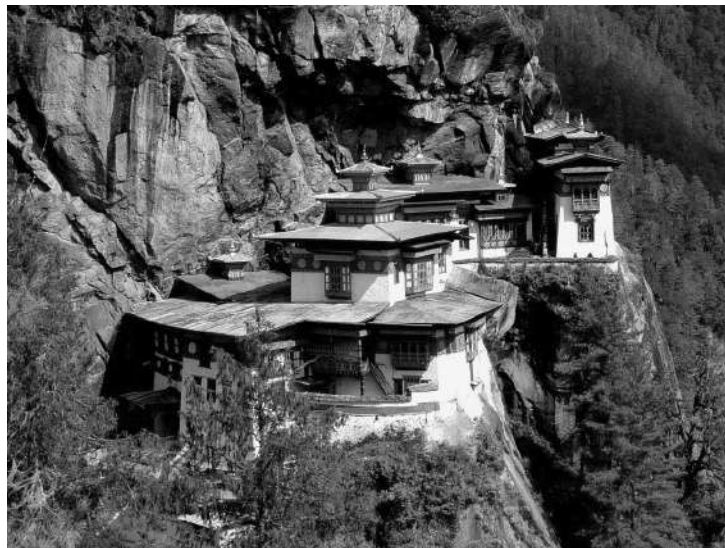


Training Report

on

Cultural Heritage Protection

**Training Course for Researchers in Charge of Cultural Heritage Protection
in Asia and Pacific 2014 - Kingdom of Bhutan -**
11 November - 5 December, 2014, Nara, Japan



Cultural Heritage Protection Cooperation Office,
Asia-Pacific Cultural Centre for UNESCO (ACCU)
Agency for Cultural Affairs, Japan
Nara National Research Institute for Cultural Properties

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Opening Ceremony at ACCU Nara Office



On-site training: Horyu-ji Temple with local guide (right), World Heritage Site



A lecture by Mr Nakamura at photo studio in NNRICP



Practical training on photography in the studio at NNRICP



Practical training on using 4×5 camera at Nara Place Site, World Heritage Site



Practical training on digital photography outdoor at Nara Place Site



Practical training on digital photography of traditional building at Hase-dera Temple



Practical training at Hase-dera Temple



Mr Kaneda lectured a demonstration of photographing using a helicopter drone loaded with a camera.



Practical training on developing photographs at NNRICP



Practical training on photo layout for publication



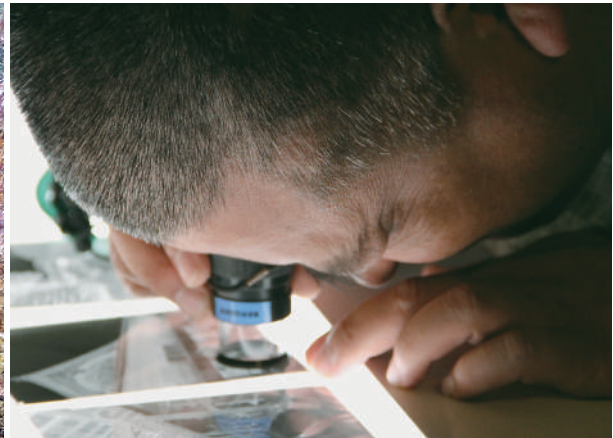
A lecture on digital photography processing



Observation of restoration site at Chion-in Temple



With coloured autumn leaves at Ryoan-ji Temple,
World Hritage Site



Detail examination (adobe)
Shutter value adjusting (below)



A lecture on photography of textile at the studio of Shoso-in Treasure House



Closing Ceremony at ACCU Nara Office

Preface

The Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU Nara) was established in August 1999 with the purpose of serving as a domestic centre for promoting cooperation in cultural heritage protection in the Asia-Pacific region. Subsequent to its establishment, our office has been implementing a variety of programmes to help promote cultural heritage protection activities, in close cooperation with the Agency for Cultural Affairs, Japan (*Bunkacho*); National Institutes for Cultural Heritage, National Research Institute for Cultural Properties, Nara; the Nara Prefectural Government; the Nara Municipal Government; universities; and museums.

The ACCU Nara's activities encompass training programmes for the human resources development; international conferences and seminars; the website for the dissemination of information relating to cultural heritage protection; and the world heritage lectures in local high schools. In addition to those, ACCU Nara offers "Local Training Workshop" which dispatches a group of lecturers from Japan to one of Asia-Pacific countries and implements the practical training on cultural heritage protection on sites. Besides, we annually appoint "International Correspondent" from each country for the purpose of establishing closer ties with the countries in the Asia-Pacific region, who will periodically send latest reports on cultural heritage protection in their country.

Our office has been conducting two types of the training course in Nara: for the group and for the individuals. The Group Training Course offers the opportunity to sixteen experts from Asia-Pacific region for about one month with two themes in alternate years: "Preservation and Restoration of Wooden Structures" and "Research, Analysis, and Preservation of Archaeological Sites and Remains." Meanwhile, the Individual Training Course is organised for a few experts from one country on the specific theme according to their requests.

In Kingdom of Bhutan, it is pointed out that tangible and intangible cultural heritage that take over the tradition are at risk of altering and crumbling rapidly. Especially, there is a need to take prompt countermeasures to conserve structures including vernacular houses and temples and documents such as sutra. In addition, accumulation of expertise and funds to respond these situation are not enough. The tasks such as acquirement of knowledge and practical techniques for documentation and conservation of cultural heritage and development of human resources have been addressed as the urgent priorities.

With this situation in mind, and in response to a request from Department of Culture, Ministry of Home and Cultural Affairs of kingdom of Bhutan, ACCU Nara has decided to invite officials with a purpose of providing the broad knowledge and practical techniques of photography and documentation of cultural heritage and digital data management and utilisation.

We would like to express our sincere appreciation to Agency for Cultural Affairs, Japan (*Bunkacho*); Nara National Research Institute for Cultural Properties; Saidaiji Photo Studio; Nara National Museum; Takenaka Carpentry Tools Museum; Disaster Reduction and Renovation Institution of Kobe City; Hase-dera Temple; Kyoto Prefectural Board of Education; Shosoin Treasure House; Hyogo Prefectural Board of Education; Kobe Municipal Board of Education; Tokyo National Museum; Historiographical Institute, The University of Tokyo; National Museum of Japanese History; Nara Prefectural Board of Education; Nara Municipal Board of Education for their cooperation and support.

NISHIMURA Yasushi

Director

*Cultural Heritage Protection Cooperation Office,
Asia-Pacific Cultural Centre for UNESCO (ACCU)*

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I. Introduction

1. General Information
2. Programme Schedule



With lecturer, interpreter and Buddhist monks of Hase-dera Temple

1. General Information

**Training Course on Cultural Heritage Protection in Asia
and the Pacific 2014 – Kingdom of Bhutan –
(11 November – 5 December 2014, Nara)
—Photographic Documentation of Cultural Heritage
and Management/Utilisation of Digital Data—**

1. Organisers

The course is jointly organised by Agency for Cultural Affairs, Japan (*Bunkacho*); Asia-Pacific Cultural Centre for UNESCO (ACCU); and National Institutes for Cultural Heritage, Nara National Research Institute for Cultural Properties.

2. Background

Kingdom of Bhutan is located at South Asia and bordered to the north by China and to the south by India. Its total area is approximately 38,000 km² and population is approximately 720,000. Buddhism is the state religion. Kingdom of Bhutan is known for modernising while protecting and passing on their unique traditional culture. Bhutanese law requires various items to respect their own traditions. For example, it is mandatory to offer education for tradition and to wear national dress on formal occasions, and the traditional architectural style must be observed to construct and restore buildings.

However, it is pointed out that tangible and intangible cultural heritage that take over the tradition are at risk of altering and crumbling rapidly. Especially, there is a need to take prompt countermeasures to conserve structures including vernacular houses and temples and documents such as sutra. In addition, accumulation of expertise and funds to respond these situation are not enough in Kingdom of Bhutan. The tasks such as acquirement of knowledge and practical techniques for documentation and conservation of cultural heritage and development of human resources have been addressed as the urgent priorities.

Based on this current situation in Kingdom of Bhutan and in response to a request from Department of Culture, Ministry of Home and Cultural Affairs of Kingdom of Bhutan, ACCU Nara Office has decided to invite officials with a purpose of providing the broad knowledge and practical techniques of photography and documentation of cultural heritage and digital data management and utilisation.

3. Date and Venues

Date: 11 November (Tue.) to 5 December (Fri.) 2014. [25 days]

Venues: Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU); Facilities and museums of cooperating organisations.

4. Objective of the Training Course

This individual training course aims at providing participants with the broad knowledge and practical

techniques for photography and documentation of cultural heritage and digital data management and utilisation (photography techniques, digital data storage and management system).

5. Training Curriculum

- Photography Techniques for Remains and Artefacts
- Digital Data Management and Utilisation
- Management and Utilisation of GPS/GIS Data etc.

6. Participants

Director of Department of Culture, Ministry of Home and Cultural Affairs of Kingdom of Bhutan recommended three person as participants for the course as below.

Kinley Gyeltshen (Mr)

Executive Engineer, Division for Conservation of Heritage Sites

Department of Culture, Ministry of Home and Cultural Affairs

Date of Birth: 24 February 1964 (Age 50)

Leki Wangchuk (Mr)

Senior Conservation Engineer, Division for Conservation of Heritage Sites

Department of Culture, Ministry of Home and Cultural Affairs

Date of Birth: 25 April 1972 (Age 42)

Phuntsho Wangmo (Ms)

Engineer, Division for Conservation of Heritage Sites

Department of Culture, Ministry of Home and Cultural Affairs

Date of Birth: 12 January 1989 (Age 25)

7. Others (Past achievement to accept participants)

Since 2000 when the above-mentioned invitation programme started, 54 participants from 18 countries have been accepted.

8. Certificate

Each participant will be awarded a certificate upon the completion of the course.

9. Language

English is the main working language of the course.

10. Expenses

Expenses for the training course will be borne by ACCU Nara Office and comprise the following:

(1) Travel expenses:

Each participant will be provided an economy-class return air ticket between the international airport

nearest to their residence and Kansai International Airport (KIX), and domestic transportation costs between KIX and their accommodations in Nara.

(2) Living expenses:

Participants shall be provided the basic living expenses incurred from the day before the training course to the next day of the final day, 10 November (Mon.) to 6 December (Sat.) 2014 in principle. Arrangements and payment for accommodations will be made by ACCU Nara Office. Also, the accommodation expenses on the way to and/or from Japan will be covered by ACCU Nara Office.

11. Secretariat

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Asia-Pacific Cultural Centre for UNESCO (ACCU)
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e-mail: nara@accu.or.jp

2. Schedule

Individual Training Course Schedule 2014 (11 November - 5 December)

	Date	9:30-12:30	13:30-16:30	Lecturer	Venue
November	11 Tue.	10:00 Opening Ceremony	Orientation to the Programme	ACCU Nara	ACCU Nara
	12 Wed.	Buddhist Monuments in the Horyu-ji Area	Historic Monuments of Ancient Nara	ACCU Nara	Horyu-ji Temple / Todai-ji Temple
	13 Thur.	Introduction to Photographs of Cultural Properties	Introduction to Digital Photographic Records	NAKAMURA Ichiro	NNRICP
	14 Fri.	Basic Knowledge about Camera and Introduction to Photography	Digital Photography in the Studio	NAKAMURA Ichiro	NNRICP
	15 Sat.				
	16 Sun.				
	17 Mon.	Digital Photography Outdoor	Introduction to Photography of Traditional Building	NAKAMURA Ichiro	NNRICP
	18 Tue.	Photography of Traditional Building		SUGIMOTO Kazuki	Hase-dera Temple
	19 Wed.	Method for Recording/Documentation of Cultural Heritage with Laser Scanning and SfM		KANEDA Akihiro	NNRICP
	20 Thur.	Digital Photography in the Studio and Outdoor	Introduction to Photograph Image Processing	NAKAMURA Ichiro	NNRICP
	21 Fri.	Risk Management for Cultural Heritage I		MURAKAMI Yasumichi	Preservation Districts for Groups of Historic Buildings, Kobe City
	22 Sat.	Traditional Craftsmanship and Conservation of Tools	Risk Management for Cultural Heritage II	SAKAMOTO Tadanori	Takenaka Carpentry Tools Museum/ Disaster Reduction and Renovation Institution
	23 Sun.				
	24 Mon.				
	25 Tue.	Introduction to Digital Photograph Processing	Digital Photograph Processing	NAKAMURA Ichiro	NNRICP
	26 Wed.	Digital Photography in the Studio and Outdoor/Utility for Publication		NAKAMURA Ichiro	NNRICP
	27 Thur.	A Study Tour: Photography and Management/Utilisation System of Photographic Data at a National Museum		FUJISE Yusuke	Tokyo National Museum
	28 Fri.	A Study Tour: Photography and Management/Utilisation System of Photographic Data of Documents		TANI Akiyoshi	Historiographical Institute The University of Tokyo
	29 Sat.	A Study Tour: Photography and Storing Management/Utilisation System of Photographic Film and Data		KATSUTA Toru	National Museum of Japanese History
	30 Sun.				
December	1 Mon.	Historic Monuments of Ancient Kyoto		ASAI Ken'ichi	Chion-in Temple/ Kinkaku-ji Temple/ Ryoan-ji Temple
	2 Tue.	Evaluation of photographs	Summary: Photographic Documentation of Cultural Heritage and Management/Utilisation System of Digital Data	NAKAMURA Ichiro	NNRICP
	3 Wed.	Photography and Management/Utilisation System of Photographic Data of Passed Down Art Objects	Exhibition of Buddhist Art in Practice	KITADA Hitoshi / NOJIRI Tadashi	Shoso-in/Nara National Museum
	4 Thur.	Writing Final Reports			ACCU Nara
	5 Fri.	Submission of Final Report/Closing Ceremony			ACCU Nara

ACCU Nara: Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO

NNRICP: Nara National Research Institute for Cultural Properties

II. Summary of Training Course



At Kinkaku-ji Temple, Kyoto

Summary of Training Course

11 November (Tue.)

■ Opening Ceremony / Orientation to the Programme

- An opening ceremony was held from 10:00am at the ACCU Nara Office. Mr Nishimura, Director of ACCU Nara Office, delivered a welcome address, followed by Mr Nakamura, an official research photographer of the Nara National Research Institute for Cultural Properties (hereinafter, “NNRICP”), one of the institutions co-hosting the programme. After the introduction of the ACCU staff members, the three training participants introduced themselves.
- At the orientation, the ACCU secretariat provided precautions regarding the training including safety issues as well as an overview of Japan’s cultural property administration and the corresponding protection system/frame work. Furthermore, the secretariat roughly explained about the Nara period (710–794) and the Nara Palace/Capital. In addition, the training participants saw the “Shoso-in (treasure house) Exhibition” being held at the Nara National Museum.



Message from Mr Nakamura



Orientation at ACCU Nara Office

12 November (Wed.)

■ Buddhist Monuments in the Horyu-ji Area / Historic Monuments of Ancient Nara

KOBAYASHI Ken'ichi (ACCU Nara Office)

- First the participants listened to an explanation about Horyu-ji Temple from a local guide. After passing through the South Gate and the Central Gate, the participants had a study tour around the Western Precinct (Five-stories Pagoda, Main Hall, and Lecture Hall), Great Treasure Gallery (Exhibition facility), and the Eastern Precinct, listening to explanations at each location.
- In the afternoon, the participants visited the East Palace Garden of the Nara Palace Site, then went to Todai-ji



Observation of Horyu-ji Temple,
World Heritage Site



At Todai-ji Temple, World Heritage Site



At East Palace Garden, World Heritage Site

Temple. After taking a look at the exterior structure of the Shoso-in (treasure house), the participants visited the Great South Gate, where an explanation was provided describing the advantages and disadvantages of reinforcement using iron materials. Then, the participants toured the Great Buddha Hall, Hokke-do Hall, Nigatsu-do Hall and a bell tower.

13 November (Thur.)

■ Introduction to Photographs of Cultural Properties /

Introduction to Digital Photographic Records

NAKAMURA Ichiro (NNRICP)

- At the beginning, the lecturer showed participants facilities such as the darkroom, image processing room, photographing studio, etc., and this was followed by a basic lecture in photography in accordance with a textbook, including the roles of the photograph of cultural properties, photographing mechanism, different uses of various cameras and various cultural property photos.
- In the afternoon, the participants attended a lecture on problems that have occurred due to changing cultural property photography from film to digital, as well as the basic knowledge of digital cameras, centering around the structure of digital cameras and digital sensors.

At 3:00 pm, the participants visited Mr Matsumura, Director General of NNRICP, for a courtesy visit.



Mr Nakamura showed facilities in NNRICP.



With Director General of NNRICP

14 November (Fri.)

■ **Basic Knowledge about Camera and Introduction to Photography /**

Digital Photography in the Studio

NAKAMURA Ichiro (NNRICP)

- The lecture started by reviewing the basic knowledge necessary for photography. The correlation between iris, shutter speed and ISO speed was covered, following which, the participants learned about the mechanism and theory by using a large camera. Subsequently, they attended a lecture on outdoor photography using a large camera, followed by practical training using the large camera.
- In the afternoon, the participants visited an excavation site to watch actual photography being conducted on site. After returning to the studio, the participants learned further points about outdoor photography.

17 November (Mon.)

■ **Digital Photography Outdoor / Introduction to Photography of Traditional Buildings**

NAKAMURA Ichiro (NNRICP)

- The lecturer explained about the type of lighting; then, explained how to practically use lights in practice. In addition, the lecturer demonstrated practical photographing to explain lighting for



A lecture on basic knowledge necessary for photography



A training by using large format camera



Using a light meter to set apperture and shutter speed



Practical training on photography

photography for cultural properties and correction methods. Subsequently, the training participants undertook a practical photography session.

- The lecturer explained how to photograph architectural structures of cultural properties without distortion and to take a sharp photo in focus, while showing various sample photographs. Subsequently, the training participants practiced photographing outdoors. Furthermore, the lecturer described how to adjust the degree of brightness when photographing so that architectural structures of cultural properties can be exactly observed via the photos thus taken.

18 November (Tue.)

■ **Photography of Traditional Building**

SUGIMOTO Kazuki (Saidaiji Photo Studio)

- On the way to Hase-dera Temple, the participants visited Isonokami Shinto Shrine to see the Worship Hall of Izumo-takeo Shrine, designated as a National Treasure.
- At Hase-dera Temple, Mr Takeyama Shoshun, the secretary of the Buzan Sect of Shingon Buddhism, explained about the precincts of the temple. After that, the participants undertook a practical training session by photographing within the precincts. At the beginning, the lecturer explained about using a tripod, determining composition, measuring exposure, etc. After that, each participant practiced such settings.



On-site training at Hase-dera Temple

-In the afternoon, a practical photographing session using large cameras was held. The participants took photos, determining composition by themselves. In the main hall of Hase-dera Temple, they set lighting and took photos of mural paintings as on-site training.

19 November (Wed.)

■ Method for Recording/Documentation of Cultural Heritage with Laser Scanning and SfM

KANEDA Akihiro (NNRICP)

-In the morning, the lecturer explained about 3D measurement as one of the recording methods of cultural properties. After introducing several 3D measurement methods to be selected depending on measuring objects or purposes for measurement, the lecturer generally explained about the most popular method of laser scanning and photogrammetry including its mechanism and measurement methods.

-In the afternoon, the training participants practiced taking actual measurements by using the devices. First, they obtained data through a laser scanner, then, inspected the results via computer. After that,



A lecture by Mr Kaneda (left: explanation of 3D measurement, right: a helicopter drone loaded with a camera)

the participants took photos of foundation stones with a digital camera, and created 3D models by using software.

-In addition, the participants watched a demonstration of photographing using a helicopter drone loaded with a camera.

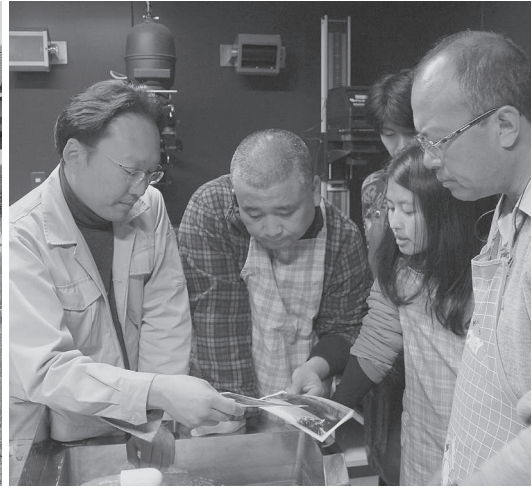
20 November (Thur.)

■ Digital Photography in the Studio and Outdoor / Introduction to Photograph Image Processing

NAKAMURA Ichiro (NNRICP)

-The lecturer explained about determining composition corresponding to a photographic theme, followed by the method of overhead photography, as well as importing photo data into a computer. Following this, the participants practised outdoor photography including setting up a tripod, setting the exposure and shutter speeds, and getting a composition, etc. in detail in the East Palace Garden of Nara Palace Site.

-In the afternoon, the participants experienced the processing of works including exposure, development, fixing, washing and dry finishing in the darkroom. They developed the photo films they took at Hase-dera Temple onto photographic paper.



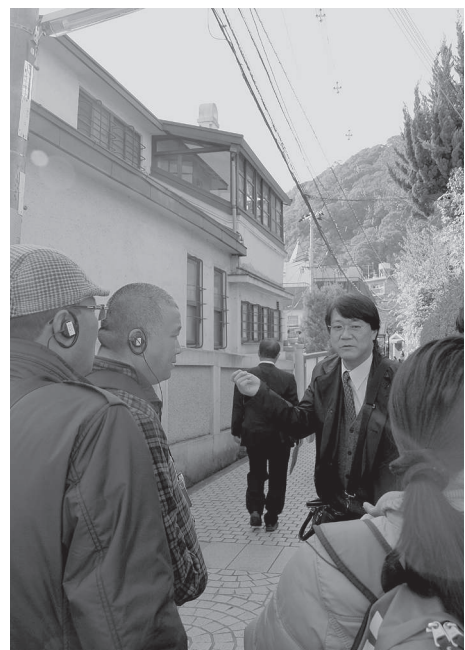
Practical training on digital photography outdoor at East Palace Garden and photo development at the dark room

21 November (Fri.)

■ Risk Management for Cultural Heritage I

MURAKAMI Yasumichi (Hyogo Prefectural Board of Education)

- The lecturer noted that it is always possible that administrative officials themselves may also be victims of a disaster. He discussed about the importance of preparing for disasters before any actual occurrence by specifically anticipating a broad range of disasters that might occur, citing case examples of the disasters that have occurred in the past.
- In the afternoon, the participants inspected the case examples in which cultural properties were damaged due to disaster. The participants received detailed explanations about restoration methods and way to approach them at the Weathercock House and Moegi House.



A lecture by Mr Murakami in Kobe City

22 November (Sat.)

■ **Traditional Craftsmanship and Conservation of Tools / Risk Management for Cultural Heritage II**

SAKAMOTO Tadanori (Takenaka Carpentry Tools Museum)

-At the Takenaka Carpentry Tools Museum, Mr Sakamoto Tadanori explained about the process of carpentry-tools development, as well as exhibited articles. Meanwhile, a full-scale model of a *sukiya* house (lit. an architecture of tea-ceremony house, style) which is not plastered to show the framework, is on exhibition. Mr Sakamoto explained the Japanese spirit of architecture.

-In the afternoon, the participants visited the “Disaster Reduction and Human Renovation Institution” that preserves detailed records of the damage caused by the Great Hanshin-Awaji Earthquake. Accordingly, the participants could gain comprehensive knowledge in order to prepare for natural disasters, such as a range of information about earthquake mechanisms and disaster prevention.



A lecture by Mr Sakamoto



A display of traditional carpentry tools

25 November (Tue.)

■ **Introduction to Digital Photograph Processing / Digital Photograph Processing**

NAKAMURA Ichiro (NNRICP)

-The lecturer explained that the purpose of the lectures of these two days was for the participants to complete a flow of work from colour correction of photos, printing, and to a layout for a publication.

-Today, the participants started the review of processing digital photos. Although there are many types of image processing software, at this lecture, a free software title was used. After the lecturer provided a briefing on the use of this software (e.g., the methods of lightness, contrast, shadow compression etc.), the participants practiced colour correction and printing of the photos they took themselves.

26 November (Wed.)

■ **Digital Photography in the Studio and Outdoor / Utility for Publication**

NAKAMURA Ichiro (NNRICP)

-In the morning session, the lecturer provided the basic knowledge of publication making. He explained the typical layout of photos and its theory by showing samples. After that, the participants practiced colour correction, selection, printing of photos, and pasting them for a layout.



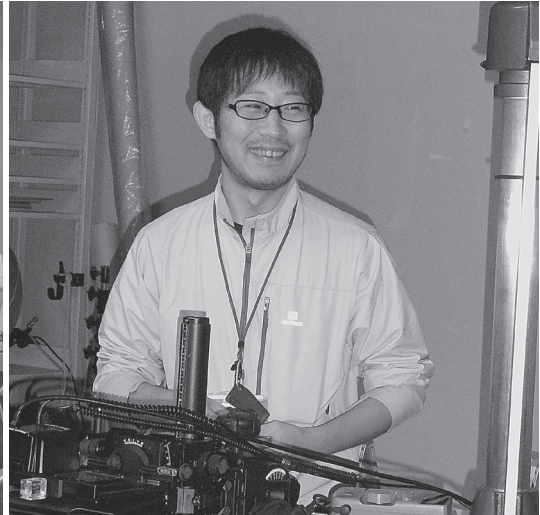
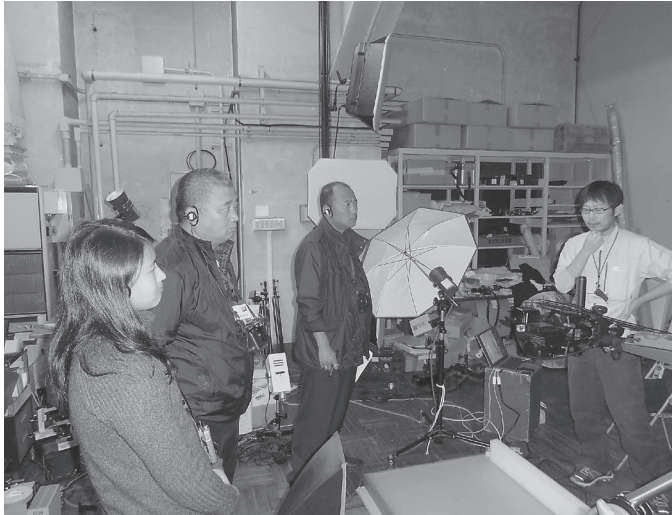
Practical training on digital photograph processing and its layout

27 November (Thur.)

■ A Study Tour: Photography and Management/Utilisation System of Photographic Data at a National Museum

FUJISE Yusuke (Tokyo National Museum)

- To begin, the lecturer introduced the photographic facilities of the Tokyo National Museum, followed by explanations regarding the fact that the applications of photography of the museum include the creation of catalogues, current-status recording, etc.. After that, while actually taking photos of a bronze mirror, the participants listened to an explanation about the division of roles between a cameraman and a curator in photographing artefacts. Furthermore, the participants visited the photograph archive room for the management of the photographic data after the photos were taken, and heard about the data management system.
- Finally, at the Heiseikan hall, the participants listened to an explanation of exhibition concepts such as exhibition layout, lighting, etc. from the staff member in charge.



A lecture by Mr Fujise

28 November (Fri.)

■ **A Study Tour: Photography and Management/Utilisation System of Photographic Data of Documents**

TANI Akiyoshi and TAKAYAMA Sayaka (Conservation Laboratory, Historiographical Institute, The University of Tokyo)

- The lecturer provided a briefing on the work of the Historiographical Institute and the Conservation Laboratory of the University of Tokyo. At the Historiographical Institute, a photography manual is prepared so that even a researcher can take photos that conform to a certain standard. In accordance with the manual, the lecturer demonstrated the photographic procedure by setting up a tripod and camera, connecting them to a computer, lighting, and photographing.
- In the afternoon, the participants moved to a photography studio, and had a briefing about the facilities thereof. In accordance with the procedures explained in the morning, the participants took photos of real historical objects. Subsequently, the participants toured around an image processing laboratory and a photograph data archive room.
- Lastly, the participants visited each lab of tracing, reproduction and restoration.



Observation of the studio



With the lecturers

29 November (Sat.)

■ **A Study Tour: Photography and Storing Management/Utilisation System of Photographic Film and Data**

KATSUTA Toru (National Museum of Japanese History)

- The participants learned about the management system at the acoustic imaging data storage room, the facility to store data related to photos, movies, recording transcriptions, etc.. Room temperature/humidity is kept constant, meanwhile, photographic films are stored in neutral-paper boxes.
- In addition, there is an acclimation room to buffer rapid change when bringing material out from the storage room. According to the lecturer, when lending a photo, they provide a copy, not the original.
- After an explanation of the photography studio and the image retrieval system, the participants observed an actual state of photo-panel utilisation at the exhibition room of the museum.



A lecture by Mr Katsuta

1 December (Mon.)

■ **Historic Monuments of Ancient Kyoto**

ASAI Ken'ichi (Kyoto Prefectural Board of Education)

- At the restoration site of the Mieido (lecture hall) of Chion-in Temple, the lecturer briefed participants about the repair, selection method of the construction members to be repaired (centering around roof tiles), and production method for new construction members. The participants asked many questions, including about nail intervals, material of nails, and whether the nail holes are damaged. They also asked about the cost and reuse of an iron shelter used for another restoration sides. After that, the participants watched carpentry closely.



The sheltered restoration site



The lecturer, Mr Asai



Observation of carpentry work in restoration site at Chion-in Temple



At the garden in Kinkaku-ji Temple



At Kinkaku-ji Temple

-In the afternoon, the participants toured Kinkaku-ji Temple and Ryoan-ji Temple, the “Historic Monuments of Ancient Kyoto”, World Heritage Sites.

2 December (Tue.)

■ Evaluation of photographs / Summary: Photographic Documentation of Cultural Heritage and Management/Utilisation System of Digital Data

NAKAMURA Ichiro (NNRICP)

-In the morning, the participants continued to work on their layouts. After the completion of the layouts, the lecturer commented on each participant’s work and photographs.

-In the afternoon, the lecturer explained about the “Preservation of Cultural Properties Photography Centering on Digital Records”, through which he briefed the weak points of storage media including

memory cards, HDD, optional disks (BD-R, DVD-R), etc.. In addition, the lecturer discussed the necessity to save photographic data as TIFF, JPEG, or PDF format files, and to store copies in several locations, not a single location.

3 December (Wed.)

■ **Photography and Management/Utilisation System of Photographic Data of Passed Down Art Objects / Exhibition of Buddhist Art in Practice**

KITADA Hitoshi (Shoso-in treasure house) and NOJIRI Tadashi (Nara National Museum)

- After visiting Shoso-in, the participants moved to the studio of the Shoso-in office, where they observed the actual photographing of silk fabrics with patterns. They learned a method to create clear and detailed pictures of those patterns by adjusting the lighting.
- At the Nara National Museum, the participants listened to an overview of the exhibition, collection, and research study around Buddhist art, and toured the exhibitions of the museum.



A lecture on taking photograph of silk fabrics with patterns by Mr Kitada (right)



Observation of Buddhist Art Library in Nara National Museum

4 December (Thur.)

■ **Writing Final Report**

The Participants prepared their reports of the training programme.

5 December (Fri.)

■ **Submission of Final Report / Closing Ceremony**

- After the participants submitted their final reports, the closing ceremony began. Mr Nishimura, Director of the ACCU Nara Office, made an address, followed by Mr Nakamura, an official research

photographer of NNRICP, an institution co-hosting this program, and presented a training-completion certificate to each participant.

-The participants expressed their deep gratitude for their wonderful experiences as well as their hopes to convey their knowledge and know-how gained from this training to their colleagues in Bhutan upon their return.



Closing Ceremony at ACCU Nara Office

III. Country Reports by Participants



The Garden at Ryoan-ji Temple, World Heritage Site

Kinley Gyeltshen

Executive Engineer

Division for Conservation of Heritage Sites

Department of Culture

Condition of Heritage Sites in Bhutan

Preface (with a brief to introduction on Bhutan)

Bhutan is a small developing country situated between China and India with its border extending from the southern foothills of India to the greater northern Himalayas. The country is mountainous with an altitude ranging from 200 m above mean sea level to 7000 m from south to north. Altitude is one key factor that contributes to the marked differences in climate among the various regions of the country. Bhutan is also characterized by dense forest growth with coverage estimated to about 70%.

Bhutan was a country closed to the outside world until the 1950s, when it eventually abandoned its policy of isolation and moved towards modernization under the guidance of the third king. However, at the same time, it is not completely true to state that Bhutan was completely cut off from the rest of the world. This was impossible as Bhutan had to rely on neighboring states or countries for many essential commodities, for which people had to cross the border and exchange with goods of their own. Although on a very small scale, such trade and interactions inevitably paved the way for outside influences on Bhutan's art, culture and architecture, nonetheless, the rugged mountains, thick forest and extreme climatic conditions proved huge barriers, restricting such movements and interactions, resulting in the development of a unique cultural heritage that Bhutan can call its own.

Today, Bhutan is known to the outside world for its unique and time-tested cultural heritage. The government of Bhutan has therefore placed immense importance on the preservation and promotion of cultural heritage, which now forms one of the central mainstreams in the development planning of the country.

This report mainly focuses on the conservation of the heritage buildings of Bhutan and wooden components in particular. Conservation includes survey and documentation, interventions, legal protection and a continuous process of monitoring and maintenance.

It should be noted, however, that conservation techniques in Bhutan are still traditional and rudimentary. The idea of modern conservation is at its development stage with its benefits yet to be fully realized. Bhutan is today carrying out renovation works extensively, with statistics showing 10-15 renovations every year. At this rate there is every danger of losing the authenticity of the architectural heritage of Bhutan.

Present condition of the heritage sites of Bhutan

Heritage sites of Bhutan range from simple farmhouses, monasteries and temples to magnificent palaces and *Dzongs* (fortresses). Bhutanese architecture also includes *chortens* (stupas) and bridges.

The earlier settlements have mostly been in the inner Himalayan regions rather than in the southern foothills where the climate is hot and humid. Thus, thick vegetation, temperate climate, geology and even topography, in addition to religion and the socio-economic conditions of the region, have hugely influenced the development of Bhutanese architecture. High mountains and dense forests have permitted only limited contact, even among people within the country, and subsequently, architecture developed with a typology specific to each region.

Dzongs or fortresses have been built principally for defense and military purposes. These towering structures are built on strategic locations—on hill tops overlooking the valley or surrounded by rivers providing a vantage point over the advancing army of the enemy. With the transformation of the political situation, these structures later became centers of religion and civil administrations.



Temples (*Lhakhangs*) and monasteries are found scattered all over the country in their thousands. They were built mainly for spiritual reasons but also served a political function. With a theocratic system of government prevailing before the establishment of the monarchy, temples and monasteries served as the seats for central control and played a crucial role in the administration of the community or the region. Even today, every village has at least one monastery that facilitates not only religious functions but also communal activities



Chortens are one of the most symbolic examples of Buddhist architecture. These are built to commemorate a great feat or an event, usually religious, or in memory of eminent saints or personages. The shape or form of a *chorten* is usually inspired by *Mandala* (Buddhist depiction of the cosmos). Traditionally, *chortens* are chiefly built of stone or mud with little or no use of timber.



Traditional Bhutanese bridges can be classified as either chain suspension bridges or wooden cantilever bridges known as *bazam*. The former type is normally adopted for wider rivers and the latter for narrower rivers. Traditional bridges not only represent exquisite architectural pieces but also engineering feats that have never failed to fascinate foreign visitors. A *bazam* is a wooden cantilever bridge, with or without a roof, and usually with bridge houses, which are tower-like structures at each end.



Typical traditional village houses are two- or three-story buildings with walls made of either stones or mud. The ground floor normally serves as storage or even for sheltering cattle. The top floor has timber frame walls with window openings.



The unique and most interesting fact about temples, monasteries, *chortens* or even *Dzongs* is that there is not much digression from the functions for which they were originally intended some centuries back, and that they still form an integral part of the day-to-day lives of the Bhutanese people.

Traditional wooden architecture



Timber is one of the oldest and most common building materials used in Bhutan, from centuries past up to the present day. With almost two-thirds of the country covered by forest, timber is intimately associated with traditional Bhutanese culture. Besides the extensive resources available, it is out of necessity that timber forms a major part of Bhutanese architecture. It is no exaggeration to say that Bhutanese architecture is largely defined by the wooden components of the structures. Timber is used for various purposes, from finishing material to extremely complex structural constructions. This can be understood from the non-availability of alternative materials and at the same time the natural abundance of timber.

In traditional Bhutanese architecture, space, form, texture and the identity of the buildings are largely governed by the method, design and extent to which timber has been used. Windows of different styles and sizes are constructed corresponding to the type, size and height of the building. *Dzongs* and temples are usually characterized by multi-tiered *rabseys* or bay windows. Aside from the masonry walls, traditional buildings are heavily laden with wooden components.



The way wooden columns are used in traditional buildings is quite interesting. Tapering wooden columns with brackets (*kachens*), which are decorated to varying degrees depending on the nature of the building, are typical of Bhutanese architecture. These columns are introduced to support the principal beams (*dung*) and joists for achieving a bigger space inside. On the first floor and above, these columns are placed on the top of columns of the floors below in a straight line. All the horizontal members are supported by columns that are not fixed or restrained against any lateral force, standing more or less precariously independent. And what is most remarkable about these structures is that they have withstood numerous earthquakes and other natural calamities over a long period of time. However, there is evidently no record to indicate that these have been designed to resist earthquakes.

Another striking feature of a traditional building is the timber pitched roof. The roof type represents the building's status in the building hierarchy. Some roof types are permissible only for superior or important buildings such as temples, monasteries and palaces. A traditional roof uses extremely heavy timber members. A roof that is barely connected to the building structure sits firmly due to its weight. It is a common practice to create a wide roof attic, with the space being used for drying and storing crops and meats. It is said that the roof should be perched like an eagle about to take off. A traditional roof uses shingles, which are laid down with stone boulders.

Traditional architecture incorporates a myriad of decorative features whose origin can be attributed to inspiration from the world of flora and fauna and religious symbols. It is also seen that some of these developed while solving common structural or architectural problems faced in the region. However, these later became standardized decorative elements and were adopted as the norm by society. All the timbers that are visible in a building are completely adorned with Bhutanese paintings.

Wood as a building material in the Bhutanese context

Wood construction is considered safe, energy efficient, dependable, affordable and environmentally superior. Wood remains one of the most versatile and abundant materials in many parts of the world. It is probably the only renewable building material and can also be recycled. Different wood species bear their own beauty, fragrance, color and texture. As it is widely available and easy to work with, wood is used from the simplest and most basic structure to the most elaborate and intricate architecture. Wood

is obviously the most used material in Bhutanese traditional architecture and some examples have survived more than 100 years. It has also proved efficient in resisting earthquakes and other forces of nature. However, being an organic material, wood is easily perishable when exposed to weathering and deteriorating agents, and is highly combustible. The latter fact is extremely disturbing as Bhutanese traditional buildings abound in timber usage but the concept and techniques of fire safety are little known to society.

Timber is broadly categorized as either hard or soft wood. Some of the types of hard wood available in Bhutan are oak, teak, sal, walnut, cypress, willow, mahogany and sandalwood. Soft woods are blue pine, spruce, chir pine, juniper, fir, cedar, poplar and hemlock. Constructions with hard wood are sturdy and durable, but soft wood is easier to work with.

In heritage buildings, hard woods have evidently survived and fared better than soft woods. Even in olden times, people allocated high quality hard woods for superior buildings and soft ones for ordinary buildings. Affordability and the extent of the craftsmanship required also determined the choice of wood types. Over time, hard wood ready for harvest is apparently in decline, which has forced the government to constrict their supply. There is now the practice, which came up much later, to grow and harvest particular species of timber in a lot for a specific construction. This was usually carried out by the government for the renovation or construction of *Dzongs* and other buildings of similar size and significance. In the villages, every farmer owns a forest area, which they tend and later harvest timber from for their own use. This has virtually guaranteed the sustainable use of forests.

Decay, failure and the treatment of timber

The most severe and widespread problem that persists among heritage buildings in Bhutan today is the decay of timber. In certain cases, the stability of the whole structure is put at risk due to the decay of key timber structural members and improper structural designs. Its shortcomings reveal themselves over time. The latter concern situations where wooden beams and columns are strained under an excessive load, resulting in sagging beams and sinking columns that bring the whole superimposed structure down with them. The causes of decay are insects, microorganisms, dampness and weathering agents. Dampness, one of the most common causes of timber decay in Bhutan, is promoted by poor planning and construction faults. However, different species have different capacities to survive in particular situations.

Apart from natural seasoning, there is no other treatment applied to timbers. One can easily make out the timbers that are well seasoned or not. Timbers that are not seasoned well are extremely vulnerable to insect attack and decay, and also start to shrink or warp under pressure. Although chemicals and preservatives are not used, the paintings done on wood have contributed a great deal to protecting the timber for a long time.

Conservation of heritage buildings

In this section I wish to express, as far as possible, my views based on the experience I have gained

working for the only agency in the country that handles the conservation, restoration, maintenance and rehabilitation of architectural heritage. The agency plans, manages and executes numerous conservation projects in the country.

The responsibilities of the agency (Division for Conservation of Architectural Heritage, Department of Culture) are briefly outlined below to provide an overview of the activities it carries out:

- Inventorying the architectural heritage of the country
- Preparation of project proposals in line with proper conservation principles
- Assisting the assessment of proposals and according approval to projects that are proposed by Districts and other organizations in the field of architectural heritage conservation
- Provision of technical and administrative help to different agencies with regard to conservation and rehabilitation of historical and cultural sites
- Provision of technical assistance to Districts and other organizations for the preparation and implementation of proposals for the construction of new *Lhakhangs* and *Dzongs*
- Undertaking conservation projects in the country

Traditional conservation techniques - Timber

Although conservation of timber in heritage buildings is widely carried out in Bhutan, the techniques and materials used are mostly traditional even today. The conservation process is explained below in sequence.

Nature of timber component

It is important to first establish the significance of the timber component. One should ascertain its worth in terms age, use, material and other relative bearings. Knowledge of the type of construction and timber species aids in conservation work.

Extent and causes of timber problems

For conservation, the cause and extent of damage should be identified. This provides the key to determining the correct conservation method.

(a) Decay and insect attacks

Timber usually deteriorates the most in historic buildings. It is affected by termites, rising damp, fire, and wear and tear. For example, timber floors in historic buildings are completely deprived of ventilation and prone to decay. Rising damp and poor ventilation limits air circulation and creates a favorable environment for the insects and microorganisms that feed on timber.

(b) Structural issues

Whatever the cause of damage, understanding the extent of the damage and structural implications is essential for determining the course of repair.

Timber floor joists and beams on upper floors span the room. Each member is closely examined and

only those in critical condition are replaced. These members are often found sagging under the weight above. It is determined whether the problem is due to the inadequate size of the timber, sinking of the support, or excessive point load.

Repair or conservation work

It is necessary to take great precautions in repairing structural members. When replacing floor joists, beams, lintels or columns, the horizontal members are jacked up. The removal and replacement of each member is done in succession from a suitable point. The outright replacement of joists or other similar members is avoided unless extremely necessary. It is necessary to study the original timber species and also assess the strength required for the timber.

Total replacement of a unit is carried out mainly in structural components where structural safety cannot be compromised. However, other non-structural timber elements can be corrected through consolidation, repair or replacement of damaged parts, etc. In conservation, every attempt is made to preserve the original material and existing conditions to retain the intrinsic cultural values.

No chemicals or preservatives are used for conservation of timber in Bhutan. Firstly, Bhutan was introduced to modern conservation only recently and these chemicals were made available only a few years back. Secondly, since the chemicals are toxic and not environment-friendly, the government discourages their use.

Good seasoning and painting—essentially vegetable based—after construction are two major activities that have helped protect and preserve the timbers of Bhutanese heritage buildings. The paint, however, has weathered over time and the timbers have thus been exposed to agents of decay.

The concept of conservation in Bhutan is still largely traditional and very basic. Though it has proved to work relatively well enough, it is very urgent for Bhutan to become fully aware of modern ideas and techniques for conservation. There is not even legislation in place regarding heritage buildings and sites. With real estate and other infrastructures developing at an exhilarating pace, the need for legislation is felt more than ever before to protect, conserve, develop and streamline conservation work.

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Division for Conservation of Heritage Sites

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Present Situation and Needs for Cultural Heritage Preservation in Bhutan

Introduction

Bhutan is located on the southern slopes of the eastern Himalayas; the kingdom is landlocked between the two great Asian civilizations, Tibet (China) to the north and the Indian States of Arunachal Pradesh, Sikkim, West Bengal and Assam in the east, west, and south. The country lies between latitudes 26°45'N and 28°10'N, and longitudes 88° 45'E and 92° 10'E. Bhutan is well-known for its rugged, beautiful landscape and for its drive to achieve Gross National Happiness for its citizenry. It has a total area of 38,394 square kilometres and a population of about 700,000 (National Housing and Population Census, 2005). Within this latitudinal range is found a diverse biodiversity rich enough to be considered as one of the ten global environmental hotspots. About 72 per cent of the area is forested, and the law requires the country to maintain at least 60 per cent forest cover forever into the future. The climate varies from a hot subtropical climate in the south to cold alpine slopes in the north. Human settlement is confined mostly to interior river valleys and a swath of southern plains.



Cultural heritage is fundamental to the lives and the well-being of the people of Bhutan, as it is for people around the world. Cultural heritage includes tangible and intangible components, such as traditional structures, indigenous customs and knowledge, practices and values, as well as monuments, sites, artifacts, archives and collections.

Depending upon language, culture and spiritual tradition, different forms of architecture have been developed in different countries. Bhutanese architecture has a strong relationship with Buddhist teachings, and for centuries many structures such as fortresses and temples representing the palace of the gods have been emulated and built. As such, Bhutan has unique architectural designs. The main materials used for such constructions are stone, mud/soil and wood.



Present situation

Due to Bhutan's self-imposed isolation from the international community until the 1950s, the cultural heritage of the country has remained to a great degree unblemished. The cultural heritage of Bhutan is so rich that almost everywhere one turns, there are examples of skills, values and traditions that have existed for hundreds or perhaps thousands of years.



From the magnificent architectural monuments (such as fortresses, temples, stupas, etc.) to the unique farmhouses in the villages, from the rich and colourful hand woven textiles still used daily to the pure white flags fluttering high up near the clouds in the mountains, from the monks deep in prayer in ancient monasteries to the small altars enshrined in the modern apartments in the cities, from the colourful and vibrant mask dances performed in annual community festivals to the folk dances enjoyed in small family gatherings—the rich cultural heritage of Bhutan is very proudly evident.



The Royal Government of Bhutan, with the objective to develop Bhutan without sacrificing its heritage, established the National Commission for Cultural Affairs in 1985 (now the Department of Culture under the Ministry of Home & Cultural Affairs) to manage the conservation and development of Bhutan's rich cultural and historical heritage.

The Division for Conservation of Heritage Sites under the Department of Culture, where I presently work, is the main agency in the country responsible for the conservation, promotion and development of the historical heritage sites of Bhutan. The following are the main functions of the office:

- Formulation of policies and regulations for the protection of heritage sites in the country.
- Keeping the National Inventory and records of all heritage sites in the country.
- Appraisal, approval and monitoring of projects concerning heritage sites that are implemented in the country.

- Provision of technical and administrative assistance to the Districts with regard to heritage sites.
- Co-ordination with other organizations including foreign donors with regard to plans and projects concerning conservation of heritage sites.
- Organizing workshops and small training sessions for the protection and promotion of heritage sites in the country.
- Besides conservation work, the Division is also responsible for the establishment of new structures or sites for cultural and religious activities that are supported by the Department of Culture.

The conservation and promotion of cultural traditions, heritage and institutions has always featured as important objectives in all of the five year plans of the government and is an integral aspect of the national development vision and Gross National Happiness (GNH).



The existing system of management to carry out the conservation of heritage sites utilizes traditional materials and techniques in their authentic form, guided by the “*Basic Guidelines for the Conservation of Heritage Sites in Bhutan*” issued by our office. The Department of Culture has recently completed drafting the Heritage Act of Bhutan and will be submitting this in the forthcoming session of the Parliament for deliberation and enactment. The bill comprehensively looks into the protection of heritage buildings, cultural sites and archaeological sites in the country.

The following are the main challenges currently faced in preserving/conserving cultural heritage in Bhutan:

1. No legal guidelines/legislation.
2. Lack of proper inventory (documentation and photography).
3. Shortage of trained professionals in the field of conservation.
4. Inadequate funds conservation works.

5. Lack of proper disaster management system.
6. Most of the heritage structures being living heritage.

Need for cultural heritage preservation

So far, Bhutan has been fortunate to have a majority of its architectural heritage still largely intact in its authentic state. Although the traditional approaches to architecture are still very much alive in Bhutan, with the advent of modern development and exposure to external influences, one has to acknowledge that these traditions, like many other things, are not shielded from challenges to them. They are thus subject to evolution in terms of approaches and attitudes. It cannot be disputed that almost every country in the world is still confronted by various development challenges. However, for a tiny country like Bhutan that is being catapulted into the 21st century, the challenges to its ancient heritage and traditions can be particularly daunting.



The future of Bhutan's heritage thus rests mainly upon understanding the heritage, along with the appropriate values attached to it, and consequently, actions taken to conserve and promote these values. Only through awareness and understanding of their heritage can people feel motivated to safeguard it. Thus, they themselves become the best custodians of their heritage. This understanding and affection towards their heritage is in itself, in the long term, a cultural asset. Therefore, understanding the values of our heritage and taking appropriate steps towards its conservation, development and promotion are of immense importance.

It has also been a great concern to the government and the people of Bhutan that the majority of ancient and valuable monuments are often ignorantly being dismantled and destroyed instead of being conserved, thus causing whole treasure troves of our heritage to be lost forever. The remote and sometimes inaccessible locations of monuments also cause many constraints in terms of maintenance, safety and conservation. Often due to the lack of legal guidelines, proper inventory (documentation and photography), adequate funds and sufficient trained manpower in the cultural sector, many of these ancient and rare structures are sometimes left to fall into disrepair or are repaired or reconstructed without appropriate techniques, which also leads to irreplaceable losses of heritage.



While modern development is to be encouraged and has many advantages, it is also leading, by a great extent, to the replacement of traditional skills and principles in various areas including architectural design, construction techniques and materials. Physical heritage traditions like architectural designs and construction techniques that are unique, environmentally friendly, and built from local materials by local craftspeople and villagers are being replaced by modern structures that are often out of context and often constructed clumsily due to inexperience and lack of skill. These are slowly resulting in the disappearance of beautiful traditional houses and at times, entire traditional villages

Therefore, in considering the above, it is felt that the need for cultural heritage preservation in Bhutan has become very important.



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Present Situation and Needs for Cultural Heritage Preservation in Bhutan

Introduction

The philosophy of Gross National Happiness is the backbone of Bhutan's development, and the Bhutanese government recognises the core importance of culture and cultural heritage in Bhutanese society, as preservation and promotion of culture is one of its four pillars.

Cultural heritage in Bhutan is an integral part of our identity, unity and continuity, and forms an indisputable physical record of the historical, artistic and technical achievements of the Bhutanese through many centuries. Cultural heritage sites in Bhutan consist of both tangible heritage (including Dzongs, Lhakhangs and traditional houses) as well as intangible heritage (including traditional paintings, carvings, sculptures and rammed earth construction techniques)) that has been carefully passed down uninterrupted from generation to generation.



Fig. Paro Taa Dzong



Fig. Neyphug Lhakhang



Fig. Traditional Carving, Intangible heritage sites



Fig. Rammed earth construction technique

Present Situation

Existing management system of heritage sites in Bhutan:

The Department of Culture under the Ministry of Home and Cultural Affairs is currently the central authority in the country responsible for the conservation, development and promotion of cultural heritage. Within the Department, the Division for Conservation of Heritage Sites (DCHS) is the key central agency that looks after the protection and conservation of heritage sites, including *Dzongs*. The DCHS is also responsible for formulation of policies and regulations for the protection of heritage sites. Nevertheless, the protection and conservation of heritage sites is considered to be the shared responsibility of all public and private bodies, local communities, and individuals in the country.

1) No legal guidelines

To date, Bhutan has had no legal guidelines to institute effective legislation for the protection of heritage sites in the country. The Division for Conservation of Heritage Sites under the Department of Culture was instituted to ensure that heritage sites in Bhutan are conserved, protected and promoted. While executing this responsibility, the office found that the number of renovations and reconstructions increased every year. Despite being strict on the do's and don'ts of executing works of heritage sites, the end result turned out to be the total reconstruction of sites in most cases, without retaining any of the earlier features or the character of the respective sites. The offender in each case could not be penalized due to lack of legal provisions. In this process we lost many important heritage sites.

However, the Department of Culture has recently completed drafting the Heritage Act of Bhutan. It will be submitted for deliberation and enactment in the upcoming winter session of Parliament. The bill comprehensively looks into the protection of heritage buildings, cultural sites and archaeological sites in Bhutan through a process of registration and designation. The purpose of this Act is to provide protection for heritage sites and sustain the cultural landscape of Bhutan for present and future generations.

2) Awareness, understanding and appreciation of heritage sites

There is a need to develop and conduct awareness raising programs on the protection of cultural heritage. In line with this, the agency concerned, the Division for Conservation of Heritage Sites (DCHS) under the Department of Culture, has been creating awareness campaigns at different levels of stakeholder. In June 2014, the DCHS went to various schools creating awareness of heritage sites and making the students understand what heritage is and how individuals can contribute to protecting our heritage sites.



Moreover, in August, the Department of Culture organised the “International Competition on Cultural Landscape in Bhutan 2014 with the objective “to learn and educate the ways of understanding and interpreting our cultural landscape leading to their safeguard and sustainability for the wellbeing of the present as well as the future generations of the country.” A cluster of houses in Dopshari Gewog (administrative block) was identified as a case settlement for the Cultural Landscape Competition.



Fig. International and local jurors for the competition with the participants



Fig. Dopshari Gewog: identified as a case settlement for Cultural Landscape Competition

3) Natural disasters vs. heritage sites

A significant number of natural disasters have been occurring more frequently in recent times. Most heritage sites, especially the *Dzongs* (fortresses), are built in strategic locations for gaining military advantage as well as political and spiritual influence. It has now become a challenge to put in place preparedness measures and firefighting. Furthermore, Bhutan, being in Zone V according to the Indian seismic map, is highly susceptible to earthquakes.

The country was hit by two major earthquakes over the span of two years, in 2009 and 2011, which affected several important cultural sites including *Dzongs*, *Lhakhangs* and *chortens*. The following are some of the cultural sites affected by the two earthquakes.



Fig. Drametse Lhakhang



Fig. Trashigang Dzong

Fire poses another challenge to preserving heritage sites. One example is Wangduephodrang Dzong, which was undergoing a comprehensive renovation and was burnt down by a tragic fire on 24 June 2012, with the country losing one of its most important and historic heritage sites. The loss of Wangduephodrang Dzong was a national tragedy in which hundreds of artefacts and murals were lost. This *Dzong* is the second oldest *Dzong* in the country, built by Zhabdrung Ngawang Namgyel in 1638, and it serves a dual purpose: the offices of both the *Dzongkhag* administration headed by the *Dzongdag* (District Governor), and the *Dratshag*, or monk body, headed by the *Lam Neten*.

Maintaining the authenticity of this historic site has now become a major and complex issue to be considered while preparing the reconstruction plans for the *Dzong*. However, the reconstruction work has begun.



Fig: Wangdue Dzong before the fire



Fig: Wangdue Dzong after the fire

4) Most heritage buildings are living heritage

Dzongs in Bhutan, being living heritage as they house temples, monk body residences, and district administrative offices, are consistently subject to alteration in terms of design and materials as well as usage. The increasing number of monks in the *Dzongs* necessitates the provision of modern facilities and amenities within the *Dzong*, thereby changing the historic structure and its fabric.

Moreover, they are exposed to continuous wear and tear, and numerous disaster risks. In this light, it raises the difficult question of whether the *Dzongs* of Bhutan can fulfil the criteria of authenticity, an important requirement of World Heritage properties, in the process of their nomination as World

Heritage Sites.

5) Shortage of professionals in the field of heritage and conservation

One of the primary problems currently faced in the field of conservation of heritage sites in Bhutan is the shortage of human resource in the DCHS office, making it more difficult to assess and monitor conservation works in the country. The remote and sometimes almost inaccessible locations of monuments also cause many constraints in maintenance, safety and conservation. Also, due to the limited technical capacity within the country in the field of cultural heritage site protection and restoration, many restoration projects actually become reconstruction projects.

6) Traditional constructions are non-engineered buildings

The traditional method of construction in Bhutan is either the rammed earth method or stone masonry with composite timber construction. Since our precious heritage monuments are either rammed earth or stone masonry without any scientific and engineering calculations, it becomes difficult to prove the stability of heritage sites with numbers, which becomes a challenge when the safety of the site is questioned.

7) Traditional beliefs vs. conservation of heritage sites

It is believed that if the temple or monastery is found in a dilapidated condition, it would bring bad luck to the community. Therefore, Bhutanese people prefer to maintain a temple mostly by reconstructing it, and people believe that carrying out such activities, especially for religious buildings, would mean cleansing their sins and helping them gain good karma. This is another challenge.

8) Lack of proper inventory of heritage sites

Currently there is no proper inventory of heritage sites in Bhutan, which is fundamental information required for the protection and conservation of heritage sites. Without an inventory record, it would be difficult to obtain the information required, especially in the case of reconstruction, which would most of the time lead to adoption of the earlier design, thus leading to alteration of the whole building. However, in 2011, the DCHS office started the preliminary work of developing an inventory of heritage sites in Bhutan, and is expected to complete the work soon.

Need for cultural heritage site protection:

Bhutan is known to the outside world for its cultural heritage, and heritage sites are one of the most unique identifications of Bhutan. The beautiful heritage sites of Bhutan form an integral core of the country's rich and ancient cultural heritage and traditions.

Tourism is the second largest source of income for Bhutan, and the sustainability of Bhutan's tourism industry largely depends on the culture of Bhutan, which is largely influenced by our heritage sites and the traditions associated with it. Bhutan has become one of the top tourist destinations in the world due to its cultural diversity and pristine natural environment.

Heritage sites in Bhutan are very much associated with religious values, which are important for

the spiritual and religious beliefs of the local people. And this forms a very integral part of Bhutan's culture in the day-to-day life of the average Bhutanese.

Since Bhutan is undergoing modernization at a very fast pace, which includes the introduction of new construction techniques and materials, and a change in the lifestyle and mind-set of the people. This poses a threat to the traditional architecture and culture of Bhutan. Therefore, it has become very important to protect our cultural heritage sites to retain the exemplary traditional Bhutanese architecture.

Both natural and man-made disasters are becoming a major threat to our heritage sites. A large number of heritage sites have been damaged during the recent earthquakes and fire. Therefore in this regard, the protection and proper restoration of our heritage sites have become very important.

IV. Final Reports by Participants



With lecturer and interpreter in a full-scale model of a *sukiya* house at Takenaka Carpentry Tools Museum

Photographic documentation of cultural heritage and management/utilisation of digital data

For the protection and promotion of cultural heritage and cultural properties within the Asia-Pacific region, the Asia-Pacific Cultural Centre for UNESCO (ACCU Nara) provides various programs and training courses related to cultural heritage protection. Since Japan has been taking the lead in the preservation and restoration of cultural heritage sites and cultural properties in the Asia-Pacific region, ACCU Nara, mainly through international organizations such as UNESCO and ICCROM, gives training in preserving and protecting heritage sites and cultural properties in neighboring countries. With many Japanese experts and its advanced technology, we can learn the latest techniques in our specific field for saving our cultural properties and heritage sites for the coming generations. In Bhutan, photographic documentation of heritage structures and other valuable elements is the most essential activity to be carried out immediately, as current practices are not professional, meaning that our cultural heritage cannot be preserved for a long period.

Our training was divided into various activities during these 25 days (11th Nov- 5th Dec).

- a) Introduction to ancient structures and their historical values, such as Horyu-ji Temple and Todai-ji Temple with site visits.
- b) Basic knowledge in photography regarding both manual and digital cameras.
- d) Practical training in using different methods for taking photographs of ancient structures outside Hase-dera Temple under natural sunlight.
- e) Different methods for taking photos of objects and artefacts indoors with artificial light (diffused light).
- f) Processing and printing of negatives in a darkroom and digital JPEG photos on a computer.
- g) Risk management of cultural heritage/sites during a natural disaster with site tours in Kobe city
- h) Preserving and utilizing photos of ancient scriptures and artefacts to the public at the Historiographical Institute, University of Tokyo and National Museum of Japanese History.

Introduction to ancient monuments and historical sites – Mr Kobayshi Ken'ichi

First, we were made aware of the history of Japan in this lecture, and then we were exposed to some of the famous temples in Nara that have been designated as World Heritage Sites. The structures have remained stable and intact to the present day although thousands of visitors come daily for site visits. It was noticed that some of the buildings have undergone several restoration works due to natural disasters occurring in the early years. The historical values of these temples were so important not only for Japanese but also for people throughout Asia, where Buddhism is still practiced and followed. The site lecture included the importance of these sites and their significance in Japanese society. With the site visit we were also briefed on the importance of Nara Palace and the archeological excavations done in this area and Mr Kobayashi showed us how the artefacts and objects are preserved in the museum after proper documentation.



Fig 1. Todai-ji Temple (visitors versus World Heritage Sites)



Fig 2. Wooden pillar (Japanese method of conservation)



Site visits to Chion-in Temple, which is undergoing major restoration, and understanding Japanese methods of restoring wooden structures.



Fig.3 Chion-in Temple (method of Japanese conservation of wooden structures)

Basic knowledge of photography for manual and digital cameras - Mr Ichiro Nakamura

First, we were introduced to the many types of professional cameras that are used for documenting cultural properties at Nara National Research Institute for Cultural Properties and the importance of photo documentation. Photographic documentation is important for conservation of artefacts, recording ages, renovation, structural documentation, and recording details of archeological sites that are filled in after excavation, and the documentation should be preserved for as long as possible for future research works. Images of both tangible and intangible cultural properties should be recorded with methods such as hand drawing, the GIS method, laser scanning, photographing and UAV helicopters, although in Bhutan we only have drawings and some ordinary photos of conservation works done earlier. During the training course we had lectures on setting and adjusting the camera for ensuring quality photos of cultural properties such as structures and artefacts. Producing good photos depends on how well you can control your exposure. For controlling exposure, the three main functions need to be set accurately.



Fig.4 Setting each function



Fig.5 Getting sharper pictures



Fig.6 Different types of cameras

Aperture: This is composed of tiny blades (octagonal in shape) and controls the amount of light entering the camera. The amount of light required can be adjusted by opening and closing the aperture. If your picture is found to be lighter than desired you can minimize the aperture, and vice versa. The value is indicated on the camera as f/1.4 to f/22.

Shutter speed: The amount of time that the shutter allows the image sensor to be exposed to light is the shutter speed, and this is measured in seconds. For example, when taking a photo in the dark one should slow the shutter speed so that enough light falls on the image sensor.

ISO: This determines how sensitive your camera is for incoming light. For taking photos of artefacts a lower ISO is desired since a higher ISO increases the amount of image noise. It is determined by standard values ranging from 100 to 1600, and it also differs from camera to camera.

In the training we were also taught how to eliminate unnecessary images from the photos by providing different lighting from different angles. To eliminate shadows from the pictures we need to provide lighting from different angles such as side lighting, top lighting, backlighting, semi backlighting, and transmissive lighting.



Fig.7 Lighting from different angles



Fig.8 Getting a sharper image



Fig.9 Avoiding direct light on the object

The training also included photo processing after editing in a PC and balancing white by using a gray card is neutral color. We practiced arranging photo layouts in our session, which also enhanced our capability to create good publications.

Practical training in taking photographs of ancient structures - Mr Sugimoto (Hase-dera Temple)

We were taught how to set up a tripod and learned about its importance in photographing cultural properties. We were also taught how to choose the correct image and the details to be photographed, and how to choose the camera angle according to the source of light, since the most important element in photography is the light, be it sunlight outside or artificial light indoors. We were also taught about the use of different lenses such as architectural lenses, which are capable of handling high/tall structures from a nearer distance while showing clear details of the structure. The usual practice of taking photographs at my site is free-hand with auto-set cameras. From learning how to take RAW photos with manual settings we can produce quality pictures after processing, and that will best for recording and display.



Fig.10 Steps towards Hase-dera Temple



Fig.11 Photos taken with a tripod



Fig. 12 Hase-dera Temple

Risk management cultural heritage - Mr Murakami Yasumichi

Our lecturer emphasized the importance of having a master plan for risk management in case of a natural disaster. With the example of the earthquake in Kobe city in 1995 we were made aware of how important it is to help each other during a natural disaster and to bring the same atmosphere back to the area. Kobe city was a multicultural city with many different types of people living there at the time. Different buildings of worship and residential houses existed before the earthquake; however, most of the buildings were severely damaged during the disaster and needed immediate repairs. So our lecturer showed some examples of how we should repair these building without altering or changing them from the original design and architecture. All these restored buildings were designated as National Cultural Properties. The very important thing is that the buildings were utilized as museums for the public.



Fig.13 Restored buildings



Fig.14 Method of intervention in restoration



Fig.15 Measures for checking movement

After the experience of the 1995 earthquake, many new alarm methods were introduced so that in a very short time the necessary measures could be implemented. The methods included warning signals on phones, enabling people to interact quickly. As cited by the lecturer, it took several years for Kobe to be restored to its former glory and beauty.

Preserving and utilizing photos of ancient scriptures and artefacts to public at the Historiographical Institute, the University of Tokyo, Tokyo National Museum, National Museum of Japanese History, Sakura city and Nara National Museum.

The main objective of these visits was to learn how important our cultural properties are, and in what way we can bring our past to the present and value our ancestors' lifestyles, the socio-economic changes that occurred, and the further development of their lifestyles. One of the main tools for conducting research on these activities is photography, and one should have a high level of professionalism in photography and also perfect preservation of the fruits of this activity for future generations.

As a result of our training in photographic documentation, we have acquired a lot of useful knowledge in photographing objects and images that are to be displayed in museums, as well as in the importance of preserving the negatives in temperature-controlled rooms for future reference. We also got the chance to learn how to develop a database in order to keep the photos in a very systematic manner.



Fig 16. Tokyo National Museum (demonstration on photographing objects for the museum)

Conclusion

This individual training course on photography has enhanced not only my knowledge of how to take photos, but also my understanding of the value of photographic documentation for future generations. The valuable historic structure in Bhutan is undergoing certain changes in its aesthetic view and architectural features year by year, and through the means of photographic documentation one can bring back its originality and recreate its former appearance once again. Not only the structures, but also images, objects and precious scripts can be utilized for educational programs, research and publication through photographs.

Lastly, I acknowledge ACCU for providing such valuable training for us, and also the time taken by individual staff for guiding us to our respective lectures and site visits. My heartiest thank you goes to all the lecturers who passed on their knowledge and experience in various fields during the training period. The same to our interpreter, who provided instant interpretations, which made it easy for us to understand the subject. Also, I should mention that Nara National Research Institute for Cultural Properties was the right venue for the training, and I thank them as well.

Thank you and *TASHI DELEK*.

Photographic Documentation of Cultural Heritage and Management/ Utilisation of Digital Data

Introduction:

The photographic documentation of cultural heritage in Japan has a long history, ever since the introduction of the camera to the world, and the system of management and utilization of data is well advanced, precise and detailed, so that it can be an example to the world. In Bhutan, the first camera (still camera) was used by Mr John Claude White, the head of mission of the British Indian government during his visit in 1905, but it was hardly used for the documentation of cultural heritage, and Bhutan still does not have photographic documentation of its cultural heritage and storage system except for ordinary printed photos.

The Individual Training Course on Photographic Documentation of Cultural Heritage and Management/Utilisation of Digital Data was conducted in Nara, Japan from 11 November to 5 December 2014, organised by ACCU Nara Office, upon the request of the Department of Culture, Ministry of Home & Cultural Affairs, Bhutan. The main objective of the course was to provide broad knowledge and practical techniques in the field of photography and documentation of cultural heritage and digital data management and utilisation (photography techniques, digital data storage and management system).

The training was mainly conducted at the photo studio of the Photography Section of the Nara National Institute for Cultural Properties (NNRICP), with lectures and practical field exercises (both indoor and outdoor) provided by various experts from the Institute. The outdoor practical work for photographing building structures was done at Hase-dera Temple. Further, we visited various National Museums of Japan such as Nara National Museum; Tokyo National Museum; National Museum of Japanese History in Sakura City, Chiba; and Shoso-in (Treasure House), the Imperial Household Agency, Nara to study their existing practices in photographic documentation and data management systems. Apart from the main training courses, we also visited historical sites and received on-site lectures on the respective sites; such as Horyu-ji Temple and Todai-ji Temple in Nara, Preservation District for Groups of Historical Buildings in Kobe City, Takenaka Carpentry Tools Museum, and Restoration of Chion-in Temple, Rokuon-ji Golden Temple, Ryoan-ji Temple (Rock Garden) in Kyoto, Nara Palace Site Museum, Nara National Museum and Kofuku-ji Museum.

Photographic documentation training:

Photography is one of the most important tools for the documentation of cultural properties. The fundamental principle of photography of cultural properties is to enable storage of materials that record

an exhaustive amount of information in place of the cultural properties themselves for an extended period of time. Although we are familiar with cameras in taking ordinary pictures, we are not really aware of the camera's various functions apart from setting the camera to auto mode, and ordinary photos are used for condition status reports for Structural Heritage Sites and recorded for pictorial reference only. It was on the 13th day of November 2014 in the photo studio of NNRICP that the lesson started with the introduction of basic knowledge of photography by Mr Ichiro Nakamura.



Fig.1 Different types of cameras



Fig.2 Camera & tripod



Fig.3 Use of grey card

During the course we learnt the following:

- i. Preparation of tools/equipment for photography along with proper handling and functions of the equipment including setting up a tripod.
- ii. The various types of cameras and the functions of image saving formats such as JPEG and TIFF.
- iii. The mechanism by which a photograph is taken and its structural outline including the camera angle and use of lenses.
- iv. Different methods of taking photographs of both indoor objects and outdoor structures including archeological sites.
- v. Methods for the recording and documentation of cultural heritage with laser scanning.
- vi. Processing of images and printing for both film and digital photographs and layouts.

We were also given a brief outline of the Guidelines for the Preservation of Cultural Properties centered on digital records.

Practical training of taking outdoor photographs of the historic structures at Hase-dera Temple:

We were taught that during outdoor photography of cultural heritage sites, it is important to know the timing for taking photographs (as per the movement of the sun) as well as the camera angle according to the source of light. We were also taught to use a tripod, decide the subject of the photography, and use a lens closer to a telephoto lens in order to eliminate distortion or an architectural lens which is capable of capturing tall structures from closer distances, and save the photos as RAW files so they can be processed to achieve the best print quality.

Site visits to different museums to study photographic documentation and management systems:

Visits were made to the following museums: Tokyo National Museum, Historiographical Institute of the University of Tokyo, and National Museum of Japanese History, Sakura. The photographic documentation and management system in each place is well established and managed at the highest level. At every museum, the photographer never touches the object himself; instead, it is the conservator who handles the object, in order not to damage it.

Visits to Buddhist historic monuments:

Horyu-ji Temple was established by Prince *Shotoku Taishi* and Empress *Suiko* in 607 AD to show respect for Prince *Shotoku*'s late father Emperor *Yomei*. This building, the oldest wooden building in the world, was designated as a UNESCO World Cultural Heritage Site in 1993. Todai-ji Temple was built in the 8th century and the world's largest gilt-bronze Buddha (Great Buddha) statue (15 m high) of the Cosmic Buddha or Universal Buddha (Dainichi Nyorai), built to bring happiness to the people, is enshrined there. Spiritually, both sites are very important, not only to the people of Japan, but also to Buddhist countries around the world. The lesson learned from these visits is that no matter how much you lose in due course with unavoidable natural disasters, it is very important to maintain the original state of the object or structure by using the same materials and techniques at the time of restoration in order to hand it on to future generations.



Fig.4 Horyu-ji Temple



Fig.5 Great Buddha



Fig.6 Todai-ji Temple

Disaster risk management for cultural heritage based on the experience of the Great Hanshin Earthquake:

We visited Kobe City and the lecturer recalled the Great Hanshin Earthquake and explained the overall damage as well as the damage caused to historic buildings, and the countermeasures undertaken after the disaster based on an actual example. We also visited one of the renovated historic buildings and the lecturer explained on a model the wall reinforcement method that had been adopted and the installation of equipment to check the inclination of the building at the roof truss level. The lecturer said it was important to take and keep photographs of the whole structure, which then will help to check the work, or as a reference if the structure has to be rebuilt after a disaster. The photos taken before can be used as evidence for later recovery works. The lesson learned from this site visit is the rescue measures to be taken after such incidents and the recovery plans and mitigation measures of the site. We also visited Disaster Reduction and Renovation Institution and Takenaka Carpentry Tools Museum.



Fig.7 Model wall, Kobe



Fig.8 Vertical check, Kobe



Fig.9 Restored Building, Kobe

Visit to historic monuments of ancient Kyoto:

A visit was made to the following Historic Monuments of Ancient Kyoto and to the Chion-in Temple, where restoration of the main temple hall was taking place, particularly the roof tiles and some parts of the roof trusses. The restorer in charge explained in detail about the works and the methodology adopted for the preservation, which is very precise, detailed work and well organized, and which can be an example for us to follow and adopt in Bhutan too. Both Rokuon-ji Temple and Ryoan-ji Temple are inscribed by UNESCO on the World Heritage List as Historic Monuments of Ancient Kyoto, and are thus internationally recognized as places of exceptional universal value; cultural heritage sites worthy of preservation for the benefit of all mankind. The inscription date for both Rokuon-ji Temple and Ryoan-ji Temple was 17 December 1994. The lesson learned from these visits is how to carry out restoration while maintaining authenticity.



Fig.10 Restoration of Chion-in Temple



Fig.11 Rokuon-ji Temple



Fig.12 Ryoan-ji Temple

Photography and management/utilisation system at the Shoso-in (Treasure House):

We were taught how to take photographs of the textile fabric with the positioning of lights in order to capture the pattern design of the fabric for research study and display. We also learnt how to read carbon ink markings by using an infrared camera lens. We also learnt that a timber log house can be more effective in preserving objects and artefacts against humidity.



Fig.13 Shoso-in Treasure House

Conclusion:

The individual training course on Photographic Documentation of Cultural Heritage and Management/ Utilisation of Digital Data for a duration of 25 days was essential for us to participate in, and the course has educated me on the subject and also enriched my professional skill in the preservation and restoration of cultural heritage. As already mentioned earlier, photographic documentation of cultural heritage in Bhutan has never been done to date, and this knowledge will certainly be helpful not only to my own work but also to my organisation and the country as a whole.

We are glad to hear that the Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU) is planning to conduct such type of training in our country very soon, and in this regard, if I may submit herewith my own thoughts, it would be preferable if the participants are professionals dealing with objects, textiles, library archives and structural heritage sites so that the training will be helpful to the agencies concerned in preserving and safeguarding their valuable treasures in a better way for future generations.

Lastly, I would like to thank ACCU Nara Office, Japan for organising this course and giving us an opportunity to take part, and to all the individual staff of ACCU Nara Office for guiding us and supporting us in this training course, which was successfully completed due to their help. I would also like to thank all the resource persons, including our interpreter, for sharing their knowledge and skills with us. Finally, I would also like to thank the Nara National Research Institute for Cultural Properties (NNRICP) and the Agency for Cultural Affairs, Japan for providing financial support, the physical venue and other resources for the training course.

Thank you

Final Report on Photographic Documentation of Cultural Heritage and Management/Utilisation of Digital Data

Background

To the outside world, Bhutan is well known for its cultural heritage, and heritage sites are one of the most unique identifying features of Bhutan. The beautiful heritage sites of Bhutan form an integral core of the country's rich and ancient cultural heritage and traditions. Heritage sites in Bhutan are very much associated with religious values, which are important for the spiritual and religious beliefs of the local people. And this forms an integral part of Bhutan's culture in the day-to-day life of the Bhutanese.

Bhutan is undergoing modernisation at a very fast pace, which includes the introduction of new construction techniques and materials, and changes in the lifestyle and mind-set of the people. This poses a threat to the traditional architecture and culture of Bhutan. Therefore, it has become very important to protect our cultural heritage sites to retain the exemplary traditional Bhutanese architecture.

Heritage sites throughout the world (natural, cultural or mixed) suffer from wars, natural disasters, weather changes and human negligence. Thus, both natural and man-made disasters are becoming a major threat to our heritage sites. A large number of heritage sites have been damaged during recent earthquakes and fires. Therefore, the protection and proper restoration of our heritage sites have become very important. However, there is no proper inventory of heritage sites in Bhutan, which is the most fundamental information required for the protection and conservation of heritage sites. To achieve this, photographic documentation plays a very important role.

Role of photography in documentation of cultural heritage

Photography has existed for more than 150 years, but only recently have advances in technology made high-quality cameras and devices readily available, affordable, and easy to use. Photographic documentation is an essential technique for recording the nature of heritage objects and illustrating conservation procedures. After visiting several museums in Japan (Tokyo National Museum, University of Tokyo, National Museum of Japanese History and Nara National Museum), we have seen that museums have been able to make use of these advances, and today many conservators use digital photography for the purpose of documenting their work.

It is necessary to make cultural heritage accessible in all possible forms and to all possible users and clients globally. This can be done by preserving them digitally. Thus, photographs can contribute significantly to the documentation, conservation and presentation of cultural heritage sites and to the growth of research in this field. However, if cultural properties are photographed without

understanding the objective and framework for taking photographs, the photographs will not achieve the information required.

The one month training course covered all the important topics which are important in the field of conservation and preservation of cultural heritage. The following are some of the areas that were covered in the lectures:

- Introduction to photography: It started with the basic knowledge of cameras and the various types available. The lectures were delivered in a photo studio, as well as at sites with hands-on training, on digital photography of archaeological sites, historical buildings, artefacts and other cultural properties. Good photography depends on a combination of shutter speed, aperture value and ISO speed, under which the aperture affects depth of field, shutter speed affects motion blur and ISO speed affects image noise. Colour charts and grey cards are also used to obtain the true colour of an image.



Fig.1: Light Orientation in indoor photography

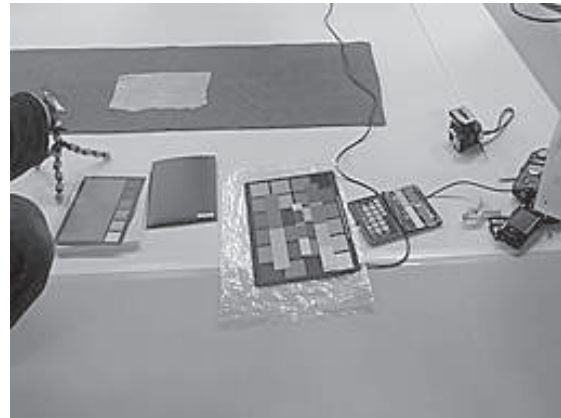


Fig.2: Use of a grey card and colour chart

- Digital photograph processing using Raw Therapee software.
- We were also introduced to a new method for documentation of cultural heritage with laser scanning and SfM.
- Risk management for cultural heritage: We are reminded that cultural heritage is susceptible to natural disasters based on the experience of the Great Hanshin Earthquake. The need to find a solution to protect three factors simultaneously—way of life, safety and cultural property—was emphasized.
- Photographic documentation of cultural heritage and management systems of digital data.
- Restoration of historic monuments in Horyu-ji Temple, Todai-ji Temple and Chion-in Temple: Visiting those historical monuments was a good experience to learn that the reconstruction of each temple was done in the original form and design, apart from changing the wooden components through proper investigation, survey and documentation of the temple's history. We had an opportunity to see non-functional wooden members from the 8th century, which are well preserved and carefully numbered for scientific research analysis. The functional wooden

components from the 17th century are amazing to observe with much less revolution through proper conservation techniques. We saw that some intentional gaps are created in the wooden components especially in columns in order to prevent cracks in the other direction (Shown in the figure below from Horyu-ji Temple).



Fig.3: Intentional cracks



Fig.4: Joinery



Fig.5: Replacement of decayed member

Restoration of the Mieido of Chion-in Temple, Kyoto as a cultural property

As part of the training course, we also got a chance to visit Chion-in Temple, which was first built in 1639 and is currently under restoration exactly 100 years after the last restoration. The temple is a wooden structure with a hip and gable roof where flat and round tiles are laid alternately. According to the chief architect, the main hall (Mieido) was renovated twice in the past, especially the roof structure, which was repaired with better reinforcement. The roof tiles were found to have undergone partial repairs many times and thus various types of roof tiles have been laid that date to different times, identifiable by the nails used in the roof structures. For example, nails used in the past are flat and later ones are round.

Japanese traditional wooden cultural buildings have survived for a long time and they can still be seen today. This may be due to regular maintenance with appropriate methods. While carrying out the restoration of cultural properties like the Mieido, original components are reused as much as possible. The components that have been seriously damaged are replaced with new ones. In such cases the new component is fabricated with the same species/material used for the original components using the original method and then the year of the repair is engraved on the component.

If the components are partially damaged, only those damaged parts are removed and replaced by new material. The other parts of the member in good condition remain in use even if they have been used for hundreds of years. If necessary, reinforcement is also provided to a minimum extent without causing any damage to the original component. In this particular project, the tilted roof trusses have been dismantled and they are to be reassembled soon. The eaves were lowered due to the heavy roof truss and they are now being jacked up to their original place. The deteriorated roof tiles were removed and they are soon to be replaced by new tiles.



Fig.6: Decayed roof members being replaced
roof members being replaced



Fig.7: Joinery of old and new timber components



Fig.8: Varieties of nails used in different eras roof
members being replaced



Fig.9: Eaves being jacked up to their original
place

Conclusion

Cultural heritage is a human creation intended to inform the next generation, so it is our core responsibility to protect and pass it on to future generations, as they have a right to know about their own culture. In this context, it is very important to document cultural heritage so that future generations know how it used to be in the past. Thus, photographic documentation plays a vital role in the preservation and conservation of cultural heritage.

Being able to have the opportunity to learn and understand the importance of photographic documentation, I would like to extend my heartiest gratitude to the Agency for Cultural Affairs, Japan; Asia-Pacific Cultural Centre for UNESCO (ACCU); and National Institutes for Cultural Heritage, Nara National Research Institute for Cultural Properties for organising this one month training program on Photographic Documentation of Cultural Heritage and Management/Utilisation of Digital Data. I believe this training program has enhanced and strengthened my skills in the field of preservation, conservation and management of cultural heritage monuments.

I would also like to thank all the staff of ACCU Nara Office, lecturers, and all the members who were

directly or indirectly involved, for your kind efforts and support in making the training programme successful and fruitful.

Last but not least, I would also like to thank the Head, Division for Conservation of Heritage Sites, Department of Culture, Ministry of Home and Cultural Affairs, Bhutan for nominating me for this training programme. Without her support, I may not have received this opportunity to participate in this training programme.

Thank you.

V. Appendix

1. List of Participants
2. List of Lecturers and Interpreter
3. Staff Members, ACCU Nara Office



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