Through this 6-day workshop, I have acquired new photographic techniques to help the cultural heritage sector in Cambodia. This knowledge is very useful for my job, enabling me to perform my daily work more effectively and take better quality photographs. I will share the new knowledge and experiences with those who were unable to attend the workshop as well.

Thun Sopheaktra
Director of Museum
Heritage Division, Department of Culture and Fine Arts,
Kampong Thom Province

Through this workshop, I have gained new knowledge and skills on how to use Cannon camera and discovered its benefits as follows:

- How to photograph movable cultural properties and architecture
- Types of cameras for use in heritage works
- How to use a camera in the heritage conservation work for photographic documentation
- Camera functions useful for the heritage conservation such as sensors, pixels, ISO, aperture, and shutter speed
- Necessary equipment for photography: Such as electric light bulbs, light diffuser films, assistance light, background white paper, and grey card
- We have to set aperture, shutter speed and ISO when shooting, place the camera chest-high or in the middle of the objects. Then move the camera closer to the objects and set white balance.
- How to store photographs inside the camera and computer. There are three types of photograph format:
  1. RAW is a file with the fullest details of the captured images but it has to be converted using computer; otherwise we will not be able to view the images.
  2. JPEG is a compressed image (small size) but it doesn't loss the image quality. It can be viewed in the computer without converting.
  3. TIFF is a lossless compressed image maintaining the integrity and clarity.
- How to properly keep the films and photographs and store the data in the computer: To keep the original files, we need to copy the files into local disk with the convertible format. We can also store our images inside the camera's memory but it will be full. It is better to select the image format than delete or cut the images.

How can I apply the knowledge given in the workshop to my work?

- I will share the know-how to the officials at all levels who want to learn this photographic technique such as: photography for movable objects (wooden, stone, metal objects, pottery, and ceramic) and photography for architecture (temples and monasteries).
- To conduct a practical training on photography for cultural properties using available museum collections including movable and immovable objects.

Acknowledgement
The "ACCU Workshop for Protection of Cultural Heritage" has successfully ended. I would like to extend my sincere thanks to His Excellency Prak Sonnara, Secretary of State of Ministry of Culture and Fine Arts, representative of Lok Chumteav, the Minister of Culture and Fine Arts, and ACCU Nara as well as all the officials who seamlessly and successfully conducted this workshop.

I am so grateful to attend this workshop as it gave me the clearest understanding of how each camera function works and how to shoot objects and buildings.

Request
In my own capacity as a Director of Kompong Thom Museum, I would like this "ACCU Workshop for Protection of Cultural Heritage" to be conducted again at other provinces in the Kingdom of Cambodia in order to strengthen and develop the capacity of the officials working at the field of cultural heritage conservation.

Chhorn Bunhak
Deputy Head of the Provincial Museum
Heritage Division, Department of Culture and Fine Arts,
Takeo Province

First and foremost, I would like to express my profound gratitude to the Office of Cultural Heritage Cooperation, Asia-Pacific Cultural Centre for UNESCO (ACCU) and the Agency for Cultural Affairs (Bunkacho) for the contribution in arranging the workshops on the topic of technical photographic skills for cultural heritage with overwhelming support and leadership from the Ministry of Culture and Fine Art.

Although the workshop is short (6 days), it was great significant and valuable for the participants from all over the provinces and capital in Cambodia because we have only taken casual photos of cultural heritage up until this point. The participants who attended the courses on photography for cultural heritage have learned the knowledge and techniques from the Japanese instructors.

Before the lesson started, the instructors asked participants how we usually take a phot of cultural heritage and how we preserve it. After being asked the question, we participants have kept it in mind and pay close attention to studying photography for cultural heritage. At the same time, the instructors explained the usage of certain types of camera and the principles of photography. The photographic technique for cultural properties has three advantages: (1) easy to manage, (2) applicable for scientific, historical and artistic researches, (3) be crucial evidences for cultural properties that have been lost or illegally taken out of country.

Furthermore, the instructors have taught some theories on how to adjust camera functions to take good photos of cultural heritage as follows:

1. Setting the right adjustment in the camera when shooting cultural heritage photos in the studio, outdoor, and knowing how to set up camera stance when shooting
2. Using the standard lighting when shooting
3. Knowing the techniques for shooting certain artistic objects with elaborate designs
4. Using certain equipment in the process of shooting to get the best result (artistic object shooting techniques from above and from the sides)
5. Going outdoor shooting (large-scale photos)
6. Adjusting the right size and scale of the photos
7. Knowing how to preserve the photos for future documents

After the 6-day training, I have gained new experiences and skill in shooting the technically accepted cultural heritage photo. It is also an opportunity to build the capacity of specialized officials in shooting high quality photos. Hence, after I have obtained this knowledge from the Japanese instructors, I shall continue to explore deeper into this expertise to the extends of my ability as well as to utilize it in the advantage of my unit and spread the knowledge to those who have not the opportunity to attend the workshop.

Cheng Vanna
Deputy Director of Provincial Department
Heritage Division, Department of Culture Fine Art,
Banteay Meanchey Province

I have learned about:

1. Roles and types of heritage photographs
2. Types of camera
3. How to store digital image
4. Functions of aperture, shutter speed, and ISO
5. How to set colour balance
6. Front shooting, overhead shooting, and shooting immovable objects

I will use all the knowledge and skills obtained from this workshop to shoot architectural heritage photography, artistic objects, pottery and ceramic, as well as to share what I have learned to the officials who missed the opportunity to attend this workshop.

Khom Sreymom
Conservator
Sculpture of Stone Conservation Workshop, National Museum of Cambodia

In this workshop which focused on photography for cultural properties stored in the museums. I learned how to shoot objects with high quality in accordance with the standard and other knowledge as follows:

1. Mechanisms of the camera and the basic of photography
2. Setup of the shooting platform in accordance with the standard
3. How to position the camera and the objects for shooting
4. Lighting technique
5. Storing of photograph data
6. Photographic techniques for each object
7. Photographic techniques for building

I will be able to apply the knowledge given in the workshop to my photography practical work for the stone and wood objects such as:

1. Installation of movable shooting platform at stone conservation workshop
2. Photographing objects based on the techniques and lessons gained from the workshop
3. Dissemination of lessons to the team

I would like to extend my sincere thanks to the instructors and staff members of ACCU for their efforts to teach us the photographic skills to Cambodian officials which are necessary for photographing the cultural properties inside and outside the museums.

San Chanthoeurn
Technical Officer (Museum Office)
Heritage Division, Department of Culture and Fine arts,
Kampong Chhnang Province

Throughout this important workshop, I have learned the basic of photography for cultural heritage. The theme met our needs as we need we need high-quality photographs for research of cultural heritage and use and keep it for a long period.

The instructors explained about the importance of the photographs. We learned about the camera functions, types of camera, specification of the digital camera, and how to store digital photographs.

In the practical training, we were divided into groups to prepare the shooting table and background, lighting kits, arrangement of small objects for shooting, installation of camera stands, and camera setting according to what we were taught. Beside shooting small movable objects, the instructor also taught us how to shoot large statues and large stone inscription with small letters carved on the stone. Moreover, the participants learned how to shoot the boat which is the part of the National Museum collections. During the practical training, there were many questions from the participants and the instructors answered all of them with details and clear explanations.

Currently, I am working for the Museum Office of Kompong Chhnang Provincial, Department of Museum and Fine Arts, where all the ancient objects need to be stored properly. Many of the objects inside the storage room and the objects displayed at the museum have not been registered or properly photographed yet.

Fortunately, the Ministry of Culture and Fine Arts had conducted the workshop on the protection of cultural heritage in collaboration with ACCU, which gave me and other officials the opportunity to learn how to shoot high-quality photographs and how to store and preserve those photographs for a longer period. I will apply the photographic technique learned from this workshop to the photography work for museum objects and other historic sites in order to register and document those heritages for the next generation.

Last but not least, I would like to extend my sincere thanks to the officials of the Ministry of Culture and Fine Arts who have conducted this workshop for capital and provincial officials in order to teach them the standard of photographic technique and help them perform their conservation tasks more effectively and efficiently.

I also would like to thank to ACCU team for their efforts to train and teach the photographic techniques for cultural heritage protection. I strongly hope that ACCU will continuously conduct such workshop or other trainings for heritage experts in Cambodian.

I wish the officials of the Ministry of Culture and Fine Arts, ACCU team and the participants the best of luck.

Khun Sathal
Chief of Education Office
Education Office, National Museum of Cambodia

I have learned a basic knowledge of using camera, setting and function of camera for taking cultural properties, setting the appropriate aperture and shutter speed, white balance, and colour temperature. I have also learned to set up a simple studio for taking photographs with local available materials and understood the shooting technique for movable objects and immovable objects.

As I have learned how to take photographs appropriately, I can take nice photographs for any exhibition work and publication for the education office.

Sharing the knowledge gained from the workshop to my colleague is one of the things that I can do as well.

Muong Chanraksmey
Staff
Inventory and Documentation, National Museum of Cambodia

I have learned how to apply the proper technique of taking pictures for cultural heritage. Those include light control, camera setting, space, background, and other key concepts of producing the professional photograph.

I would like to apply these methods and techniques in the field of heritage, which involves both history and archaeology where I am based in. I will also be happy to disseminate these methods to the colleagues and students in the future, which will help them to achieve their research and work in any circumstances.