Report

Training Course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region

Preservation and Restoration of Wooden Structures

25 September – 24 October, 2003

Nara, Japan

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

National Research Institute for Cultural Properties

International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM)

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Cultural Heritage Protection Cooperation Office,
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Nara Prefectural Government “Horen” Office Ground Floor
757 Horen-cho, Nara 630-8113 Japan
Phone: +81-742-20-5001
F A X: +81-742-20-5701
E-mail: nara@accu.or.jp
U R L: http://www.nara.accu.or.jp

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Preface

In contribution to cultural heritage protection activities in the Asia-Pacific region, the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU) was established in Nara in 1999, supported by the Agency for Cultural Affairs, the Nara Prefecture and the Nara City.

Since its establishment, the ACCU Nara Office has carried out numerous projects in relation to cultural heritage protection, such as providing training for experts, holding international conferences and public lectures, collecting information relating to cultural heritage and building a database. These activities aimed to develop human resources and to provide technical support in the Asia-Pacific region.

The fourth Training Course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region was held from 25th September to 24th October, 2003. It was held in cooperation with ICCROM (International Centre for Study of Preservation and Restoration of Cultural Property) and the National Research Institute for Cultural Properties. Fourteen participants from countries in the region were invited to Japan to attend this year's training course. Professionals who are engaged in the conservation and restoration of various kinds of wooden structures in the Asia/Pacific region were invited with the aim of developing human resources in this field.

The training course on 'the conservation and restoration of wooden structures' was also conducted last year. This year's program was repeated under the same theme in order to provide an opportunity to those who missed out on last year's course.

In Nara, the Horyu-ji Temple area and the Nara city area had been inscribed as world heritage sites, therefore the restoration, conservation, and reuse of ancient structures can be observed during the training course. Apart from providing training on conservation, the course enabled the participants to exchange ideas with professionals in the same field and to establish a professional network in the region.

On behalf of the ACCU Nara Office, I wish to express my deepest gratitude to the many organizations and institutions that provided their support and expertise during this programme. These include the Nara Prefectural Government, the Nara City Government, the Japanese Association for the Conservation of Architectural Monuments, and the Nara Women's University.

Yoshiyuki USHIKAWA
Director
Cultural Heritage Protection Cooperation Office,
Asia-Pacific Cultural Centre for UNESCO (ACCU), Nara

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1. General Information

Training Course On
The Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region:
- Preservation and Restoration of Wooden Structures -
(25 September – 24 October, 2003, Nara, Japan)

1. Organizers

Jointly organized by: The Asia/Pacific Cultural Centre for UNESCO (ACCU); the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); and the National Research Institute for Cultural Properties

In cooperation with: The Japanese Association for Conservation of Architectural Monuments (JACAM); Japan's Ministry of Foreign Affairs; the Japanese National Commission for UNESCO; Nara Prefectural Government and Nara Municipal Government

Sponsored by: Japan's Agency for Cultural Affairs

2. Background

In Japan, numerous wooden structures remain from as early as the 8th century, the majority of which have been well conserved thanks to regular restoration projects. Such constant efforts since early times to preserve the nation's cultural heritage have also brought about the development of preservation/restoration philosophies and the accumulation of knowledge and techniques. Having this background, Japan has been widely expected to contribute to the development of human resources necessary to preserve and restore ancient wooden buildings in foreign countries by providing training in the areas of wooden structure survey techniques and conservation/restoration philosophy and technologies.

The idea of holding training courses in Nara, Japan's ancient capital was proposed in a meeting of experts held to discuss the preservation of cultural heritage in the Asia-Pacific region, which took place in early March 2000 under the joint auspices of ACCU's Cultural Heritage Protection Cooperation Office and the Agency for Cultural Affairs. In response to this request, ACCU and ICCROM decided to hold training courses for the preservation and restoration of cultural heritage in the Asia/Pacific region, in a broad framework of UNESCO's activities.

3. Date and Venues

Date: September 25 (Thu.) to October 24 (Fri.), 2003
Venues: ACCU's Cultural Heritage Protection Cooperation Office (Nara Prefectural Government Horen Office, 757 Horen-cho, Nara City);
cooperating organizations' facilities; sites undergoing preservation and restoration, etc.

4. Objective of the Training Course

With many of the world's oldest existing wooden buildings, Nara Prefecture enjoys the wealth of knowledge and techniques accumulated over time concerning the preservation and restoration of historic structures. It is also rich in experience with advanced technological skills and has established philosophies based on such expertise and experience.

The aim of the training course is to further improve participants' theoretical knowledge as well as practical skills through lectures and practical training in the areas of wooden structure survey techniques and conservation/restoration philosophies and technologies. In addition, the participants will be provided an opportunity to share information and exchange their views and ideas with other people working in the same field within the Asia-Pacific region.

5. Training Curriculum

Lectures
- Introduction to Architecture
- Introduction to Asian Architecture
- Treaties and Charters relating to Cultural Heritage
- Survey Methods on Conservation of Vernacular Houses and Historic Towns
- Theories of Preservation and Maintenance
- Design and Supervision, Construction
- Management and Utilization of Structures
- Others

Practical Training and On-site Lectures
- Practical Training on Old Wooden Structure Conservation Project Sites
- On-site Lectures at the Facilities for Wood Conservation
- Field Study on Conservation, Restoration and Utilization (4-day study tour)
- Other works relating to preservation and restoration of architectural structures

Presentations and Discussion
- Presentations on the present status of preservation in each country and discussion
- Summary of the training course

6. Participants in the Training Course

(1) The training course is offered to the following 36 signatory countries to the UNESCO World Heritage Convention. For application, UNESCO National Commissions or UNESCO liaison offices need to submit documents required for those nominated no later than **20 / July 2003**: letters of recommendation written by the head of the organization to which a nominee belongs, profile of the nominee, and report on his/her major achievements. From among the nominees, 15 people will be selected as participants in the training course.

Afghanistan, Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Iran, Kazakhstan, Kiribati, Kyrgyz, Lao P.D.R., Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Rep. of Korea, Samoa, Solomon Islands, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam, Marshall Islands, Micronesia, Palau, and Vanuatu

(2) Qualification Requirements

Applicants should be:

A. experts, aged 45 years or younger, who are engaged in the preservation, restoration or management of wooden buildings and can capitalize on what they learn from the training programmes in their home countries;
B. those who have a good enough command of English to understand lectures, deliver presentations and write reports;
C. those who can attend all the training programmes;
D. those who can submit documents required (recommendation by NATCOM and reports) on time;
E. those who were not participants in the training course in 2002.

7. Notification of Screening Results

After due considerations with the other organizers, ACCU will select 15 people (only one per nation) from among applicants in around mid-August, and inform UNESCO National Commissions in each country and successful applicants of the screening results.

8. Certificate

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

9. Language

English will be used throughout the course.

10. Expenses

Expenses for participation in the training course shall be borne by the ACCU, only living expenses during their stay in Japan shall be borne for participants from Australia, South Korea and New Zealand.

(1) Traveling expenses:
Each of the participants (excepting those from Australia, South Korea and New Zealand) shall be provided an economy-class air return ticket from the international airport nearest to his/her residence to Kansai International Airport, and transportation fees between Kansai International Airport and Nara.

(2) Living expenses:
Participants shall be provided the basic living expenses incurred during the training course from September 25 (Thu.) to October 24 (Fri.), 2003. Arrangements for accommodations will be made by the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO.

11. Correspondence

Mr. USHIKAWA Yoshiyuki
Director
Cultural Heritage Protection Cooperation Office,
Asia/Pacific Cultural Centre for UNESCO (ACCU)
Nara Prefectural Government Horen Office,
757 Horen-cho, Nara City 630-8113
Tel: +81-742-20-5001
Fax: +81-742-20-5701
E-mail: nara@accu.or.jp

2. Programme Schedule

	M	D	AM 9:30-12:30 PM 13:40-16:40	VENUE
Introductory Lectures	September	24	Arrival	
		25	Inauguration and Introduction to the course Introduction to the Cultural Heritage Protection System in Japan (Dr. SAITO)	ACCU
		26	Introduction to Architecture (Dr. SAITO) Conservation of Timber Buildings (Mr. YAMATO)	ACCU
		27		
		28		
		29	Conservation of Wooden Architectural Heritage in the Asia-Pacific region(Dr. WIJESURIYA) Design for the Reconstruction of Ancient Buildings in Nara Palace Site (Mr. SHIMIZU Shigeatsu)	NRICPN
		30	Theory and Practice of Conservation (Mr. MYKLEBUST) Discussion	ACCU
Workshop	October	1	On-site Lecture: Horyu-ji Temple, Yakushi-ji Temple and Nara Prefectural Folklore Museum (Prof. UENO)	
		2	Participants' Presentation and Discussions: Case Studies on Practical Wooden Architectural Heritage Conservation in Asia and the Pacific (Dr. INABA)	ACCU
		3		ACCU
		4		
		5		
		6	System and Project Planning for Restoration of Important Cultural Properties (Mr. KIMURA) Overall Process of Conservation in Japan (Mr. KIMURA)	ACCU
		7	On-site Lecture (preparation for practical training) Workshop	Toshodai-ji Temple
		8	Workshop	
		9		
		10	Workshop Discussion on Practical Training	
		11		
		12		
		13	National Holiday	
Lectures		14	An Introduction to the Conservation Science of Archaeological Relics (Mr. KOHDZUMA) Architectural Development of the Japanese House and Wood Species Used for Construction (Prof. ITOH)	NRICPN
		15	On-site Lecture: Hida-Takayama, Gifu Pref. (Mr. SHIMIZU Shigeatsu)	
		16	On-site Lecture: Shirakawa-go(World Heritage), Gifu Pref. Kanazawa, Ishikawa Pref. (Mr. SHIMIZU Shigeatsu)	
		17	On-site Lecture: Ichijodani Site, Fukui Pref. (Mr. SHIMIZU Shigeatsu)	

Further lectures	**October**	18		
		19		
		20	Dendrochronology in Japan and its Application (Dr. MITSUTANI) Cultural Heritage Preservation and Restoration (Mr. SHIMIZU Shin'ichi)	NRICPN
		21	Policy and Problems regarding the Conservation of Historic Districts in Japan (Prof. UENO) On-site Lecture: Imai-cho Town, Kashihara (Prof. UENO)	
		22	Protection of Traditional Techniques and Materials for Sustainable Conservation (Mr. MURATA) On-site Lecture: Roof-tile Factory	ACCU
		23	Day for writing the Final Report	ACCU
		24	Conclusion and Evaluation of the Course Closing	ACCU
		25	Departure	

NRICPN : National Research Institute of Cultural Property, Nara

II

Proceedings

1. Opening Ceremony
2. Summary of Lectures
3. Workshops at Toshodaiji Temple
4. On-site Lectures

1. Opening Ceremony

The Opening Ceremony of the Training Course was held on 25th September 2003 at the Kasugano-so, Nara city, Japan with the attendance of fourteen participants and honorable guests from Japan's Agency for Cultural Affairs, the National Research Institute for Cultural Properties, the Japanese Association for Conservation of Architectural Monuments (JACAM), Nara Prefectural Government and Nara Municipal Government.

Mr. USHIKAWA, ACCU Nara

Mr. USHIKAWA Yoshiyuki, Director of the ACCU Nara Office gave a heartfelt welcome address to the participants, introducing the roll of the office, as well as the history and background of the Training Course. Mr. USHIKAWA concluded his speech wishing all participants a fruitful stay in Japan.

Mr. TANABE, National Research Institute for Cultural Properties, Nara

Mr. TANABE Ikuo, Head of the Centre for Archaeological Operations, National Research Institute for Cultural Properties, Nara welcomed all participants and wished that they will bring back many good experiences from this programme.

Ms. OHNUKI, ACCU

Ms. OHNUKI Misako, Director of Culture Division of ACCU, introduced the history of ACCU. She wished that all participants would take advantage of this training course in Nara and learn effective ideas and strategies not only from the lectures but from the people living in Nara.

Mr. SUZUKI, Japan's Agency for Cultural Affairs

Mr. SUZUKI Norio, Councilor on Cultural Protection of the Japan's Agency for Cultural Affairs insisted the importance of cultural heritage and how international cooperation on the protection of cultural heritage will contribute towards the cultural development. He anticipated that the participants would spend a memorable month in Nara being surrounded by many historical sites and buildings.

Mr. Minamida giving a welcome address.

Mr. Katsuyama

Mr. MINAMIDA Akinori, Deputy Mayor of Nara Municipal Government and Mr. KATSUYAMA Kiyoshi, also gave a welcome addresses.

Following the speeches, honorable guest, Mr. MURAKAMI Jin'ichi, Executive Director of JACAM and Ms. SANO Takiko, from the Japan's Agency for Cultural Affairs were introduced to the participants.

Each participant was individually introduced and a commemorative photo was taken. The group then visited Nara Prefectural Government Hall and made a courtesy call on Mr. MASUI Isao, Deputy Governor of Nara Prefecture. Mr. MASUI welcomed them with a heartfelt greeting.

From the top level of the building, the participants gained a panoramic view of the city of Nara, where they would stay in the following four weeks.

Mr. Masui welcoming the participants

2. SUMMARY OF LECTURES

A series of lectures were delivered by various experts during this Training Course. The following is a complete listing of the lectures with a brief description of their contents.

Introduction to the Cultural Heritage Protection System in Japan (25 Sept. 2003)
Dr. Hidetoshi SAITO, National Research Institute for Cultural Properties, Tokyo.
"History of the Protection and the Concept of Cultural Properties in Japan"

- Historic overview of the development of conservation laws in Japan in relation changes in its political and economic context.
- An introduction to aspects of the law, including the various classifications of cultural properties and the concept of 'tangible' and 'intangible' cultural properties.

Introduction to Architecture (26 Sept. 2003)
Dr. Hidetoshi SAITO
"Preservation of Historic Districts in Japan"

- Definition of 'Groups of Historic Buildings' – one of the categories of cultural properties.
- Explanation of the designation process, including the roles of the local and national governments.
- An overview of the regulatory controls that apply to designated districts, illustrated by examples.


Dr. SAITO giving the first lecture of the training course

"Katsura Rikyu – its Buildings and Gardens"

- Description of the history and design of the Katsura Rikyu, Kyoto. This villa was regarded as the 'finest example' of Japanese imperial architecture and garden design.


Mr. Yamato introducing the Japanese system of protecting architectural cultural properties

Conservation of Timber Buildings (26 Sept. 2003)
Mr. Satoshi YAMATO, Agency for Cultural Affairs.
"The Tradition of Wooden Architecture in Japan: Outline"

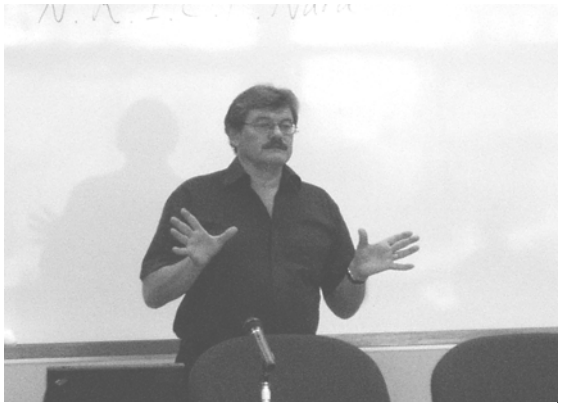
- The historic development of traditional architectural forms in Japan.
- Description of the characteristics and typology of Japanese wooden architecture, including traditional carpentry techniques.

- An overview of the regulatory bodies and experts involved in the conservation of architectural monuments, including the specialized role of conservation architects in Japan.
- A theoretical outline of common restoration procedures.

"Protection of Cultural Property Buildings"
- An overview of the trends in the types of buildings that were designated during different stages in the development of conservation laws in Japan.
- The distinction between 'designated' and 'registered' cultural properties, and the different levels of regulatory control and government subsidies that apply.
- Financial support from the government: subsidy and tax exemption schemes.
- Training for Conservation Architects.

Theory and Practice of Conservation (29 Sept. 2003)
Dr. Dag MYKLEBUST, Directorate for Cultural Heritage, Norway.
"Concepts and Philosophy of Conservation"

* This presentation had been based on discussions on the following topics:
- Personal and political agenda underlaying conservation activities.
- Definition of the concept of 'history' and 'monument'.
- The concept of conservation activities as 'story-telling', which sometimes conflicts with the value of 'authenticity'.
- The concept of 'sustainable development'.
- The 'Value Analysis Chart' – elucidating the purposes and methods of conservation. Case study: Nara palace site.


Mr. Myklebust

- Pragmatic and ethical issues related to conservation, illustrated in European examples and the restoration of the Stave Church in Norway.

Design for the Reconstruction of Ancient Buildings at the Nara Palace Site (29 Sept. 2003)
Mr. Shigeatsu SHIMIZU, National Research Institute for Cultural Properties, Nara.
- Controversies concerning the merits of reconstruction work.
- The processes involved in a reconstruction project: investigation, research, design, construction.
- Difficulties in extrapolating missing information from existing physical remains on site.
- Various types of resources used in researching for reconstruction designs and their limitations.

- This lecture was followed by a site visit to the reconstruction site of the Daigokuden (main hall of the Heijo palace), where earthquake-proof techniques were observed.

After Mr. SHIMIZU's lecture, participants toured the reconstruction site of the Daigokuden, Heijo Palace Site (World Heritage), and observed the new technologies applied on the reconstruction.

Conservation of Wooden Architectural Heritage in the Asia-Pacific Region (30 Sept. 2003)

Dr. Gamini WIJESURIYA, ICOMOS –
Department of Conservation, New Zealand.

- Methodology of conservation: examples of conservation projects in Sri Lanka.
- Issues and values pertaining to conservation practice: local vs. global principles, political motives vs. conservation values. Shifts in values throughout history.
- Consideration of the intangible values that are transmitted by and preserved with monuments.

Dr. Wijesuriya

Country Report Presentations (2 – 3 Oct. 2003)

Facilitator:

Dr. Nobuko INABA, National Research Institute for Cultural Properties, Tokyo.

Guests:

Mr. Dag MYKLEBUST, Directorate for Cultural Heritage, Norway.

Dr. Gamini WIJESURIYA, ICOMOS – Department of Conservation, New Zealand.

Country Report Presentation

Participants explaining about the legal structure for conservation work in their countries

Mr. Kohdzuma guiding a tour of the conservation science laboratory.

- Each participant delivered a 45 minutes presentation about the cultural heritage in their country, and aspects of conservation work in their country. The presentations generated discussions on the merits of conservation activities in different countries, as well as comparisons of the different approaches.

System and Project Planning for the Restoration of Important Cultural Properties (6 Oct. 2003)
Mr. Tsutomu KIMURA, The Japanese Association for Conservation of Architectural Monuments, Tokyo.

- Description of the various classifications for cultural properties in Japan.
- Distinction between the registration and designation system, and between locally and nationally designated cultural properties. Flowcharts illustrated the extent of regulatory controls that apply to cultural properties within different classifications.
- Case Study: Assembly Hall of the Yamagata Prefecture. This elucidated the typical procedures of a restoration project in Japan, as well as an exemplifying the adaptive reuse of a historic building.

Terrestrial Laser Scanning Equipments (6 Oct. 2003)

- An introduction to some of the most advanced surveying technologies used in the investigative stage of the restoration project at Toshodaiji Temple.

An Introduction to the Conservation Science of Archaeological Relics (14 Oct. 2003)
Mr. Yohsei KOHDZUMA, National Research Institute for Cultural Properties, Nara.

- An introduction to the various scientific methods and instruments used in the analysis and preservation of historic relics, with particular focus on the treatment of timber artifacts

and possible applications of such technologies in the preservation of timber architectural components. This lecture was followed by a tour of the conservation science laboratory at the Nara National Research Institute for Cultural Properties.

Prof. Itoh

Architectural Development of the Japanese House and Wood Species used for Construction (14 Oct. 2003)

Prof. Takao ITOH, Wood Research Institute, Kyoto University.

- A historical overview of the evolution of timber structures in Japan.
- An introduction to the species of timber that were commonly used during different periods in Japan's history.
- Determining the age and origins of cultural artifacts by identifying the species of timber they were made of.

Dr. Mitsutani, giving a lecture on new dating methods.

Dendrochronology in Japan and its application (20 Oct. 2003)

Dr. Takumi MITSUTANI, Nara Research Institute for Cultural Properties.

- An introduction to the technique of Dendrochronology, i.e. 'Tree ring dating'.
- An overview of the procedures involved: data collection and calibration, sample analysis and dating process.
- Applications of dendrochronology in determining the age of archaeological and architectural relics.

Mr. Shimizu

Cultural Heritage Preservation and Restoration (20 Oct. 2003)

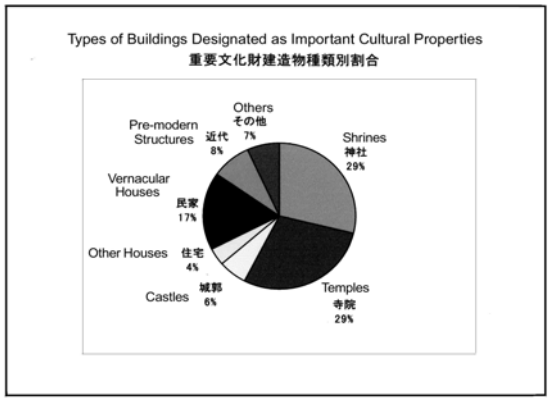
Mr. Shin'ichi SHIMIZU, Nara Research Institute for Cultural Properties.

- Highlighted various areas to address in carrying out the conservation of historic buildings, including the installation of fire prevention systems, precautions against natural disasters, ongoing repair and maintenance.
- Emphasized the importance of public awareness and the delegation of responsibility to property owners.

Mr. Murata

Protection of Traditional Techniques and Materials for Sustainable Conservation
(22 Oct. 2003)
Mr. Ken'ichi MURATA, Agency for Cultural Affairs, Tokyo.

- Recapitulation of the legal framework and practice of conservation activities in Japan, with examples illustrating the range and current conditions of designated buildings.



Excerpts from the presentation of Mr. Murata

3. Workshops at Toshodaiji Temple

7th – 10th October, 2003

A series of practical workshops were held at the Toshodaiji Temple restoration site. Chief conservation architect Mr. Tetsuji UEDA delivered an on-site lecture outlining the history and progress of the restoration project. This project exemplifies the unique Japanese method of '*kaitai shuri*' – restoration with complete dismantlement, which is generally carried out every 300 to 400 years in the repair of traditional wooden structures.

Due to the presence of significant structural deformation at the Toshodaiji Temple, major restoration work was initiated in 1998. This project is scheduled to be completed in 2009. Mr. Ueda described the meticulous process of the project, which includes the following main stages:

1. historical research
2. site investigation and structural analysis
3. restoration design and planning
4. site preparation (construction of a sheltering shed over the temple)
5. dismantlement of the temple
6. data collection and recording
7. examination and repair of structural components
8. reassembly of the temple
9. cleaning of the site (removal of sheltering shed)

At the restoration site, the participants were able to gain hands-on experience of the various techniques used during a restoration project. The workshops focused on two areas: site analysis and the recording of data; they are described below:

Workshop 1 – Restoration Plan Proposal

Purpose: To critically examine the present conditions of a dilapidated historic structure, and to determine an appropriate restoration plan.

Activity: Participants visually examined and recorded the conditions of a small shrine building (the *Benten-sha*), which is located on the temple grounds. In particular, they were asked to observe evidence of previous restoration work, the age of the different parts of the structure, as well as the location, causes and extent of damages in the present structure. After a consideration of these data, each participant proposed an outline restoration plan.

It was interesting for the participants to compare their restoration plans and note the differences in opinion and approach. Many participants thought that this was a valuable exercise for them to experience the process and apply the principles of conservation, which they have learnt during the lectures in this training course.

Inspecting the Bentensha Shrine

Comparing the restoration plans

Sketching a model of the Main Hall

Taking site measurements

Workshop 2 – Site Drawings

Purpose: To gain an understanding of the structural principles of traditional Japanese wooden buildings, and to produce various types of drawings as records.

Activity: Part 1 – Since the Toshodaiji main hall has now been almost completely dismantled, the participants studied a scaled model of the temple in order to visualize the complete structure. Participants prepared a sectional sketch of the model, in order to understand the logic of the structural assembly.
Part 2 – Participants prepared a scaled drawing of a bracket set based on measurements and sketches of the actual temple taken at the restoration site.

Most participants have found that through careful observation and sketching, they were able to derive a clearer understanding of the structure of traditional wooden buildings, as well as the original design intentions.

Workshop 3 – Techniques of Recording data (The *takuhon* method)

Purpose: To practice the techniques of dry-rubbing and wet-rubbing, which are applied in making records of building components.

Activity: Part 1, Dry-rubbing – Participants covered the surface of a timber structural member with a sheet of special tracing paper. An imprint of the timber grains on the face of the member was then made by rubbing it with carbon paper. This enables surface defects to be clearly identified. The participants learned how to prepare an accurate, scaled drawing of the irregular-shaped member from the outline of the trace.
Part 2, Wet-rubbing – An imprint of the patterns on the face of terracotta roof tiles were made by overlaying the tile with a piece of wet tracing paper. The paper was gently pressed and molded into the contours of the tile. It was then stamped with an ink-soaked pad in order to obtain an imprint of the patterns on the tile.

These techniques were new to most participants, who had found them economical and useful ways of recording information about historic building components. Many participants commented that they intend to introduce these methods in their work back in their own countries.

Practising the dry-rubbing method

Practising the wet-rubbing method

4. On-site Lectures

Historic Buildings in the Nara Area: A way to understand Japanese wooden architectural heritage (1 Oct.)
Prof. Kunikazu UENO

Open air Museum of Traditional Houses: Nara Prefectural Museum of Folklore

Prof. UENO gave an overview of the conservation concepts and methods for traditional houses. He guided the group around the museum, explaining about each of the exhibited houses. After his site lecture, there was time for the participants to examine the houses by themselves and ask Prof. Ueno questions.

On-site lecture at the Open-air Museum

Horyu-ji temple

Participants toured an exhibition of traditional carpenter tools at the information center of the temple before touring the site.
Horyu-ji temple is the oldest wooden building in Japan and is registered as a World Heritage site. This temple has been repaired many times throughout its history, based on the principle of retaining as much of the original as possible and repairing only the damaged parts of the structures. Here the participants were able to observe the outcome of such conservation practice.

Yakushi-ji temple

A brief history of the temple was given by Prof. UENO. The participants observed the reconstructed temple buildings at this site and were able to compare them to the original, old buildings seen at Horyu-ji Temple.

World Heritage -Preservation, Restoration and Utilization of Historic Street (*Machinami*) (15-17 Oct.)
Mr. Shigeatsu SHIMIZU

15 Oct. - Takayama City, Guided by Mr. Akira TANAKA and Mr. Keisuke OZAKI

Takayama Museum of Local History

The museum itself is an example of the reutilization of an old brewery. Mr. TANAKA gave us a short lecture on the building's history.

Mr. Tanaka explaining about the fire-fighting system in Takayama historic town.

San-machi

San-machi was designated as a preservation district in 1979. Participants observed the landscape, buildings and conservation activities here:

1. Nearly 25 years have passed since its selection as a preservation district. Examples of the repair, restoration and utilization of historic buildings in this area was observed and evaluated.
2. Fire prevention measures employed here was studied. The most advanced and thorough fire prevention measures have been undertaken in this district as the streets are lined with wooden historic buildings that can catch fire easily.

Studying the design of a traditional *sake* brewery in Takayama.

Shimonino-machi and Daishin-machi Area

The National Research Institute for Cultural Properties in Nara conducted an investigation of this street from 2001 to 2002, since it has been nominated as a 'Preservation District of Groups of Historic Buildings'. Municipal authorities took initiatives to get the consensus of local residents and to develop the preservation plan.

1. Learn about the process of achieving the consensus and cooperation of local residents in the preservation of "*Machinami*"
2. Discuss the methods of preserving "*Machinami*" and conducting restoration work on site, focusing on the restoration of areas where some buildings have been reconstructed based on modern designs or set back from the street to make space for planned road construction projects.

Observing a reconstructed *gassho* style house in Shirakawa-go.

16 Oct. - Shirakawa-mura Village

Shirakawa-mura, Ogimachi, Guided by Mr. Keita MATSUMOTO (from the Shirakawa-Go *Gassho*-style Conservation Foundation)

Shirakawa-mura (a World Heritage site) is a Preservation District of Groups of Historic Buildings. Participants visited a traditional 'gassho style' house which is now undergoing repair work, and another house that has been reutilized as an inn. Participants observed the conservation status of this mountain village settlement in various aspects:

1. Landscape conservation
2. Restoration work of structures
3. Disaster prevention facilities
4. Vernacular house museum
5. Examples of utilization
6. Merits and demerits of World Heritage inscription

Oyama-Jinja Shrine, Kanazawa city

16 Oct. - Kanazawa City
Higashiyama, Higashi and Oyama-Jinja (shrine) gate, Guided by Mr. SHIMIZU

Higashiyama is a designated Preservation District of Groups of Historic Buildings. Participants evaluated and discussed the conservation status of "Chayamachi" – a traditional entertainment area, and "Oyama-Jinja (shrine) gate"– an Important Cultural Property that exemplifies a recently restored quasi-Western style structure built at the end of the 19th century, which displays a strange merging of Japanese pre-modern carpentry techniques and western architectural styles.

17 Oct. - Ichijo-dani, Fukui City, Guided by Mr. Yasuhide YOSHIOKA
(from the Wakasa History and Folklore Museum of Fukui Prefecture)
Ichijo-dani, the Asakura Clan historic site – Special Historic Site
Fukui Prefectural Museum of Ichijo-dani, the Asakura Clan Site

In the Ichijo-dani castle town, medieval wooden buildings were reconstructed based on paintings of those days and archaeological evidence. Mr. YOSHIOKA has been involved with the planning of this site from the beginning.
After his explanations on site, participants observed the reconstructions at Ichijo-dani and discussed the concepts and methods used there.


At the Museum of Ichijo-dani, watching the diorama of Ichijo-dani Valley

Policy and Problems on the Conservation of Historic Districts in Japan (21 Oct.)
Prof. Kunikazu UENO

The Imanishi-ke residence

Imai-cho Town – Preservation District
Prof. UENO gave a lecture on historic districts. This was followed by a site tour during which the participants examined the actual application of conservation theories. The sites visited include the Imanishi-ke residence and the former Kometani-ke residence, both of which are registered as important cultural properties, as well as other restored residences.

The Protection of Traditional Techniques and Materials for Sustainable Conservation (22 Oct.)
Mr. Akio KOBAYASHI
(from the Kawara-u Roof tile Factory)

On-site lecture at the roof tile factory

Kawara-u ― Roof tile factory
Kawara-u is a roof tile factory that produces traditional roof tiles for the reconstruction and repair of traditional buildings all over Japan. Participants observed how terracotta roof tiles are made, and saw the huge collection of roof tile molds and tools, which are also registered as cultural properties by the Nara municipal government.

III

Participants' Country Reports

(In alphabetical order by country)

Bangladesh

Zakir Hossain CHOWDHURY
Sub-Assistant Engineer
Department of Archaeology
Government of Bangladesh

Historical Monuments of Bangladesh & the Problems of their Preservation

Introduction

Bangladesh, which was established as an independent country in 1971, is bounded on the north, west and east by India, in the extreme southeast by Myanmar, and on the south by the Bay of Bengal. Except for a few low hill ranges on its northeast and eastern fringes, the entire country is almost flat and level and is essentially deltaic in nature. In fact it is the largest delta in the world and truly the gift of three mighty rivers such as the Brahmaputra, the Padma (Ganges) and the Meghna. These three rivers, together with their innumerable tributaries, sweep across the vast basin in a bewildering network of channels and streams. These rivers made and unmade the history of the country and are largely responsible for shaping the destiny of the land and its people.

Historical background

The early history of Bangladesh is mostly legendary. From the 3rd century BC to the 12th century AD, the northern and western part of the country (then known as Pundrovardhana) was ruled successively by the great Mauryas (3rd Century BC), the Guptas (4th – 6th Century AD), the Palas (8th-12th Century AD) and the Sena rulers (11th – 12th Century AD) until the latter's rule was overtaken by the Muslim in 1204 AD. The central part known as Vanga (Banga→Bangala→Bangladesh) was ruled by some semi independent and less known dynasties. Lastly, from the 7th century to 11th century the southern and eastern part of Bangladesh was ruled independently successively by Buddhist Khadga, Deva and Chandra rulers of the Samatata Kingdom situated on the trans-Mugha region.

Since the conquest of the north and western part of Bengal by Bakhtiar Khilji in 1204 AD a new era was ushered in the history of Bengal. In the next two centuries, the whole of old Bengal was gradually brought under Muslim rule. It broke away from Delhi in 1338. For more than two hundred years from 1342 Bengal remained independent until it was subjugated by the Mughals in 1576 AD. Since then it remained a rich province of the Mughal empire until the death of the last great Mughal emperor Aurangajeb in 1707 AD. In 1757 Bengal was occupied by the British East India Company and the colonial rule continued for nearly two hundred years.

During more than two thousand years of its history a large number of prosperous cities, fortified palaces, huge Buddhist monasteries and stupas, magnificent temples, monumental gateways, victory towers, mosques and mausoleums as well as other public buildings were built by various rulers of the country. Most of these noble monuments have perished with the passage of time and at the hands of various destructive forces of nature and man. But, those that still survive are not insignificant.

Materials used in ancient architecture

The causes of the obliteration of ancient architecture and the present problems of their conservation can best be understood by knowing the materials used for their construction and the climatic condition of the land. These are briefly discussed below.

Most of the pre-Muslim buildings were built with highly perishable materials such as mud, bamboos, reed and wood. Only the more pretentious buildings were made of kiln-burnt bricks laid in mud-mortar. However, in most of these huge buildings the doors, windows, doorjambs, doorsills, door leafs and also the roofs were made of wood. Clay has been the main building material of the traditional architecture of Bangladesh throughout all periods. As a result of the copious monsoon rains, which falls between June and September and vary between 70 to 100 inches in a year, buildings made of clay or clay mortar soon crumble to the ground. The same fate befalls on architecture made of wood. Although no wooden structure of the pre-Muslim period has survived, the discovery of a number of wooden pillars and architectural members belonging to the Sena period amply testify that wood were used in constructing palaces, temples and other buildings by kings, courtiers and other rich people. With the advent of the Muslims in Bengal in 13th century AD, the use of clay as mortar was replaced by lime-surki (a mixture of lime and powdered bricks) as bonding materials. However, buildings constructed during the Muslim period also met with the same fate due to heavy rain and the resultant dampness.

Stone is not readily available in Bangladesh, therefore it was rarely used in old construction works. However, it had been used very economically in some pre-Muslim monuments as doorjambs and pillars. During the Muslim period, stone was also used sparingly since they had to be brought from long distances away. As a result bricks made from easily available clay has been the main material for architecture in Bangladesh since time immemorial.

The devastating effect of the complicated hydrographic system is also largely responsible for the obliteration of many noble monuments of the country. The rivers which created the delta have frequently and extensively shifted their beds and in this process many prosperous settlement and historical monuments have been engulfed along their yielding banks.

In the past, the deliberate destruction of architectural edifices caused by man has also been extensive. The age old activity of vandalism to ancient monuments for the illegal extraction of bricks is a common practice. To these is added the problem of over population. In order to meet the needs of an ever expanding population, old and dilapidated buildings and mounds containing the ancient monuments are reclaimed daily by the plough for food production.

Despite such destructive activities of nature and man, quite a large number of ancient and historical architectures have survived. Only a few of the most important monuments are discussed below in brief to give an idea of the enormity of the task we are facing now to preserve those.

Historical monuments

There are a lot of historical monuments in Bangladesh but their exact number is not known since a thorough survey of them have not yet been completed. However, three hundred and thirty of the most important monuments and sites have so far been protected by the government. Only a few representative ancient monuments are discussed below under the following sub-titles:

1. Mahasthangar - the earliest known city site,
2. Buddhist Monuments,
3. Muslim Monuments,
4. Late Hindu-Buddhist monuments, and
5. British period architecture.

Mahasthan

The extensive ruins of Mahasthangar, sprawling on the western bank of the Karatoya River in the Bogra district, represents the earliest city-site in Bengal. It has been identified as the ancient Pundranagara of the Mauryas (3rd Century BC). The city continued to flourish as the provincial capital of the imperial Guptas (4th-6th Century AD), and the Buddhist Pala rulers (8th to 12th Century AD) of Varendra. The ruins of this ancient city cover a heavily fortified irregular oblong site, measuring 5000 by 4500 feet with an average elevation of about 15 feet from the surrounding countryside. Limited excavations here have revealed densely packed dwellings, temples and massive fortification walls at various points of the citadel. The city plan followed the general irregular pattern of all ancient great cities of northern India. Excavation on a number of ancient mounds, dotted about the city's suburb that fan out in a semi-circle of five miles radius, has exposed many temples and remains of various secular buildings. Archaeological evidences have proved that the citadel site was in use up to 16th century AD.

Buddhist Monuments

It is not precisely known when Buddhism was introduced into Bangladesh. However, it is a common belief that the religion was firmly established in North Bengal during the reign of Emperor Asoka (273-232 BC). The famous Chinese pilgrim Yuan Chuang who visited Pundravardhana in 638-39 AD, claimed to have seen a gigantic stupa built by Emperor Asoka on the outskirts of Pundranagara. One can visualize from the accounts of Yuan Chuang that in the 7th century, there were many Buddhist establishments in Bangladesh and the fame of some of these spread far beyond the frontiers of the land. It is known that when Buddhism was almost wiped out by the end of 7th Century elsewhere, it flourished in Bengal. Pala rulers of Varendra in the north were devouted Buddhists, as well as the contemporary Deva and Chandra rulers of Samatata in the south. Under their generous patronage, countless Buddhist religious and educational institutions flourished in the country. The remains of a number of ancient monasteries, stupas and other edifices have been unearthed in the recent past. For the purpose of this paper only a few monasteries are mentioned in brief.

Paharpur

The most spectacular Buddhist monument discovered during a regular excavation is the gigantic monastery at Paharpur in the Naogaon district. It has been identified from an inscription as the famous Somapuri Mahavihara built by the great Pala emperor, Dharmapala (770-810 AD). It is one of the biggest single Vihara in Asia. This immense quadrangular monastery (922x919 feet) with 177 living cells for monks arranged in regular rows on its four arms, its elaborate gateway complex on the north, numerous votive stupas, minor chapels and a multitude of other ancillary buildings within its vast perimeter, is dominated by a lofty pyramidal temple in the centre of the enclosure. The ground plan of this colossal temple resembles a square cross with angles of projections between the arms. It gradually rises in several terraced pile round a deep central shaft with an ambulatory passage around the monument in each of the two upper terraces. The basement wall of this imposing edifice is embellished, curiously, with 63 Brahmanical stone sculptures, above which runs, in two lower terraces, rows of terracotta plaques depicting the folk-art of the period.

Architecturally and historically, the Paharpur Vihara is a treasured heritage of the world which, in ancient Asia, established for the first time a striking new style of temple building on a grand scale It has influenced temple designs in the Far East, noticeably at the Pagan temples in Burma and the Chandi Loro Jongrang and Chandi Sewu temples in central Java.

The Paharpur vihara has been listed by UNESCO as a World Heritage.

Mainamati

An isolated, 11 mile long spur of dimpled hill-range, known as the Mainamati-Lalmai range, stretches through the middle of the Comilla district. Exploration of this range has revealed over 50 ancient sites dotted throughout the hills, mostly containing Buddhist remains of the 8th to 12th centuries. Excavation at a number of sites, locally known as Salban Vihara, Kotila Mura, Ananda Rajar Badi, Bhoja Rajar Badi, Rupban Kannya Mura, Itakhola Mura, Charpatra Mura and Mainamati Ranir Badi has, besides, exposing many Buddhist monasteries, temples and stupas, also yielded a rich collection of antiquities. By studying dozens of royal copperplates and coins, it has been possible to reconstruct the complete genealogy and military exploits of the hitherto unknown independent Deva and Chandra rulers of Samatata who made these monuments.

At the Kotila Mura site, three stupas have been found in a row, representing the Buddhist 'Trinity' or the Three jewels, i.e., the Buddha, Dharma and the Sangha. They were built with the traditional square plan and circular drums and hemispherical domes, and are a rare architectural example in the subcontinent.

At Salban Vihara, a well-planned 550 feet square monastery of the Paharpur type, consisting of 115 living cells for monks, built around a spacious courtyard with a cruciform temple in the centre facing its only gateway complex on north, was discovered in the 1960's. It was built by Bhava Deva, the 4th ruler of the Deva dynasty. But the remains of the second largest monastery of the country were discovered at the Ananda Rajar Badi mound after the country's independence. It was built by Ananda Deva, the third and the greatest ruler of the dynasty. This and other similar monasteries discovered at Mainamati, Paharpur, Vasu Bihar(Mahasthan), Jagaddal(Naogaon) and Sitakot (Dinajpur) represented a relatively late development of this typology, and were erected under royal patronage. These systematically planned, self-contained and massively built monasteries resembled defensive fortresses more than pure religious establishments, since the concern for security was an important factor in architecture.

Muslim Period

The building art of the Muslim period spanning more than five centuries may broadly be classified into two phases: the pre-Mughal (1205-1575 AD) and the Mughal (1575-1757 AD). The period of its isolation and independence for well over two hundred years is distinguished by strong regional elements on the monuments. This is reflected in a luxurious richness of surface decoration with this region's terracotta traditional art. Among other indigenous elements, characterizing the pre-Mughal phase are a striking curvilinear roof-form, drawn from the common thatched huts of rural areas, and the adoption of covered court in place of an open court. The more ambitious monuments built during the period of the independent Sultans such as the stupendous Adina Masjid (1364) at Pandua, the imposing triumphal gateway known as the Dakhil Darwaza (1465) at Gaud, the Eklakhi tomb (1425) etc., are all now in West Bengal. However Bangladesh is also rich in some of the finest monuments erected during this period.

Pre-Mughal Phase

Among the surviving monuments of the Sultanate period, the Tomb of Ghiyasuddin Azam Shah (1409) at Sonargaon, the Mosque of Baba Adam near Dhaka, Sura Mosque (1493-1519) in Dinajpur, Chhota Sona Masjid (1493-1519) at Gaud in Chapai Nawabganj, Bagha (1523) and Kusumba (1558) Mosques in Rajshahi, Qutb Mosque in Mymensingh and the Kherua Mosque (1582) at Sherpur in Bogra are excellent specimens. These splendid specimens of the Sultanate period are all profusely adorned with either terracotta floral motifs or delicate stone carvings.

A group of homogeneous buildings bordering Sundarbans in the mid-15th century were discovered. They were erected by an obscure saint-General named Ulugh Khan Jahan in the far south, and are distinct from the other buildings in this phase. The architecture is characterized by its severe simplicity, cyclopean tapering walls and turrets bearing affinity to the more famous Tughlaq architecture of Delhi. In this group, the most magnificent brick mosque - the biggest in Bangladesh(160 x 108 feet) – has been commonly known by its misleading name of Shait-Ghumbad Masjid (meaning 60 domed mosque). In actual fact, it is roofed over with 77 squat domes including 7 *chauchala* or four-sided pitched Bengali domes in the middle row.

The Shait-Ghumbad Masjid has been listed by UNESCO as a World Heritage.

Mughal Phase

With the advent of the Mughals and the enforcement of political centralization in this province, a uniform Mughal style in architecture was promoted, and the indigenous styles were largely discarded. New elements introduced by them included a dominant central dome and tall central entrance, set in projected bay for emphasis which itself was inset in a taller half-dome. But the fundamental change in adorning a building was brought about by discarding the terracotta art of the region and replacing it with repetitious plaster panels. The typical curvature of the roof of the pre-Mughal edifices were likewise abandoned in favour of a straight horizontal skyline. Henceforth the pillared kiosks of the Delhi monuments were emulated by the Bangladesh architects with remarkable success. However, during the early Mughal period, some monuments erected in outlying areas displayed a happy blending of the new imperial Mughal and pre-Mughal regional features. In this group the finest specimen is the Atia Jami Mosque (1609) at Tangail.

Important architectural legacies of the Mughal period, mainly concentrated in Dhaka, are the Bara and Chhota Katras, the unfinished Lalbagh Fort, tomb of Bibi Pari, Sat Gumbad Masjid, the Mosques of Haji Khwaja Shahbaz (1679), Khan Muhammad Mridha and Kartalab Khan (1704), the Husaini Dalan and a series of river forts at Idrakpur in Munshiganj, Hajiganj and Sonakanda in Narayanganj. The magnificent Katra buildings were erected in the middle of 17th century on the traditional Central Asian plain of caravansaries with a grand river front and monumental gateways. The Lalbagh Fort or the Aurangabad Fort, as it was originally named, is the unfulfilled dream of a Mughal prince. Emperor Aurangazeb's third son, Prince Azam began its construction on a grand scale in 1678 while he was Viceroy of the province, but could not complete it during his very short tenure of office. Shaista Khan the next governor continued the work but abandoned it unfinished.

The Lalbagh Fort is one of the noblest Mughal monuments in this region. It conforms to the general characteristics of the imperial Mughal architecture and accommodates a number of striking buildings inside, such as the Audience Hall and Hammam of the governor and the mausoleum of Bibi Pari. The unique tomb of Bibi Pari, the traditionally attributed daughter of governor Shaista Khan, is the only monument in Bangladesh where marble stones from Rajputana, black basalt from Rajmahal and glazed tiles have been used to embellish the interior of its nine chambers. The corbelled roofs of the chambers were spanned by massive overlapping courses of black basalt. The central tomb chamber is covered outside by a false copper dome in order to bring balance to the otherwise flat, unimposing composition.

Late Hindu-Buddhist Monuments

When the Mughals introduced sweeping changes in the building art of Bangladesh, especially in the surface decoration where the old traditional terracotta art was totally replaced by plaster panels, a large number of specialized local artists and craftsmen lost their patronage of the rulers but readily found their traditional skill transferred to the innumerable Hindu temples, raised all over the country by the affluent Hindu Zamindars from the 16th century onwards. Among these the Mathurapur Deul at Faridpur, the Kodla Math near Bagerhat, Sarkar's Math at Mahilara in Bakerganj and the Sonarang

temples at Tongibari, Dhaka, belong to the *sikhara* or tapering single spired type. The more ornate Hindu temples had more than one decorative spires or *ratnas* variegating the temple-top. Numerous beautiful specimens were found all over the country, such as the *pancha-ratna* Govinda temple at Puthia in Rajshahi, *nava-ratna Kantaji* temple at Dinajpur and the *Satara-ratna* temple near Comilla, the *Jor-Bangla* temple at Pabna town and the double-storeyed *chau-chala* Siva temples at Chandina in Comilla. These late medieval temples were usually embellished with fabulous terracotta plaques in continuous friezes, depicting the contemporary social scenes, scenes from the Hindu Epics and extremely delicate floral motifs.

Almost all the late Buddhist architectures of the country were situated in the district of Cox, Bazar and the Chittagong Hill Tracts. Those were built by the Chakma and Magh Buddhist tribes of the region. These devout Buddhists have erected a number of monasteries known as Khyangs, as well as beautiful pagodas and temples in Rangamati, Bandarban and Kaptai. But the most attractive and fascinating monasteries and temples were erected by the emigrant Rakhaine settlers of Cox's Bazar after 1800 AD.

A series of very colorful Pagodas or temples and Khyangs or Buddhist monasteries on the hill-tops or foothills of Cox's Bazar and Ramu were built in the true Arakanese architectural style. The pagodas, looking like stupas, usually had a square vault above the cellar. The structure tapered upward to a height of about 20 feet and was crowned by an ornamental brass pinnacle. The corners of the square base were chamfered with faceted vertical moldings. The sanctum was a low vaulted chamber, and originally housed the image of the Buddha on a recessed brick pedestal, which was approached through a vaulted barrel entrance. The structures at Cox's Bazaar are almost entirely built in brick and plastered over with lime-surki. The Khyangs of Cox's Bazar, Ramu, Chitmorong near Kaptai and several others in the area are also representative of the typical Arakanese style of architecture.

In Cox's Bazaar there are eight wooden Khyangs or monasteries and a number of pagodas. A group of about half a dozen dilapidated pagodas picturesquely located on the hill-top near the Circuit House is particularly noteworthy. In Ramu there are six Khyangs and several pagodas, as well as more in its areas. All these Khyangs and pagodas are held holy by the Buddhists from Teknaf to Cox's Bazar. The monasteries and temples are all built of teak wood in the style found in Rakhaine state and they slightly differ in plan, function and decoration from the contemporary wooden monasteries in upper Burma. All monasteries are raised well above the ground on heavy round wooden columns. The temples, although built with teak wood superstructure, rest on brick platforms.

Of the 8 Khyangs in Cox's Bazar the largest and most picturesque is the Aggameda Khyang, located near the entrance to the Cox's Bazar town. It consists of two parts and an old ordination hall which is supported by wooden columns, and some temples of relatively recent date for the use of the Buddhist community. According to the presiding priest of the monastery, the history of the structure goes back to 500 years when a temporary shelter was erected by some merchant for an ascetic named Egameda. Later, about 200 years ago Rakhaine refugees built this monastery on this holy site. It was ruined about 100 years ago and was rebuilt in 1899.

At Ramu, about 9 miles east of Cox's Bazar, the Rakhaine settlers erected at different times a number of Khyangs and pagodas. Of these the most important monastery, known in Burmese as Autapha Khyang is comprised of two wooden temples and one monastery, built as usual, on heavy teak columns. From an old inscription over the entrance to the temple it appears that the larger of the shrine was built in 1901 A.D.

There are five more surviving monasteries in Ramu, of which one is well looked after by a local Barua community while the others are in poor condition. The well-known Samo Mtroi temple complex includes within its vast precincts many temples and Buddhist monasteries erected at different times during last two hundred years. The oldest is a wooden monastery claimed to have been erected about two hundred years ago by a resident of Ramu. The temple is beautifully decorated with delicate wooden carvings similar to the wooden temples of upper Burma. The porch and the railings are also

covered with exquisite wood carvings which appear to have been originally plated with gold leaves that are still traceable at places.

Not far from the Samo Motri temple is a very big monastery, known as Ywagyi Pha Khaung. From a distance it appears like a myriad of tiered towers and roofs soaring high towards the heaven. The carved teak planks supporting the load of the multi-storied superstructure and roofs are very thick and solid.

At Nhila on the way to Teknaf there is a large cruciform monastery known as Tan Phya Khyang. It was built in 1899. Another important architectural monument, an old wooden monastery at Teknaf, is in very poor condition and is now being pulled down to clear the site for new development.

Only some of the prominent monasteries and temples of the area have been mentioned in brief to give an idea about these late Buddhist religious architecture. There are many more existing in the hilly areas and other places. Although these monuments are not native to Bangladesh and are not the typical architecture of this country, these late Buddhist monuments represent a milestone in our history, ie. when foreign art and architecture of adjacent territory was introduced under particular historical circumstances. Some of them need immediate attention for proper conservation; otherwise they will perish with the passage of time or would be destroyed as in the case of the Teknaf monastery mentioned above.

British period

The architectural trend under the British rule found a new dimension. European Renaissance style first appeared at Dhaka in churches, but was later applied to secular buildings, which were often provided with semi-octagonal or round towers at corners. Few of these surviving buildings are located in the Wiseghat area of the old city. The former State Bank building near Sadar Ghat is a fine example of its kind with its tall Doric columns. New architectural elements introduced in almost all palorcious houses of the 19th century include the semicircular arch, triangular gable supported on semi-Corinthian capitals and attractive foliated patterns in plaster. The Ahsan Manzil of the Dhaka Nawabs, the old High Court Building and the Greek Memorial inside the University Teacher-Student Centre are noteworthy examples.

Towards the end of the 19th and beginning of the 20th century a new hybrid Mughal and European style emerged. In their appearance obvious inspiration from Mughal architecture was drawn, while all amenities of the European buildings were provided inside. This hybrid style can be seen in a number of palaces build by rich land lords known as Zamiders. Among them Baliati Prashad, Ruplal House, Ahsan Manzil, Bardoman House of Dhaka, Shashi Lodge and Muktaghacha Zamiderbari of Mymensingh; Dhighapatia Raj Bari and the Palace of Rani Bhavani, Natore, Putia Raj Bari of Rajshahi, Tajhat Zamider Bari of Rangpur, and Dinajpur Rajbari are noteworthy. All these palaces are double storied and sprawling over a vast area. They are also gigantic. The present state of their conservation is not at all satisfactory. They are built of brick, which are laid in brick-surki mortar. The flat roof is rested on lighter wooden rafters and iron joists. Most of them are now abandoned while only a few have been declared protected by the government. Others may be left to ruin if speedy conservation is not done.

Present Conservation Policy

In Bangladesh the governmental Department of Archaeology is solely responsible for the preservation of cultural heritage including historical architecture. At present, there are 330 protected sites and monuments and the Department carries out regular maintenance work, chemical treatment and architectural conservation of these monuments with its limited resources and manpower.

However, special conservation of some very important monuments is being carried out under as development projects with fund provided by the government or donors.

The execution of structural conservation is conducted by an Archaeological Conservator with his Assistant Engineers. Each Assistant Engineer has his own jurisdiction. There are sub-Assistant Engineers in field level. Normally conservation work is requested by archaeologists, that is, the Regional Directors of the 4 Archaeological regions of the country. After receiving the requests for conservation, a Sub-Assistant Engineer prepares a proposal and submits it to the Assistant Engineer for modification. The proposal is then sent to the Director through the Regional Director of his region. It is then reviewed by an Archaeological Conservator before being finally returned to the Regional Director for execution. The project is assigned to engineers, who execute it based on the estimate, photograph and drawings supplied by the Regional Director.

Conservation projects are usually taken in two phrases – small scale repair of the damaged part to prevent further loss, and restoration of missing parts on the basis of archaeological research work. For the execution of both kinds of work the following steps are followed:

1. Procure site details;
2. Clear debris and weeds;
3. Collect materials;
4. Prepare materials (matching the original materials of the buildings);
5. Assemble a trained project team;
6. Choose an appropriate starting point based on the condition of the building under conservation;
7. Collect new found information
8. Report writing.

For the compilation of the report an engineer usually starts his writing with an introduction, which includes site particulars such as name, location, topography, environmental condition of the building and justification for the work. In the next phase of writing he describes the length, process (both structural and chemical) and everyday challenges. In the 3rd phase he concludes with his remarks including suggestion for the future. He adds a comparative statement also on the basis of pre-work and post-work photographs as well as drawings.

Major conservation work done so far since Independence

Conservation work has been done in a number of sites and historical monuments after liberation in 1971. A few of these are mentioned below.

Mahasthangar Fortification wall

Since independence structural conservation has been regularly carried out at different parts of this fort. Moreover, regular excavation is being continued in Mahasthangar under joint collaboration with French Govt. since 1991. Emergency conservation work of the architectural remains exposed during excavation is being done every ever.

Paharpur

Since its exposure during excavations from 1919 to 1933, limited but steady conservation measures have been adopted for the maintenance of this huge monastic complex. These include the repair and restoration of damaged and decayed walls of the central shrine, monastic cells, votive stupas and other subsidiary structures. Major repairs and restoration works have been being carried out here since the 1980's. These are outlined in the following.

The big refectory of the monastery was in a very bad state. The walls and pillars with mud as their binding ingredient were in an advanced stage of decay. Rain has caused the growth of vegetation on site, which in turn has caused great damage to the remains. While the interior of the damaged structures was restored with infillings of undressed bricks in lime surki mortar, the face of these buildings was repaired to match their original appearance with dressed old bricks. Thus the lime-surki mortar is kept invisible under the covering of mud mortar.

The southeast corner of the central shrine collapsed in 1975 and was restored in the following year. The fallen debris was removed and the missing wall rebuilt in the original style. Care was taken to reproduce the original ornamentation in the face work.

Some complex problems were encountered during the conservation of this monument. Due to the lack of suitable drainage, its vast courtyard remained flooded during the monsoon. The basement of the central shrine, votive stupas, refectory and other exposed remains of the courtyard suffered very badly from the accumulation of stagnant rainwater. The vast array of terracotta plaques with which the central shrine is decorated are fast corroding due to saltpeter action and water logging.

In order to tackle those problems effectively, international assistance was solicited in 1973. In response to this, UNESCO had sent three consultancy missions in December 1973, March 1975 and January 1979, headed respectively by Mr. P. Pichard, Mr. Roland Silva and Mr. John Sanday, who submitted their reports on the basis of their on-site observation of the problems.

Measures recommended by the UNESCO consultants for stopping rainwater percolation and for drainage from the pyramidal central temple have been executed. An earthen embankment with a gradual outward slope was provided around the central shrine, and a drain was laid out at the edge of the sloping ground so that water is not accumulated against the structure. The running off of water over the walls has been considered less harmful than the accumulation of water over them. The seepage of rainwater into the depressed open areas of the temple was prevented by inserting slab coverings over them (open cells, procession path, etc), which are graded for drainage. These slabs are concealed under 10 inches thick brick-chips and earth. A series of concealed drainage pipes at various levels carry rain-water quickly down to the ground level.

However, on the basis of the final report of the UNESCO consultants for the effective control of water logging and salinity, a Master Plan has been prepared. The first phase of conservation work as described in this Master Plan was finished in 2002. Now the preservation of the monument is almost complete. But there still remain several problems. These are listed below:

1. Humidity effect/dampness,
2. Stagnant rain water,
3. Salinity/acidity,
4. Effect of tourism,
5. Fragility of terracotta plaques, and
6. The lack of facilities for the local treatment of surviving antiques.

Sitakot Vihara

The structural remains of Sitakot Vihara were excavated just before the Liberation of the country. The excavated ruins were in a state of decay. The brick courses on the top and at the broken edges of the walls were dislodged. The walls in many places were deformed or dislodged out of the face lines. Conservation works executed during 1973-75 mainly consisted of resetting the loose masonry, and rebuilding the deformed walls to their original state. However, the repair work was executed with lime-surki mortar instead of the original mud. This was carefully concealed under the top layer of mud in order to ensure stability while maintaining the original appearance of the remains.

Salban Vihara, Mainamati

Extensive excavations undertaken during the 1950's and 1960's exposed imposing structural remains at Salban Vihara. These building remains were in an advanced state of decay. Activities of unsympathetic visitors and heavy monsoon cause further damages. However, continuous conservation measures in the last few years have maintained the monuments in a good state. For example, the damaged walls of its monumental gateway including entrance halls and staircases had been restored with old dressed bricks in lime-surki mortar. Further conservation work is now continuing.

Ananda Vihara

The Vihara of Ananda Deva was included in the conservation works program for the first time in the 1980's. At the time, it was in a very deplorable state with highly damaged walls and fallen terracotta plaques. It was also covered under dense vegetation. At the beginning, debris along with the wild plants were cleared. In the second stage, damaged portions of the walls were drawn and photographed. From the collected information, the damaged bricks were removed and the wall was reconstructed with a view to provent further decay. Loose plaques and bricks were restored to their original condition, and some face works were applied. The preservation of this building is now almost complete.

Conservation of Muslim Monuments

Major conservation work has been applied to a number of Muslim period monuments including the Chhota Sona Mosque, Khania Dhigi Mosque and Darashbari Mosque of Gaud, Chapai Nawabganj. Special attention was given to the conservation of Mughal monuments in Dhaka. The Lalbagh Fort deserves particular mention. The Mosque inside the Fort, the Audience Hall, the Tomb of Bibi Pari, fortification wall and two gateway complexes of the fort were thoroughly repaired and a Mughal style garden with fountains was laid out. Now the fort has been restored to its formal pristine beauty.

We have also done some special conservation work at the Pathrail Mosque at Faridpur in recent time (Fig. 1). In fact we have to do a lot of restoration work here as the mosque was in a highly dilapidated condition. The first phase of the conservation was limited to urgent repair works. The second phase of conservation was undertaken in 1988 and it continued until 1996. In this phase of work, some old stone pillars were replaced with new concrete pillars that conformed to their original shape and size. For the reconstruction of the dome a model was prepared based on the design of contemporary mosques, featuring lateral arch, sequenches with over sailing courses of bricks, etc. For the construction of the model, mud, wooden plunks and bamboo were used. The half circular dome was placed over a reconstructed brick structure. For surface decoration, professional potters were engaged to prepare cut bricks and terracotta plaques based on the designs of the old specimen discovered at the mosque site. The potters made several replicas on site and they were set on the walls of the mosque. Finally, the whole site was made presentable by clearing the surrounding. Now the mosque is a living monument and closely resembles the original.

Before restoration.

After restoration.

Fig. 1 The Pathrail Mosque, Faridpur.

Conclusion

The techniques of conservation may vary from time to time and region to region depending on the environmental condition, availability of materials, traditional processes and laws of a particular land. Moreover, there are international charters and recommendations. Provisions of all these are made in Bangladesh. However, we still carry out most of our conservation work on the basis of the Archaeological Work Code of 1938. This code is too old to cope with the challenges of conserving ancient architecture affected by salinity, water and other destructive forces of nature and man. The Department of Archaeology is the only agency responsible for conservation, and yet it has neither sufficiently trained human resources nor enough fund to tackle the enormous tasks of maintaining quite a large number of ancient monuments. In fact the country has extreme financial and expertise constraints. As such, conducting conservation work successfully is a challenging job for us. We hope affluent countries and organizations like the ACCU will extend further assistance both financially and by imparting appropriate training to our staff, so that we may succeed in saving our precious architectural heritage.

Bhutan

Nagtsho DORJI
Architect
Division for Conservation of Architectural Heritage
Ministry of Home and Cultural Affairs

Problems and the needs of cultural heritage protection activities in Bhutan

Bhutan is a small Himalayan kingdom unknown to many. But to the ones that have known Bhutan, it has always been its rich and unique culture that has left the deepest impression of the country. Be it the age old traditions and customs that are vibrantly alive or the religion that is dedicatedly followed or the rich architecture that is thoroughly practiced, Bhutan to date has been able to withstand the test of time and remain as a unique example of an original Himalayan culture.

From the magnificent architectural monuments to the unique farmhouses in the villages, from the rich colourful hand woven textiles still used daily to the pure white prayer flags fluttering high up near the clouds on the mountains, from the monks deep in prayer in ancient monasteries to the small Buddhist altars enshrined in 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 proudly evident.

The rich cultural traditions and the diverse architecture, to a large extent, has been kept alive due to the religion that the country has followed since the 7th century. Bhutan is the only country in the world where the Vajrayana (tantric) form of Mahayana Buddhism is the official / state religion. The respect for and importance of this religion in the day-to-day life of a Bhutanese has kept alive the age-old traditions, customs, culture and architecture in a harmonious way.

The cultural heritage of Bhutan is of such importance to the country that it is considered as the foundation upon which the identity of Bhutanese people and the kingdom of the Bhutan as a sovereign, independent nation is built.

In the document Bhutan 2020 – A vision for peace, prosperity and happiness, it is stated that:

> "For a small country like Bhutan, maintaining and strengthening a distinct national identity will always be an important factor in its continued well-being and security. It must be remembered that through the centuries, Bhutan had remained a sovereign, independent country because our past generations greatly cherished the unique national identity, which had been forged by the high values of the Bhutanese system and the rich cultural and religious heritage of the nation.
>
> Therefore, not only must this unique identity be preserved and safeguarded against the negative attitudes and influences that emerged with the process of development, but constant efforts must be made to foster an unfailing faith in, and a love and respect for, the nation's traditional values and institutions. Concrete steps must also be taken to promote all aspects of the nation's traditions, culture and customs that are relevant and practical for strengthening the country's unique national identity. At the same time, it must be realized that such measures are not being taken because of sentimental values or orthodox views to uphold past practices, but that they are crucial steps that must be taken to consolidate and safeguard the sovereignty and security of the nation."

The cultural heritage of Bhutan is so intricately interwoven into practically every aspect of the lives of the Bhutanese, that an overall sustainable development of the country is virtually impossible without the simultaneous conservation, promotion and development of the country's cultural heritage.

To quote Robert Dompnier from his book *BHUTAN - The Kingdom of Dragon*,

> "In terms of quality and originality, Bhutanese architecture is without doubt one of the best expressions of the country's cultural identity."

The topography, climatic conditions, availability of resources, indigenous construction methods, religious beliefs and cultural tradition in Bhutan has brought about a diverse architecture that reflects her history. Most of these architectural forms are treasure houses of the nation. They contain some of the best examples of Bhutanese craftsmanship with their magnificent carvings, murals, sculptures, ancient hand printed scripts, rare artifacts and textiles.

To a certain extent, the continual practice of building traditional architecture has helped in

- Consolidating and strengthening the unique cultural identity and spiritual traditions of Bhutan,
- Safeguarding the thirteen crafts (zorig chusum) of Bhutan and
- Promoting the economic development of the country (mainly the tourism sector).

The diverse architectural forms of Bhutan consist of the following:

1. Dzongs (fortresses)
2. Lhakhangs (temples)
3. Goempas (monasteries)
4. Chortens (stupas)
5. Palaces
6. Houses
7. Bridges

Dzongs:

Fig. 1. Dzong: Paro

These strategically located massive fortresses are the most important symbols of Bhutan's history. Primarily built for defense purposes, the *dzongs* house the monastic communities and functions as the administrative centers of the country. The *dzongs* were normally constructed to form oblongs or squares (that consisted of monk's cells and administrative offices) enclosing a courtyard with a central temple known as *utse.* These structures were usually made of massive buttresses type stonewalls, richly detailed wood works and pitched shingled roofs, which are now being replaced by corrugated iron sheets. Even to this day, the *dzongs* function as the dual centers of administrative and monastic activity of the country.

Palaces:

The few palaces that are found in country are mainly constructed during the reign of the first and second king. Though the basic layouts of these palaces are very similar to *dzongs*, the architecture of these palaces is considerably less massive and more open. These royal residences are also more decorative and colourful in terms of woodwork.

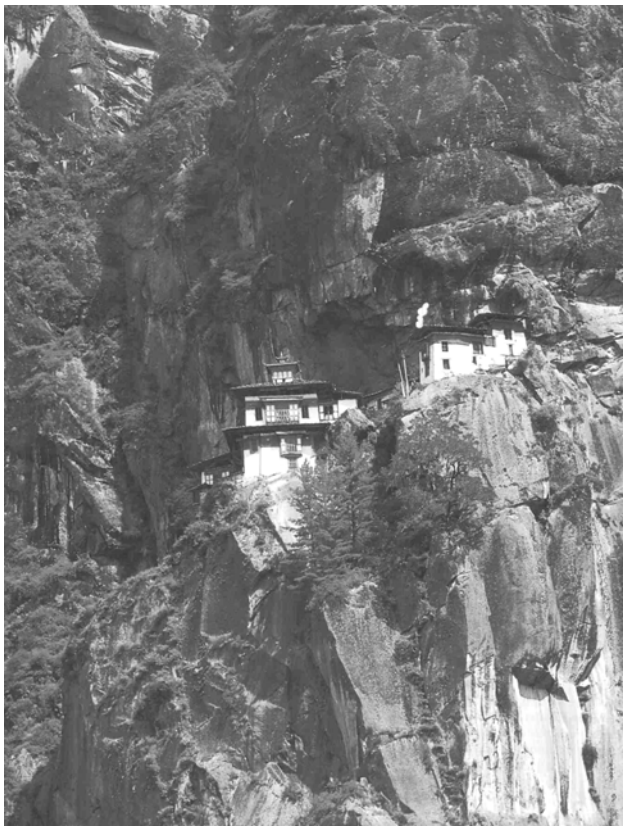


Fig. 2. Lhakhangs: Takshang

Lhakhangs:

These temples are said to be the first form of religious architecture and many of them are older than the dzongs, with some dating as far back as the 7th century. They are found in almost every village and on every hill / mountain of the country.

The *lhakhangs* are quite simple in terms of their layout and size compared with the dzongs, and few of them have as richly detailed woodworks as the *dzongs*. Besides being the religious centers of a particular village, *lhakhangs* play an important role in the social and cultural functions of the local community. A few *lhakhangs* are located in secluded and precarious locations; they serve as meditation centers. The *lhakhangs* usually house fewer monks compared to *goenpas*.

Goenpas:

These monasteries are primarily places of study for the monks.

The *goenpa*s usually consist of one or more temples with various dwelling and service structures grouped around it. The dwelling units for the monks are either haphazardly located around the main temple or it encloses a courtyard with a central temple, similar to the *dzong* layout. The size of the complex mainly depends on the number of monks studying in it.

Though the *goenpa* building techniques are very similar to the *dzongs*, there are few *goenpas* that have more elaborate architectural detailing than the *dzongs*.

Fig. 3. Goenpas: Gantey

Fig. 4. Chorten: Chendebji

Fig. 5. Traditional houses in Bhutan

Fig. 6. Yangtse wooden Bridge

Chortens:

The *chortens* (stupas) are the most common religious structures found in Bhutan. There are over ten thousands *chortens* located mainly on high mountain passes, on bridges, along the river and roads and on approaches to important locations such as *dzongs, monasteries, lhakhangs* and palaces.

Thare various types and sizes of *chortens*, the most common being the square shaped *chortens.* These square *chortens* are sometimes linked together by walls that have religious inscriptions on them (*mani* walls). Most of the *chortens* are built from stone in mud mortar with stone slabs, slates or wooden shingles as the roofing material.

Houses:

The traditional houses that form small villages not only function as residential units but also as a social, economical and religious unit. The family lives on the upper level of a common two-story traditional house while the ground floor is for domestic livestock. In certain villages, besides using the attic for drying agricultural produce and storage, the walled courtyards in front of the building is also used for the storage of large agricultural implements and for pounding cereals. These houses are usually constructed with thick-rammed earth or stone masonry walls, with narrow timber windows on the lower floors and larger ekra (wooden frame work with bamboo lathing plastered with mud mortar) timber windows on the top floor. The gable shingle roofing is placed over open timber trusses, thus forming the “flying roof” style.

Bridges:

The bridges in Bhutan have played a vital role in spreading rich spiritual and cultural values throughout the kingdom. The eight traditional means of conveyance across rivers that have developed in Bhutan are by a raft, tree trunk overlay bridge, stone slab cross-over bridge, cane ropeway, cane suspension bridge, iron chain bridge, single span *bazam* (bridge built out of timber trusses, with the trusses resembling layers of elephant tusks supporting the deck of the bridge) and double span *bazam* with a pier in the middle.

Bhutan's architectural heritage, prior to the country's emergence in the international scene (1960s), has remained rich and pristine from the time it has existed. The significance of these architectural structures to the daily lives of the Bhutanese people have made it possible for our ancestors to retain every feature in its original form. Even to this day, the existence of our heritage structures in their unblemished form tells us about the history, religious beliefs and the construction techniques of the people and the country.

Now, with exposure to the international community and modern development, and with all the positive consequences and mechanized technologies, a degeneration of the country's architectural heritage has inevitably resulted.

Bhutanese architectural designs that are unique, environmentally friendly, and built from local materials by local craftsmen are gradually being replaced by concrete structures constructed clumsily due to inexperience and lack of skills.

Entire villages with beautiful traditional houses are slowly disappearing with the introduction of new materials and imported construction methods. This is an evident of economic and materialistic values overshadowing cultural values towards the preservation and respect of cultural heritage that have been handed down through generations. In the past, the practice of preservation of traditional Bhutanese architecture was based on the religious belief that both the commissioner and the creator would earn merit in their next life. Now, the preservation of architectural heritage is practiced for aesthetic values and financial reward.

Chortens and temples are being desecrated and robbed; valuable cultural properties are being smuggled out of the country, and a general loss of respect for traditional and spiritual values is slowly creeping in the community.

With no tested models or tools, the process to effectively integrate modern development with the promotion of architectural and cultural heritage is largely unpredictable and thus poses numerous challenges.

To meet the challenge of developing the country without sacrificing its heritage, the National Commission for Cultural Affairs was established in 1985. Recently, this Commission has been merged with the Home Ministry and is now called the Ministry of Home and Cultural Affairs (2003). The main objective of this organization is to protect, preserve and promote the cultural heritages of the country. Under the Royal Government's policy of decentralization, it has also promoted sharing the responsibility of preserving the country's cultural heritage between all bodies, institutions, districts, local communities and individuals.

The Division for the Conservation of Architectural Heritage under the Ministry of Home and Cultural Affairs is responsible for the protection, promotion and development of the entire spectrum of architectural heritage in the country.

The Division for the Conservation of Architectural Heritage has the following main functions:

- Formulation of policies and regulations for the protection of architectural heritage in the country.
- Compiling the national inventory of all historical and cultural monuments and sites.
- Appraisal, approval and monitoring of projects concerning cultural and historical monuments and sites.
- Provision of technical and administrative assistance to the Dzongkhags (districts) and the public with regards to historical and cultural monuments and sites.
- Co-operate with other organization in plans and projects concerning conservation of Bhutan's architectural heritage.

- Co-operate with foreign donors with projects concerning Bhutan's architectural heritage.

- Organization of workshops and small training sessions for the protection and promotion of architectural heritage 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 Ministry of Home and Cultural Affairs and the Zhung Dratshang Lhentshog.

- The Division also provides technical assistance for the maintenance, repair and development of all existing buildings of the Ministry of Home and Cultural Affairs. This includes the Paro National Museum, the National Library, the Textile Museum, the Folk Heritage Museum and the Royal Academy of Performing Arts complex.

Beside these functions, the Division also works towards educating the Bhutanese people so that they will realize the values of architectural heritage and the need to conserve them in their original state. An example of one such educational programme is the annual essay competition held among students on the topic of 'the importance of architectural heritage conservation'. This essay competition is mainly targeted towards students because we believe that they play a vital role in keeping the architectural heritage alive as well as in passing it down to the future generation.

Although all efforts are being made by the Government and the Bhutanese people towards the conservation and promotion of architectural heritage in the country, many direct and indirect constraints have hampered the progress and impact. The main ones include the following:

1. Lack of Awareness:

The Royal Government with an objective to consolidate and strengthen the unique architectural style of Bhutan has laid out a set of guidelines and rules that state the necessity of incorporating certain traditional architectural elements into new buildings. This process of adapting traditional architectural elements with the needs, construction material and technology of current times has given birth to a new style of Bhutanese architecture. However, the emergence of such a style has, to a large extent, contributed to the eradication of the spiritual sentiments in protection of architectural heritage. In earlier times, Bhutanese people took great care in protecting the originality of structures due to the spiritual belief that one would attain nirvana by doing such deeds in preserving one's architectural heritage. Today, due to issues like commercialism and a lack of awareness on the values of architectural heritage, structures of historical and cultural importance are either being remodeled or dismantled to achieve grandeur using modern materials and construction style.

Such lack of awareness on the values of our architectural heritage has contributed towards an immense loss of ancient and rare architecture, art and crafts like traditional woodcarvings, mural paintings and other evidences of the country's rich cultural heritage and history.

2. Lack of appropriate legislations and guidelines:

The lack of proper legislation in regards to the protection, conservation and promotion of architectural heritage in the country has made it very difficult for the organization or individual concerned to work towards the conservation of architectural heritage. Without relevant legal support and guidance, confusion and disorganization is sometimes created and many efforts are wasted or become ineffective.

3. Lack of appropriate study and researches in the field of Conservation:

The lack of appropriate study and researches to demonstrate the authenticity, age, evidence of historical events and figures related to the site and the strengths of traditional structural designs have always been one of the constraints of conservation. A lack of proof to illustrate the authentic values of architectural heritage sites has contributed towards numerous cases of the dismantlement or reconstruction of important structures of great heritage value.

Most heritage structures have been reconstructed or remodeled in the belief that the new building would be better aesthetically and stronger structurally. But people fail to see that every part of a so-called old structure is an evidence of the existence of our ancestors embody the cultural, architectural and historical values that we have inherited. Therefore, due to lack of vital information about historic architecture, a mere crack on a rammed earth wall or stone masonry wall, signs of insect attack on the timber or a wet patch on the timber or wall is a good enough excuse for most Bhutanese to either reconstruct or renovate the entire building. The proven strength of new construction materials and techniques entices a Bhutanese more than the traditional style of construction. Such notion contributes to the loss of the traditional art of construction as well as the loss of architectural heritage.

4. Shortage of trained work force with necessary skills:

The shortage of skilled manpower who are not only trained in traditional skills but also have appropriate modern technical, management and innovative skills and training, has also created major obstacles in the conservation of cultural heritage. Sometimes, many ancient and rare structures are left to fall into disrepair or repaired or reconstructed without proper plans or preservation techniques. There have been cases where cracks on a traditional mud wall with exquisite mural paintings have been sealed using cement mortar. Though such practices have been carried out with good intentions, they have often caused more damage to the overall structure.

With regards to traditional skills, the majority of the experts are of the older generation. Younger people need to be guided to acquire these traditional skills, so that these skills can be sustained. The development of trained human resources must draw upon modern information and documentation technologies that will widen access to our heritage.

5. Access and communication problems:

Most of the architectural heritage sites in Bhutan are located in remote and sometimes almost inaccessible places, causing many constraints in their maintenance and restoration.

To a large extent, these hurdles faced during the process of conservation and promotion of architectural heritage in Bhutan are mainly due to the fact that the concept of conservation is still very new to the people. This is mainly due to the country's emergence onto the global scene being very recent. Preferences are for modern methods of construction as they are convenient, strong and fulfill current needs. On the other hand, the traditional methods of organic construction are considered cumbersome. Because of such preferences and thoughts, most fail to see that the unique cultural identity of the country is partly due to the existence of the rich architectural heritage, which to date has a high relevance to every individual in the country.

Cambodia

Sophorn KIM
Chief, Cultural Heritage Office
Battambang Provincial Culture and Fine Arts Department
Ministry of Culture and Fine Arts
Phnom Penh, Cambodia

Problems and Needs of Cultural Heritage Protection Activities in Cambodia

Introduction

Today I am very glad to have the opportunity to attend this training course. It is my great honor and pleasure to be here with you. This training program gives me an opportunity to exchange views with all of you present at this training course.

The Kingdom of Cambodia is the one of the oldest Southeast Asian countries and is one of the richest countries in terms of cultural heritage.

The Ancient capital of Angkor, in which the Khmer Kings built many monuments, is in Siem Reap province, where Angkor Wat is located. Besides that, there are many other ancient monuments and archaeological sites distributed throughout the country, for instance, in the provinces of Battambang and Banteay Meanchey in the north-west of the country, etc.

In this report I would like to inform participants of the "Problems and Needs of Cultural Heritage Protection Activities in Battambang Province of Cambodia".

Battambang is located in the North-West of Cambodia. About eight hundred thousand habitants live in Battambang Province. It was the second city of Cambodia during Sangkun Reastr Niyum which was ruled by the King Norodom Sihanuk, who today is the King of Cambodia. Battambang covers an area of 12,000 km^2, with a population density of 68 persons/ km^2.

Battambang Province has more than one hundred ancient temples, but today there only remain four ancient temples; the others have fallen into ruin. Also there are many traditional houses in the villages around Battambong City, and many houses of the colonial style in the city. Of the temples of pagodas, ancient buildings in the pagodas, traditional houses, colonial style houses, some are more than one hundred years old and the others are nearly one hundred years old.

Some of those old buildings are used as government offices and others are protected by landlords. The public buildings, like the buildings in pagodas, are protected by the commission of each pagoda and they are supported by the inhabitants who live around them.

I. Present Situation

1. Traditional houses

Almost all traditional houses were deformed, but some have changed their original forms, or changed a little in accordance with the landlords. Many traditional houses in the Battambong area were destroyed under the Khmer-rouge regime. The Khmer-rouge demolished the traditional houses to build new ones for villagers to gather in when they ruled Cambodia.

2. Colonial Style Houses

The colonial style houses are used for government offices and for citizens. Many of people are living in the colonial style houses, especially in the city. Apartments are standing along both sides of the streets in Battambang town. All the houses were closed during the Khmer-rouge time, and the people were not permitted to live in the chief town.

3. Pagodas

The temples and buildings of pagodas are nearly one hundred years old. Normally, each pagoda was controlled by pagoda commissions. Some temples and pagoda buildings were demolished or destroyed under the Khmer-rouge regime.

4. Ancient Monuments

As mentioned above, there are four standing temples in Battambang area at present, and they are in a bad condition. These temples were erected in the eleventh century. During the Khmer-rouge time, they took some stones of these temples to construct roads. That was a stupid idea.

5. Movable Arts Objects

Statues have been stolen from ancient temples or from pagodas. Sometimes the looters have looted the sculptures from bas-relief of temples or they excavated in prehistoric sites, archaeological sites and on the terraces of old temples. The inhabitants who live near to archaeological sites made collections to keep at their houses. Wooden Buddha statues in the temples of pagodas were stolen and ruined. Wooden sculptures are easy to be damaged by insect destruction.

There are many art objects in the provincial museum of Battambang, but no places to exhibit those objects because Battambang museum is a small one. Some objects were placed in the museum many years ago, and others were collected from areas surrounding Battambang. The Provincial Museum of Battambang is located in Battambang town on 1St street on Sangke western bank. The museum was built of concrete during the Sangkum Restr Niyum and was named the Museum of Sangkum Reastr Niyum.

It was officially inaugurated on October 29, 1968 by King Norodom Sihanouk himself who was then Head of State. During the time of Sangkum Reastr Niyum, there

were many valuable artifacts. All of these were inventoried, catalogued, dated and identified. However, during the genocidal era of Pol Pot, most pieces were seriously destroyed, and some others were lost. The Museum itself was used as a detention centre where innocent people were tortured and killed.

In 1997 the museum was supported by the NGO Seila Programme. The museum has been strengthened and improved. With the Seila donation, a small storeroom was built and there are more places in the museum for visitor displays. The museum was reopened for regular public visits.

II. History of Ancient Buildings

The traditional houses were constructed during the French Colonial era. Cambodia had been ruled by the French from 1863 to 1954. During that time, many colonial style houses were built.

The Preah Vihear (temples) of pagodas and the ancient buildings of pagodas were constructed by public donation, or sometimes rich persons supported those buildings. But the temples of pagodas must rely on the support of public foundations.

The four ancient standing temples were constructed in the eleventh century under the reign of King Suryavarman I. One of the four temples is located on Mount Banan. It was repaired two times, first in the twelfth century, and secondly in the thirteenth century. So, the Bậnan temple mixes three styles of Khmer art.

III. Cultural Heritage Protection Activities

There are six persons who work for the Cultural Heritage Office of Battambang province. This office is under the Department of Culture and Fine Arts of Battambang Province. We are responsible for Battambang Provincial Cultural Heritage Protection and Conservation.

We have prepared documents, laws and circular letters concerning the cultural heritage protection activities in order to disseminate information to the inhabitants. We present all documents to the chiefs of communes and villages for their understanding of what we do and what we plan to do in the future. In towns and the countryside, we have been informing chiefs of the role of landlords. The landlords are responsible for their traditional houses in the villages; when they have some problems, they must inform the village or commune chief and the chief or representatives or the owners of the traditional houses directly come to inform us.

When the owners have informed us about problems with rotting buildings, we must answer to them and observe what happened.

Most colonial style houses are situated in the chief town of Battambang Province. The houses were decorated in the European style. They were built along the streets in the town. The people who are living in the town enjoy a better life than people in the countryside. Some houses are made of stucco and covered by tiles. But at the present day, some tile roofs have been replaced by sheet iron roofs. We asked the owners to discuss with the representatives of communes before repairing them and the owners must make a request to the authorities concerned.

The old buildings and the temples of pagodas are deformed to varying degrees. Old people were selected to conduct work on each pagoda. They repainted the temples with their goals, such as the temple's walls, etc. Before they repaired some buildings in pagodas, they always joined in discussions with the pagoda commission. The members of commission had a meeting to decide before doing something. They wrote a letter to request permission from the authorities and concerned services. They had obtained public support. The official religion is Buddhism and almost 90% of the population is of this faith.

In regard to the temples of Battambang Province, they are in a bad condition. There are a few guardians at each temple and they are responsible for cleaning, protection and conservation, as well as giving us their monthly reports. We have met the chief of communes to talk about the protection of monuments because they are also responsible for cultural heritage in that area. This responsibility covers the population of the commune, for easy dissemination of the laws and circular letters to the villagers who live around the monuments.

We have prepared workshops on the protection and the conservation of cultural properties. The participants include village chiefs, commune chiefs, district chiefs, commission members of pagodas, owners of VCD and DVD shop, and Acha of Pagodas (heads of traditional wedding ceremonies). These people are invited to participle in the workshop, which is conducted by the Department of Culture and Fine Arts of Battambang. The workshop has been held in each district of Battambang Province. Cultural conservation and protection are the main matters discussed. All chiefs of offices of the Department of Culture and Fine Arts gave lectures concerning their work to participants.

The Department of Culture and Fine Arts has five offices, namely: Cultural Heritage Office, Film office, Cultural Development office, Plastic Arts office, and Dancing Arts office. The

participants asked some questions after the lectures. We answered to them what we can do. At the same time, many documents were distributed so that they may deepen their knowledge.

In the museum, there are many valuable artifacts. Among more than eight hundreds pieces, approximately one hundred pieces are orderly arranged and displayed. We made an inventory of these artifacts. The space in the museum is too small for displaying all of them.

A storehouse was built with the support of the Seila program. The Seila Program is a program of CARERE, a NGO which works as a partner with the provincial government. We have received some funds from the Seila Program. Through this fund, we might improve the museum. We made an inventory, repairs and exhibits. At present, the Battambang museum welcomes the public after re-arrangement.

We called for students to come to visit the museum, and guided them in the museum, explaining all the meanings of the displays of valuable artifacts. We showed them by video and pictures what we can do for cultural heritage protection activities. We tried hard to explain to them that it is not only the Department of Culture and Fine Arts' responsibility, but also that of the Cambodian people to protect their cultural heritage. The important result is that they have a vision and will participate in the long-term and sustainable development of their society and country after more than two decades of war.

We have repaired the steps of the Banan monument. Banan temple is located 22 km southwest of Battambang town. At present, the steps are still under repair, but the work is nearly completed. There are more than three hundred steps from foot to top. We collected the laterite pieces surrounding the mountain, which collapsed a long time ago. We have a pagoda commission to discuss the repair works. The members of the commission are the district chiefs, the director of the Department of Tourism, the director of the Department of Culture and Fine Arts, the chief of the Education office in the district, the chief of the Pagoda, and the Advisor of the governor of Battambang province. All of them have the task to find a budget for supporting this work according to their possibilities. For example, the Department of Culture and Fine Arts helps them in techniques and the others find the budget. In regard to this work, we know the monks have the ability to find the funds for supporting repair activities. The monks can tell visitors what we want to do and to develop the tourist area. Almost 90% of the population is Buddhist. Therefore, the monks can easily explain to all the people what we need.

IV. Problem and Needs of Cultural Heritage activities

With our difficult mission, we have always met many problems. Sometimes we can solve these but other problems were complicated, i.e. they are still obstacles in our work. I graduated in archaeology in 1995 and from 1998 until now I have been working for the Department of Culture and Fine Arts. I am thus now responsible for developments prior to my presence in Battambang province.

1. Traditional houses

The traditional houses are gradually rotting from the effects of nature and people. Some owners do not understand about the Cultural Heritage value. The traditional houses are made of wood and easily rot in the hot and wet tropical climate. When their houses were broken down, some owners did not tell us and they repaired the buildings themselves. As a result, the appearance of some houses has changed over time. Changes were made to the house structures, such as roofs, columns, leaking roofs, windows, and so forth. Little by little the houses were deformed. On the other hand, when the owners informed us of problems they have worsened and we could not solve them because our Department of Culture and Find Arts has only an archaeologist and an architect sent from the Ministry of Culture and Fine Arts. Their skill and experience is limited. Sometimes, we can solve the technical problems but our department and the government has not the budget to support these projects.

2. Colonial style houses

Many French colonial buildings were made of stucco and wood covered by tiles. The stucco walls have been broken by people making repairs using cement. This activity is not requested by our department. Many rich people in this town do not want to live in the old houses: they prefer new and modern ones so they destroyed the old houses and rebuilt new ones. When the owners asked us to solve their problems, we often cannot do anything, because those works require large budgets and expert human resources.

3. Pagoda Buildings

We have had similar problems after discussions with the members of the pagoda commissions. They demolished and reconstructed new, modern buildings. Sometimes they think that the old temples of pagodas in Battambang province are too old and that they need new buildings, and look for rich donors. That is a big problem for our Department.

4. The Ancient Monuments

The Monuments are in a bad condition because of nature and war. Pieces of the stones of the temples have broken and fallen to the ground owing to the small trees and plants growing on the towers. In addition, many visitors wrote their names on the walls of the towers. The villagers released cows to eat the plants in the temple complexes. Some inhabitants came to stay in the temple complexes while their villages were flooded and their stay in the temple caused a bad environment. Looters still take artifacts and art objects from the monuments, the temples of pagodas and archaeological sites. There is a lack of irrigation systems such as canals and dams to prevent flood problems affecting these heritage sites. Floods have made temples collapse. We do not have enough material to do our job because we do not have a budget to spend for difficult works like this.

5. The Museum

Battambang Museum is too small. We have been making an inventory of all artifacts and art objects in the museum. There are more than 800 artifacts and sculptures in the museum. The current limited budget from our government and the Department of Culture and Fine Arts is not enough to support the cultural heritage protection activities.

Recently, a technical team of the National Museum in Phnom Penh came to Battambang museum to repair some statues. This cooperation helped us to obtain good experience in this field.

IV. Conclusion

What we described above concerns our working problems. When we clearly understand the problems we face, it will help us to understand what human resources we will need for future work.

We tried to work hard and to solve problems, but many problems still remain so the government must help us more. However, there are many big problems that we have been trying to work on to develop our poor country.

Therefore, we hope we will receive new knowledge and experience from this training course at the ACCU, Nara, Japan. At the same time, I would like to express my profound thanks to ACCU Nara for allowing me to participate in this training program. Thank you very much for your attention.

China

ZHU Yu-Hua 朱宇華华
Assistant Researcher
Institute of Architectural History and Historic Preservation
Tsinghua University, Beijing

The Relocation of Zhang Fei Temple

Abstract: The relocation of Zhang Fei Temple has been one of the most important events in the realm of conservation in China; it is known as the second largest project for the relocation of an ancient building complex after the foundation of New China[1]. Zhang Fei Temple is a group of magnificent buildings of the Qing Dynasty constructed in memory of General Zhang Fei. It was built using traditional techniques and with decorations that only existed in ancient south-western China. Here I will introduce the multi-ply values of the temple and the whole process of its relocation. I will also attempt to develop an understanding of the temple's authenticity as well as discuss the preservation of its historical setting, which is a priority in the relocation of Zhang Fei Temple. In the end, the author reviews the whole event and shares some thoughts about the problems reflected in this relocation project.

Key Concepts: Zhang Fei Temple, Authenticity, Value, the process of relocation.

Currently in China, the Three Gorges Project of Yangtze River has attracted attention all over the world because the new dam is scheduled to be closed to store water this year. A lot of relics along the river would be inundated soon. Zhang Fei temple in Yun-yang town is one of them; it is a group of magnificent buildings of the Qing Dynasty displaying prolific traditional decorations. As a National Protected Monument, the preservation of Zhang Fei Temple has become one of the most important issues in the realm of conservation in China. From October 8, 2002 ~ July 17, 2003, the conservation project of Zhang Fei Temple has been conducted involving many sectors of the society. Here I would like to review this important event and discuss the method of conservation applied during the relocation of this historic building.

1. Background

Located on the southern bank of the Yangtze River in Yun-yang County, 359km from Chong-qing City, the Zhang Fei Temple was built in memory of Zhang Fei, a famous general who lived during the Three Kingdoms Period. It is one of the well-known scenic spots of the Three Gorges. As an architectural complex, it has been

[1] 建国后第一次大規模文物建筑搬迁是 1954 年因修建黄河三門峡水庫而進行的**山西永楽宮**搬迁。

recognized as a renowned cultural and historical relic of the Qing Dynasty on the Yangtze River. In 2001, Zhang Fei Temple was listed as a National Protected Monument by the Chinese State Council. There are many famous poems, calligraphy, stone and wooden carvings and paintings inside the temple, such as the wooden carvings of 'zheng zuo wei tie (争座位貼)' done by Yan Zhen-qi（顏真卿） of Tang Dynasty, 'lan ting xu (蘭亭序)' done by Wang Xi-zhi (王羲之) of Jin Dynasty and the famous General Yue-Fei's (岳飛) calligraphic work 'chu shi biao (出师表)', which was based on an article by Zhu Ge-liang (諸葛亮). These are regarded very precious artworks in China. The temple is reputed as an 'attraction of the Ba Shu (巴蜀) area' for its possession of many gems of artistic work. A British visitor once described the scene of Zhang Fei Temple as one of the most beautiful he has ever seen.[2]

Located opposite Yun-yang town, the magnificent Zhang Fei Temple with its polychrome roof and delicate windows perches on the Flying Phoenix Hill on the southern bank of the Yangtze River. The present Zhang Fei Temple, which had mostly been rebuilt during the Tong-Zhi period of the Qing Dynasty due to extensive damages caused by a flood, consists of many individual buildings including the Main Monumental Hall, Jie Yi Building (Building of Pledges), the Cuckoo Pavilion and so on. The construction techniques employed in the buildings are quite unique in the history of Chinese architecture as they differ from the traditional crafts commonly seen.[3] It is essential for us to carefully research and study the evolution of Chinese wooden structures in order to fully appreciate the temple's architectural expressions. Zhang Fei Temple features an abundance of regional decorations from ground to roof; such designs are unique to the area of ancient Ba Shu along the Yangtze River.

There is an impressive legend well-known to the locals about the origin of the Zhang Fei Temple. It was based on the classic "*The Romance of the Three Kingdoms*" written by Guan Zhong Luo. This is a historical fiction set in China during the Three Kingdoms Era 1700 years ago; it is very popular in the country and throughout Asia. *The Romance of Three Kingdoms* has been regarded as a "rolling panorama of human passions and ambitions"[4]; it is read by people of all ages in China. From children to politicians to scholars, this book is enjoyed by everyone.

Among the many heroes in *Three Kingdoms*, General Zhang Fei is one of the most famous heroes for his bravery and loyalty to friends. He was known as the 'Tiger General'. In 221 A.D., Guan Yu, Zhang Fei's sworn brother, died in a battle with the State of Wu. The Tiger General swore revenge and prepared to attack Wu with his massive army. He ordered Zhang Da and Fan Jiang, two of his lieutenants, to prepare the attack or suffer the pain of death. The two cowardly officers murdered Zhang Fei, cut off his head and surrendered to Wu. However, on the way they heard of a peace agreement made between the States of Wu and Shu, and threw Zhang Fei's head into a nearby river hastily. Legend has it that Zhang Fei appeared in a fisherman's dream that night and made a request to salvage his head and bury it on the soil of Shu state. On the next day, the fisherman retrieved Zhang Fei's head and then buried it on Flying Phoenix Hill as was requested in the dream. When he dug the ground to bury the general's head, he accidentally found a jar of gold, which he

[2] Little, Archibald John, Through the Yang-tse gorges, London: Sampson Low, Marston, Searle & Rivington, 1888. p163~p164. "…the whole forming a scene, which would make as pretty a picture of Eastern scenery as I have ever seen."

[3] 朱宇華，重慶三峡地区祠庙建筑的建造特色，紀念宋'営造法式'刊行 900 周年宁波国際学術研討会論文集.

[4] （明）羅貫中，三国演义，天津：天津古籍出版社, 1994

thought was bestowed upon him by General Zhang Fei. As a token of appreciation, he raised a temple to commemorate the brave General with the gold he found and initiated the tradition of a local memorial ceremony that was held annually and which has continued to today.

On 3rd April 1992, the world's largest hydraulic power project, the Three Gorges Project (TGP), was commenced. It was estimated that it would take seventeen years to complete. With the beginning of the construction of the Three Gorges Dam, the world's largest rescue project of cultural relics also commenced simultaneously. According to research data, 39 of the 108 historic sites along the Yantze will be submerged when the TGP is completed. In order to save these valuable sites along the Three Gorges, the Chinese government has made every effort to come up with plans and measures to protect them. However, by 2003, eleven sites will disappear forever. Among them, Zhang Fei Temple is the only historical building complex to be relocated. It was to be moved to a new site 32km upriver near the Pan-Shi village on the south bank of the Yangtze River, and would be located opposite the new Yun-yang town to reflect its former relationship with the town.

Zhang Fei Temple will be the second largest project concerning the relocation of an ancient building complex since New China was established. It is also the most important conservation activity in the Cultural Relics Rescue Project of the Three Gorges. From October 2002 to June 2003, the dam is going to gradually accumulate water up to a level of 135 meters. Without being relocated, Zhang Fei Temple would be mostly submerged as well as the opposite Yun-yang town. According to the plan for relocation, the temple will be moved upriver along with the Yun-yang town and will be kept intact without any changes.

2. Analysis on the values and emphasis of this relocation

All conservation and restoration projects of historical buildings are based on a thorough assessment of their values. After an assessment of Zhang Fei Temple's values, appropriate plans and measures for its relocation were devised.

From the perspective of historical values, Zhang Fei Temple is the only large-scale building complex in the region of the Three Gorges at present that still retains the unity of its original structure and style. Although historians are still uncertain of its founding date, a stone inscription of the Xuan-He period (Song Dynasty) recorded that an officer named Chen-Si visited the temple. The events described in this "Chen-si Bei" tablet, which is stored in the temple, indicates that the temple's history dates at least back to the Song Dynasty. Most of the temple's current buildings were rebuilt at the end of the Qing Dynasty after a major flood in the 9th year of the Tong-zhi period during the Qing Dynasty (A.D.1870)[5]. Among them, the Main Monumental Hall was rebuilt in the first year of Dao-Guang period (A.D.1821); this is also the earliest building in the Zhang Fei Temple complex. The Jie-Yi building (Building of Pledges) was reconstructed in the 12th year of Tong-Zhi period (A.D.1873). The Cuckoo Pavilion was rebuilt in the first year of Guan-Xu period (A.D.1875). Other buildings were also restored between the Tong-Zhi period and Xuan-Tong period. Throughout its history, the temple had been destroyed and rebuilt repeatedly following the times of flood in the Yangtze River. Several peculiar flood level marks were found around the temple; these had been

[5] 云阳縣志，云阳縣志編委会，四川人民出版社，1999

useful for the purpose of historical research on the hydrology of the Yangtze River. For example, a mark stating "大清同治庚午洪水至此", which indicated the flood level during the 9th year in the Tong-zhi period of the Qing Dynasty, was engraved on the cliff at the back of The Cuckoo Pavilion (Fig. 1). The flood levels in the 1980's were chiseled on a stone near the main portal. In addition, the cliff on the back of the Cuckoo Pavilion features a special carving of four characters: "澤惠流离", which means "giving relief to refugees as the rain does to grass". In its context, it narrates a history of how refugee immigrants from Jiang-Shu Province were accommodated by the kind folks of Yun-yang town during the floods of Yangtze River in the 9th year of Tong-Zhi period. All these valuable vestiges have been integrated into the temple as a whole and became an inseparable part of its history.

In terms of scientific values, Zhang Fei Temple is representative of the ancient vernacular architecture in the area of Ba-shu in south-western China[6]. It features many important regional and traditional characteristics. Ba-shu is noted as one of the districts where the Chinese civilization originated and developed in ancient times. Many historical relics are still undiscovered in the district. In the architecture of the region, various kinds of unique traditional building techniques are still used; these are not found in other regions. The Zhang Fei Temple complex was built according to the timber system of 'Chuan-Fang' (穿枋式), a type of Chinese timber-frame construction in which purlins were directly supported on top of columns, which are tied by many lintels. The timber structural skeleton of Zhang Fei Temple was efficient in load-transfer, and features no additional ornaments. This simplicity and structural integrity is thought to reflect the type of structural frames originally adopted in ancient Chinese architecture. It is important for us to study the origin, evolution, and development of Chinese architecture to gain a deeper understanding of the framework of the temple. For instance, the method of raising the eave at the corner of the roof is remarkable; it is very different from all the other means we have known so far (Fig. 2). This unique technique is still widely utilized in the construction of ancestral temples and shrines in the district of the Three Gorges today.

Fig. 1 Engravings on the cliff showing the flood level during the 9th year in the Tong-Zhi period of the Qing Dynasty.

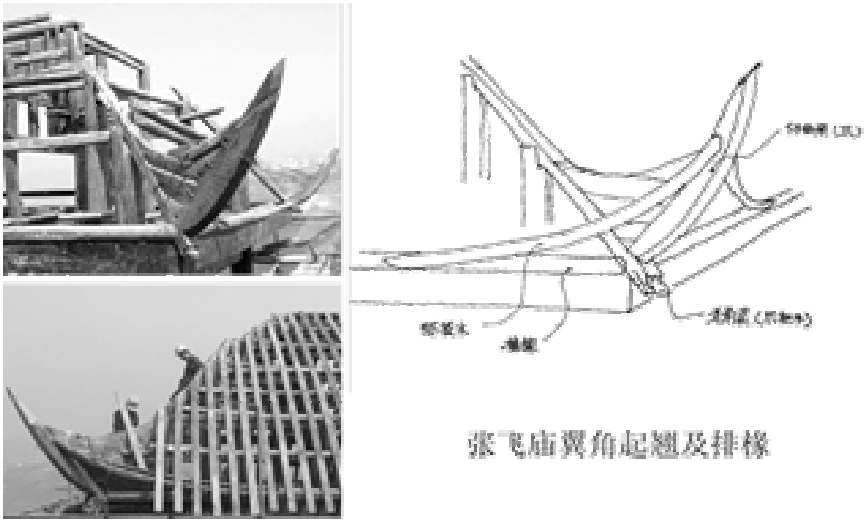


Fig. 2 Structure of the raised eave at the corners of the roof.

[6] 吕舟，从云阳張桓候庙的价值判断談傳統鄉土建筑的保護， 建筑师，第 79 期.

From the point of view of aesthetic values, the temple exhibits many elegant features of folk-custom, analogous to a garden containing all kinds of flowers. Moreover, there is an abundance of precious wooden and stone sculptures as well as historical wall-paintings exemplifying fantastic imagination. On the roof, the tiles are colorful with different sizes and shades which reflect their different ages. The use of ceramic cups produced locally as nail-cappings on the roof (Fig. 3), and expressive statues which ornament the roof are just some of the unique features that make the temple look magnificent. Every detail reflects the aesthetic values of the local people, their lives and customs, which have a tremendous value in art and history.

Fig 3. Locally produced ceramic cups used as nail-cappings on the roof.

From the perspective of cultural value, Zhang Fei Temple is one of the most famous cultural sites along the river of the Three Gorges. Known as a classic historical novel, the story of *Romance of the Three Kingdoms* had a wide influence on Chinese culture and the rest of Asia. The story of the loyalty between Liu-bei, Guan-yu and Zhang-fei who became sworn brothers at the Peach Garden and had vowed to live and die together is famous throughout the country. The region along the Yangtze River between Chong-qing City and Hu-bei Province was the ancient battlefield of the states of Wu and Shu. The Zhang Fei Temple in Yun-yang town which commemorates the Tiger General of the state of Shu, together with many other relics on both banks of the Yangtze River, constitute a group of integrated cultural properties relating to the history of the Three Kingdoms Period in the region from Nan-Jing City of Jiang-Su Province downriver to Cheng-Du City of Si-Chuang Province. Yun-yang town was a key location for transportation routes and battles during the Three Kingdoms Period and it has a wealth of relics which are remnants from that time. General Zhang Fei was famous for his boisterous character and his loyalty to his brothers and the nation. Such related stories about him have reinforced the temple's values in the aspect of culture. Professor Lu Zhou of Tsinghua University had commented that "*The Zhang Fei Temple combined with Bai-di town in Feng-jie City, and historic sites such as the Ba-zhen Tu of Strategic Setup, the Gorge of the Sword and the Tactics Book and so on, set up a brilliant cultural chain illustrating the legends and relics of the Three Kingdoms along the Three Gorges of Yangtze River. Zhang Fei Temple is undeniably an important and indivisible part of the chain.*"[7]

[7] 吕舟，从云阳張桓候庙的价值判断談傳統鄉土建筑的保護， 建筑师，第 79 期.

Fig 4. Local festival at Zhang Fei Temple.

The Legend of the Tiger General has been well integrated into the local customs. Offering sacrifices in the temple has become an annual tradition. The local people regard General Zhang Fei as their common ancestor and prayed to him for safety and happiness. The temple has also become a place of leisure and recreation for the townsfolk. On August 28 of every year in the Lunar calendar, the birthday of General Zhang Fei is celebrated. People from all over the county come together and hold a grand memorial ceremony in his memory (Fig. 4). People light firecracker and incense near the temple, pray for good harvest and safety, and exchange small commodities. Even on regular days, boatmen in the river would regularly bow towards the temple in respect as they pass by. Today, the temple has been identified as a National Protected Monument and its spiritual function still exist for the local people because it is an integral part of the regional culture.

According to an interpretation of international documents:

> "*A monument is inseparable from the history to which it bears witness and from the setting in which it occurs. The moving of all or part of a monument cannot be allowed except where the safeguarding of that monument demands it or where it is justified by national or international interest of paramount importance*"[8].

Due to the Three Gorges Project, both the town and the temple need to be relocated or otherwise they will be submerged. At present, the new Yun-yang city located 32 kilometer upriver has already been set up and most of the residents have moved into the new town. But the relocation of the Zhang Fei Temple involved more complicated issues – What should be the emphasis of its relocation? Studying the associated values, the most remarkable feature of Zhang Fei temple is that the delicate building complex has stood by the Great River and integrated into the rocky mountainside for over 1000 years. Moreover, the relocation will mainly result in the loss of its magnificent surrounding environment. The historic setting is the prioritized value of the temple. As the Venice Charter said:

> "*The sites of monuments must be the object of special care in order to safeguard their integrity and ensure that they are cleared and presented in a seemly manner*."[9]

Naturally, the main problem of the Zhang Fei Temple's relocation involved how to preserve the integrity of the historical environment in which the temple have existed for so long. There were originally three plans on how to move the temple (Fig. 5). The first one suggests the integration of the temple into the relocation plans for the new Yun-yang city; this plan would cost the least. Almost all experts involved disagreed with this plan as it lacks considerations for the temple's relationship

[8] Article 7, The Venice Charter, 1964 , ICOMOS
[9] Article 14, The Venice Charter, 1964 , ICOMOS

with its former historical environment. The second plan is to move the temple to a higher altitude at the former site on the Flying Phoenix Mountain, which would prevent it from submersion. This plan was good in conserving the temple in its old setting, but it ignored the relative historical relationship between the temple and the town opposite the river, and the local customs resulting from it.

The third plan proposes that the temple should be moved relative to the relocation of Yun-yang town. That is, the temple would be moved to somewhere 32 kilometer upriver with the town and would be restored on another mountain near the river. This plan safeguards the intimate relationship between the temple and the town, keeps the important folk-customs intact, and enables the preservation of all related cultural activities. Which plan was implemented? Evidently, the third plan was favored.

	Relocation Plan	**Objective**	**Cost**
1.	Move into the new town	Convenience for visitors	Least
2.	Move it to higher level at the same site.	Keep the historic surrounding	Moderate
3.	Move it opposite the new town	Keep the relationship between the town and the temple	Most

Fig. 5. Relocation options for the Jian Fei Temple.

At this point, we should discuss what it means to be authentic to a historic setting. The concept of authenticity comprises several facets. It applies not only to the physical surroundings but also to the associated culture and spirit of the place. The Flying Phoenix Mountain where the temple has been built is very steep with dense forests, trickling springs. With the passing of time for over a millenium, the Zhang Fei temple has become an integrated part of the mountain. Keeping the temple on the old site as per the second relocation option would be best for protecting the authenticity of the historical setting. However, the interdependent relationship between Zhang Fei Temple and the town would cease to exist if the town was independently relocated upriver. Actually, the values of Zhang Fei Temple comprise not only the magnificent ancient buildings but also the rich cultures and folk-customs related to them. For example, the people who live in the town opposite the temple crossed the river by boat to worship in the temple. Such cultural activities are of high importance, and are part of the essential values of the Zhang Fei Temple. As the Nara Documents said:

> "*Authenticity judgements may be linked to the worth of a great variety of sources of information. Aspects of the sources may include form and design, materials and substance, use and function, traditions and techniques, location and setting, and spirit and feeling, and other internal and external factors*"[10]

The temple could be viewed metaphorically as an old man with a long history and good health rather than a dead historic relic. Therefore it can be easily understood that moving the temple in relation to the town is good for the conservation of precious culture values, safeguarding the authenticity of the folk spirit and the authenticity of its cultural and historical environment.

[10] The item 13, The Nara Document on Authenticity, 1994 . UNESCO.

In conclusion, the emphasis on the relocation of Zhang Fei Temple has been on effectively retaining the historic setting. It was also essential that the temple maintained its connection with the town and the people in order for the local traditional customs and culture to be maintained after its relocation. However, we should pay attention to making a careful choice of the new site and do our best to restore the former appearance of Zhang Fei Temple's surroundings.

3. The Process of Relocation

Being the largest relocation project of an ancient building complex in China, the moving of Zhang Fei Temple has been the focus of the state's attention since the scheme began in October 2002. The project was led by the Cultural Relic Bureau of Chong-qing City. Academics of Tsinghua University (from the Institute of Design and Research and the Institute of Architectural History and Historic Preservation) cooperated in the project and provided the drawings and instructions for the reconstruction. The construction team was chosen within China through public bidding, but the entire construction process was supervised by academics of Tsinghua University - one of the most reputable institutes of research on historical building in China. They were appointed by the Culture Relic Bureau of Chong-qing City. The relocation and reconstruction was completed by July 2003, prior to the water storage stage of the Three Gorges Dam. It took ten months in total.

On October 8, 2002 the Zhang Fei Temple was closed for disassembly and relocation after hosting its last wave of visitors. The process of the project was divided into several stages as follows.

Fig. 6 Disassembling the roof.

1) Disassembly (October 8 to October 23, 2002)

This stage involved the division of workers into groups for each of the individual buildings. Each group was responsible for documenting the disassembly of each building with records and photos. A cameraman was appointed in each group to capture the whole course of disassembly. Every part of the structure, from timber to stone, was marked with numbers and descriptions for sorting purposes. Wrapping the paintings and carvings with soft materials for conservation was also required.

2) Alteration and solidification of the new site (October 8 to December 25, 2002)

This stage was carried out at the new site near the Pan-Stone village as the first stage was simultaneously proceeding. Because there are many sites along the river where the earth is loose and prone to slide, and the new site faced similar

risks. According to the geological report, the alteration and solidification of land has been carried out since October 2002. Afterwards, the foundation of the building was prepared and reinforced with concrete footings.

3) Relocation of materials and preparation for restoration.
(October 23 to December 30, 2002)

It was necessary that all the elements of the structure were marked and categorized after the building was disassembled. Before transportation, detailed arrangements were made to ensure that the road for transporting was good and safe for the transporting of the relics. In fact, the government allocated a special road for this purpose. The new site was divided into an area for storing the materials and an area for the field workshop that housed equipments such as machines and fire hydrants. When all the elements of the structure had arrived at the new shelter safely, the workers checked the written records in detail to make decisions on the treatment of the stone and timber parts under the guidance of specialists. Then the damaged or rotten windows and doors were repaired, or patched with new timber etc. New materials such as replacement tiles and stones were also purchased at this stage.

4) The reconstruction process. (February 10 to June 30, 2003)

On February 10, the workers began to lay the construction groundwork for the Cuckoo Pavilion, which was the first building to be restored. This restoration process had lasted for a long time. Through this individual building's restoration, the experts in the field were able to evaluate the construction workers' abilities in cooperation, technical skills, and efficiency. Meanwhile, they carefully reviewed the feasibility of the chosen conservational methods. The representatives cooperated with each other and revised plans for future restorations. After the completion of the Cuckoo Pavilion, all workers gained valuable experiences, and the process of construction accelerated. Near the end of April, the main wooden frameworks for Zhang Fei Temple's buildings were basically completed. During the last two months of May and June, the restoration work mainly involved repairing windows, fixing doors and tiling roofs. The whitewash and painting work were completed as the last step. Before the oil painting began, all the delicate timber sculptures that were fixed in the structure were shielded carefully. It was decided that the old paintings on all carvings and sculptures would be kept in their original state without any treatment in this reconstruction. On June 30, the restoration of the ancient buildings of Zhang Fei Temple was completed successfully. The experts from the Tsinghua University institutions, who reviewed all the procedures during the reconstruction, played an important role in determining the methods and principles of preservation adopted. They made the final decision on deciding the general principle of conservation and choosing the technology for preservation throughout the reconstruction. Experts from the Ancient Building Preservation Research Institute of Henan Province supervised the operation on-site to ensure work quality; they even taught the workers the practice of some traditional skills. The exchange of information between the experts from both institutions promoted the efficiency of work and the accuracy of problem solution. The cooperation of experts ensured that the authentic values of the historic buildings and sites were preserved to the utmost extent in this project of restoration.

From the administrative perspective, the Culture Relic Bureau of Chong-qing City provided support for construction management and finance. It is worth mentioning that in the process of disassembly, many historical evidence and documents regarding the Zhang Fei Temple, which have never been discovered before, were revealed from various sources. The design drawings for conservation were often modified according to new discoveries throughout the project, however, the leader of the construction team sometimes complained about the modifications as they increased the amount of work. The budget was continually increased as a result of changes of the design. Hence a slogan was adopted among the workers in the process of construction — "all for General Zhang". In summary, the project proceeded smoothly with few difficulties, except for the occasional rainy days. With the cooperation and united efforts of all sides of the project team, the project for preserving the Zhang Fei Temple was successfully completed.

5) Inspection and evaluation by groups of experts

On July 17, 2003, the National Cultural Relics Bureau in China organized a special group of experts composed of eleven members to inspect the completed site. After carefully inspecting the buildings inside and out, the experts has drawn final evaluations as follows:

- The new site matches the qualities of the environment at the old site: the temple still stands on a cliffy mountain and faces the Yangtze River, opposite the New Yun-yang town across the river just as before. The layout of the former surroundings had been respected and thoroughly considered, embodying the international principle that the conservation of a monument implies preserving the traditional setting in which it occurs.
- The former style and layout of the buildings of the Zhang Fei Temple was preserved very well. A good respect for the visual scenery around the temple was maintained. The principle of "no change to the former appearance" that is stated in the Chinese laws on cultural relics preservation was strictly followed.
- The methods used to preserve the materials of the buildings during the period of disassembly and transferring were effective. The reuse of old components of the buildings in the restoration process was carried out to a great extent, especially in regards to the conservation of historical carvings and sculptures of timber or stone.
- There was a good combination of restoration and reparation in this construction project. Although traditional construction techniques were adhered to as a general rule, modern scientific techniques and materials were also implemented in a careful manner so as to help preserve the temple for a longer period.
- In the period of construction, many effective measures were taken to increase work efficiency. A reasonable schedule was created, and detailed data on the construction were recorded, all of which helped to execute good organization and management.
- Introduced a system of for supervising conservation projects for the first time. Experts from professional institute were invited as supervisors to monitor the whole procedure of construction. Set new management standards in conservation projects in China.

- From the evaluations above[11], the experts reached a common agreement that the relocation project of Zhang Fei Temple was a successful case of conserving an ancient building complex. It adhered to the Laws for preserving Cultural Relics in China strictly and embodied the basic principles of international charters on conservation. The experts agreed that the construction was good enough to pass the examination.

Fig. 7 The relocated Zhang Fei temple.

4. Some thoughts on the conservation and relocation of the Zhang Fei Temple:

Today, China has entered the flourishing age of the Market Economy, and is developing rapidly at an amazing speed, which has already been recognised all over the world. The launch of the Three Gorges Project directly resulted in the relocation project of the Zhang Fei Temple. Such is the social background for this project. It is believed that the emphasis of this project had been on preserving the historic setting of the Zhang Fei Temple and its associated cultural values and traditional folk customs. The methods adopted for the conservation project reflect the construction standards of a modern China, these included inviting public bidding, introducing supervisory systems and so on. Moreover, being a vital part of both the Three Gorges Project and the largest relocation project for the conservation of an ancient building complex in China, the Zhang Fei Temple project became a social focus from the start. All levels of governments and the media throughout China drew great attention to this project. People were informed of each phase and every detail of its construction from TV, newspaper and Internet at all times. The whole process was a testament to the capabilities of contemporary China in all aspects. I will review the process in summary.

Research on the present buildings and a thorough study of the original materials as well as historical documents formed the foundations of the project, on which judgments on the values of the cultural relics were based. The following factors have contributed to the success of the Zhang Fei Temple relocation project:

- A great deal of studies on the historical documents about the temple was carried out.
- There was a large amount of records and practical surveys made for the present buildings of the temple.
- There was sound judgment on the complex values of the Zhang Fei Temple including its historical, aesthetic and cultural values.

[11] Quoted from ‘ the report of evaluation of the Zhang Fei Temple’s relocation’, 2003 (引自‘張飛庙工程評審報告’2003,)

- Good construction plans and drawings for conservation were made based on the judgments of values.

> *Cultural heritage diversity exists in time and space, and demands respect for other cultures and all aspects for their belief systems. In cases where cultural values appear to be in conflict, respect for cultural diversity demands acknowledgement of the legitimacy of the cultural values of all parties.*[12]

Professor Lu Zhou of Tsinghua University led his research group in the study of the temple's history and was responsible for designing the final plan and specifications for the conservation of the Zhang Fei Temple. He undertook this task for almost six years. He has studied a great deal of historical documents in relation to the Zhang Fei Temple and summarized the various values of the temple. Finally, through discussions with the experts of the National Cultural Relic Bureau, Professor Lu Zhou has come up with a set of conclusions about the values of the Zhang Fei Temple. In summary, the emphasis of the conservation and relocation of the Zhang Fei Temple is on how to deal with the preservation of its historical setting. The authenticity of a historical setting involved not only the natural environment but also the intangible culture and the believes associated with it. A respect for the culture related to the Zhang Fei Temple was more important than the other values in this case. Based on this, the Institute of Design and Research of cooperated with the Institute of Architectural History and Historic Preservation of Tsinghua University, and prepared the drawings and instructions for the construction. These became the design instructions for the relocation project.

Secondly, it is highly necessary to have a professional designer guiding the construction process. For example, the designer may discover many hidden traces in the temple during the disassembly and make alterations in the conservation design accordingly in time while collecting more materials for further study. Morever, the designer has professional skills to supervise the site and can have direct control over the result of the construction at any moment. This guarantees the quality of the construction.

Thirdly, introducing a system of supervision throughout the construction and conservation process has proven to be important and effective. Many construction groups in China lack the traditional skills and knowledge of historic Chinese timber structural system and often the designer cannot check every detail of the work at all times. It is suggested that delegating professional institutes as the quality control supervisor whose role is to monitor the whole process of construction will set a new standard for such relocation projects in China. The Ancient Buildings Preservation Research Institute, He-Nan Province, was the first to receive the certification as supervisor for conservational work from the National Cultural Relic Bureau of China. The successful relocation of Zhang Fei Temple has proven that having professional institutes monitor the whole procedure of construction is helpful for the preservation of historic buildings. The supervisor played a key role in applying the principles and guiding the operation to ensure a satisfying result.

[12] The item 6, The Nara Document on Authenticity, 1994. UNESCO.

In spite of the overall success of the project, there are many questions to think over. For example, is the bidding system for modern constructions that was introduced in the conservational project of historic building applicable? In the moving of Zhang Fei Temple, the ancient building construction team from Hu-Bei Province had won the bids for moving and restoring the temple, but the wooden structures of Zhang Fei Temple feature the traditional methods and regional styles of folk buildings that only exist in the area of Si-Chuan Province and Chong-Qing City. The workers from Hu-Bei Province have very little understanding of these local construction methods so that they had to ask for help from the local craftsmen. There were other problems such as the unclear role of the government in the conservation project, and the role of the media in the process of construction should also be reviewed. In conclusion, the relocation of the Zhang Fei Temple has left many unanswered questions about the nature of conservation in China.

Wooden sculpture of General Zhang Fei.

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Indonesia

Fitra ARDA
Documentation and Publication Division
Office of Protection on Heritage of Banten, West Java,
DKI Jakarta and Lampung Provinces

The Restoration of Pesagi Traditional House in West Lampung District

The Pasagi house

The Pasagi house, from the north side

The Pasagi house, from the east side

1. Introduction

Indonesia consists of many kinds of tribes. Each tribe has a unique life-style and culture which is different from others. One of those differences can be seen in how they build their dwellings. Each tribe has its own housing style which is different in shape, size, and interior designs.

As an architectural creation, a house is not only a physical structure, but is also related to its philosophical background. Ths in many kinds of traditional tribal houses, supernatural superstitions are expressed through labels or signs (Syarief 1994: 1). Besides that, traditional houses that were built by a community in the past also symbolize traditional wisdom that refers to their environmental conditions. As one example we can find the Lampung traditional house called th*e Pesagi Traditional House*, which we will discuss further in the next section.

2. Location

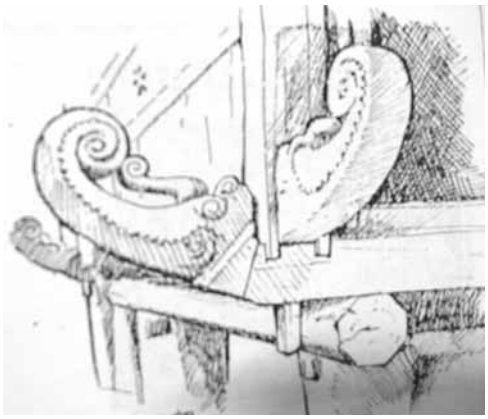
The *Pesagi Traditional House* is administratively situated in Sukadana, Kenali village, Belalau area, West Lampung district, Lampung province. This dwelling lies on 704 m² ground and is about 700 m above sea level. To the north of Kenali village is Luas village, to the south is Bedudu village, to the west is Bumi Agung, and to the east is Bakhu.To the north side of this traditional building are the Semangka River and also a mountain called Pesagi (2,127 m)

This traditional house can be reached easily by public transportation from Rajabasa bus terminal with the route to Liwa through Bandar Jaya, Kota Bumi, Bukit Kemuning, Sumberjaya, Sikincau until Kenali, about 270 km from Bandar Lampung.

3. History

In the past, Pekon Kinali or Kinali village was located on the slopes of Pesagi mountain, in the land which was called *Bernasi.* This village cannot be traced anymore since it was assumed that it had been destroyed when Islam entered that region for the first time. From *Bernasi*, the Pekon Kinali people moved to Pekon *Kinali Tuha*, regonized as *Pekon Undok*, which was located at the upper area and to the east of a village that we know now as Kinali village. The migration of Pekon Undok to Kenali happened after the Dutch administration era, when the main road in Belalau area was officially opened by the Dutch. With that main road in existence, Pekon Undok people started moving down town to the west side area, which is known as Pekon Kinali (Syarief, 1994: 108-109).

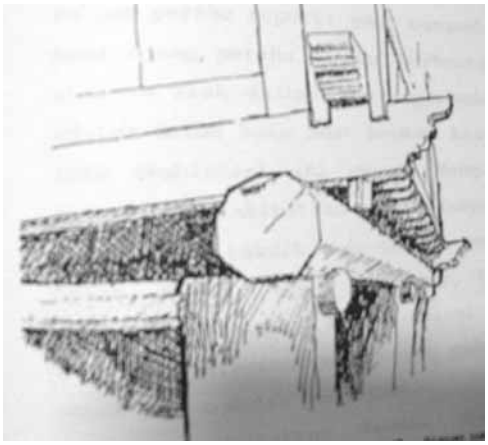
The people believe that Pekon Kinali is one of the villages that was first occupied and was also the center of the distribution of the Lampung population (Hadikusuma 1989: 157). The legend which is still expanding in the community says that Kinali village was the Lampung people's ancestral place of origin, especially the ancestor from "*Kabuayan Umpu Blunguh"*. *Kabuayan* is people of a genealogical unity who live in a certain area.



Special attributes for the aristocracy (Punyimbang)

4. Pesagi Traditional House

Generally, traditional houses in Lampung are houses on stilts 1 – 2 m above the earth's surface. The traditional house in Kinali is called *Lamban*, the dwelling of a nuclear family. People believe living together inside a house is like sailing within a boat. Because of that, in the past, a family who slept inside a *Lamban* had to follow a regulation. They had to stretch out facing the prow direction. They called this "*tidur jura"*. The exception was only for dead people, whose bodies faced the back side. Because of Islam's influence, today dead bodies are lain in a different way: they are stretched out to the north side with the face facing the direction of Mecca (Syarief 1994: 118).



Special attributes for ordinary people

There are two types of traditional houses in Kinali: the dwelling for aristocratic families or *punyimbang* and the dwelling for ordinary people. In general, those buildings have almost a similar shape or character. The main differences are only in the additional floor plan for the room at the back side and the additional decoration in the form of symbols with their special attributes for the aristocracy and the *penyimbang* family house.

In general, Lampung Barat traditional house floor-plans are in the shape of a square or a rectangle. The people of Kenali call the square house *'Pesagi'*, and the rectangular one *'Mahanyuk'an'*. They believe that the rectangular is the oldest house.

Roof, made of palm fiber

Roof framework contruction, called *bubung kukus*

The size of Pesagi traditional house in Kenali is 8.79 x 7.43 m and the height is 9.58 m. Its orientation is north- south with the entrance facing to the east side. The shape of the roof is *tajug* or pyramidal. It is usually called *bubung kukus.* This traditional house uses light organic materials, such as lumber for the lower section (foundation) and the combination of wood and bamboo for the upper section of the house. This building also uses palm fiber (*ijuk*) for the rooftop. The house consists of twelve poles (stilts). The walls are made of bamboo, called *pelupuh.* The supporting poles of this building, called *tihang duduk* , are made of logs resting on pedestals. The room arrangement for this house is very simple, since there is no special room inside, and the front stairs lead directly to the living room. This house consists of four rooms (*kebik),* which are at the front, at the middle and at the back side of the house.

When people built the Pesagi traditional house, they did not use nails. The building is constructed by using a binding system using palm fiber cord and combined with a bolt system. This system makes Pesagi traditional houses resistant to earthquakes. This could be proven by the 1933 and 1992 earthquakes. At those times, this house survived the earthquakes.

In the past, people left the under section of the stilts of this house open, but today they cover it with plaited bamboo (*pelupuh*). People left that section open in the past. Today, they use this part of the house as a place for storing lumber and firewood.

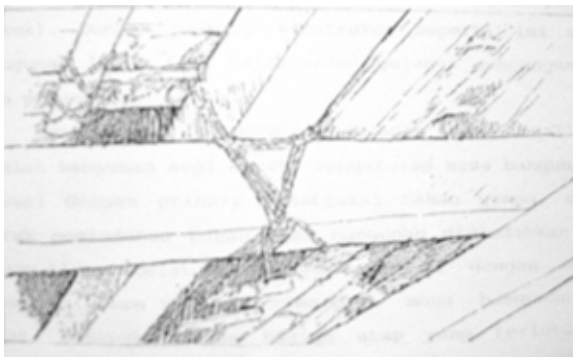
5. The condition of the building and its care

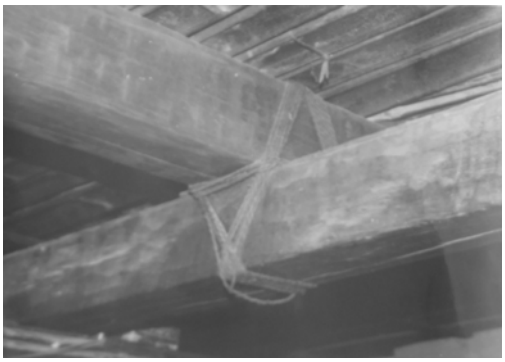
The building condition of the Pesagi traditional house and its care will be observed in three aspects: structural damage, architectural damage, and the care of the building.

5.1 Structural Damage

Field observation describes structural damage of the building which was caused by the weakening of the supporting power of the soil where the building is built, damage to the foundations, and the degradation of the building materials. These occur due to several factors, such as:

Supporting poles of a building, called *tihang duduk*





One model of wrapping system with cord

- Natural factors: the building is located in an area where earthquakes are prevalent.
- Aging factor: the building materials are already old.
- Disease factor: the damage caused by termite attacks.

A structural damage that can be observed at the Kenali traditional house is the sliding of the foundation at the western part of the building, that has made the building slant to the west. This damage was caused by the frequent earthquakes that led to the shifting of the building foundation due to soil instability. To avoid the collapse of the building, the owner made several repairs to part of the building. The repairs of the foundations and the house pillars, made by the owner, were merely temporary using bad quality material. That is why the slope of the house can still be seen. This condition has caused the building construction to split apart, something that could accelerate the collapse of the building as well.

In addition, the corrosion process due to the aging of wood, together with the termite attacks, has also caused the instability of the building. Since it was difficult to find roof material made of palm fiber (and if it exists, it is expensive), the owner made the roof thin. As a result there were leaks in some parts of the roof that weakened the supporting roof poles. The owner then replaced again those weakened parts, but he did not consider the condition of the materials and the construction pattern.

5.2 Architectural Damage

Architectural damage can be observed from the incomplete building components as we could see them in the original building. This damage was caused by replacement of some building elements conducted by the owner. The replacements were made without considering the originality of the old architecture. The replacement of some parts of the house was supposed to strengthen its position. The efforts conducted by the owner caused architectural damage and the strength of the building is not like the original one.

Architectural damage also can be seen from some missing decorations, which were intentionally taken from every part of the building to be sold to collectors. The missing decorations have certainly caused the loss of the typical beauty of the house. The sale of some parts of the building had something to do with the society's efforts to fulfill daily needs and with the business of collectors who came to villages to find antiques which they bought at low prices.

Floor supporting construction, made of wood

Floor supporting construction, made of bamboo

Dowel construction made of wood, called *pasak*

Entrance stairs

Furthermore, there were some additional parts on the roof at the east and south sides of the house. The new parts are made of roof-tiles. Another change is the covering of the space underneath the house with plaited bamboo.

5.3 The care level of the building

The purpose of observations on the care level of the Pesagi traditional house is to be aware of the declining quality of the building material.

As we know, the Pesagi traditional house is still occupied by its owner. All life activities take place there all the time, like sleeping, eating, cooking, keeping fire wood, etc. Those activities are uncontrollable, so that the care level of the building is not good enough. The placing of firewood in the space underneath the house causes insufficient of air circulation and high air humidity. Such a condition will accelerate corrosion of the building materials. Oily smoke from a charcoal stove causes the building materials to be covered with oil all over. This can be seen on the wooden walls, poles, plafond, and *blandar*. The smoke from the kitchen also causes the color of the building materials to become black and dirty.

Because of humidity, green moss grows in some parts of the building. The roof of the building is also covered with this green moss and a kind of edible fern.

From field observations, it can be concluded that Pesagi traditional house is not well maintained. That condition accelerates damage to the whole building.

6. Restoration Issues

Peeping window model

Charcoal stove in the kitchen

6.1 Common issues on restoration in Indonesia

Generally common issues in Indonesia on archeological building restoration are:

1. There has been a territorial autonomy policy since the year 2000. The province territory is fully authorized to manage itself. Its impact also influences the way of handling archeological objects. Restorations to archeological buildings (and objects) are eagerly conducted by territorial governments while there are no archeologists in the area. Such restorations are done inappropriately, without following appropriate regulations. Many archeological buildings have deteriorated as a result.
2. Lack of coordination between central and territorial government in the archeological field.
3. The archeological restoration expenses are so high that they are conducted in accordance with a priority scale. Thus there are still many archeological objects that have not yet been cared for.
4. The corrosion of wooden building materials because of Indonesia's tropical climate.
5. Lack of knowledge of the person who is in charge of restoration and conservation of archeological buildings, especially those that are made of wood.

6.2 Problems in restorations of the Pesagi traditional building.

The problems faced in restoring the Pesagi traditional building are:

1. The difficulties in finding wood material that is the same as the original, especially of the same type and size. That kind of material is not sold in lumber stores in West Lampung. Moreover trees are felled at random in the forests for the sake of a certain community's business and trade.
2. The scarcity of palm fiber for the roof. This is hard to find because it is not sold in West Lampung anymore. Moreover the plants that produce palm fiber do not grow in the forests there.
3. Lack of awareness in the society on how important archeological remains are. That is why there are many of them that are not cared for or maintained. There are even some buildings that were destroyed on purpose to be replaced by new ones.
4. Poverty and the economic crisis factor, so that many people sold their houses to collectors.
5. The scarcity of traditional carpenters who have the ability to make and restore traditional building. This problem is caused by the fact that no-one builds their house from wood anymore because it costs a lot of money. Besides this, the traditional house is considered to be old fashioned.
6. The limited funds from the government available for archeological buildings restoration, resulting in minimum restoration and care.
7. There are so many termites and beetles attacking the building materials. The prevention of such damage needs a lot of money.
8. Lack of experts in conservation and restoration

7. Preservation Efforts

Considering that the Pesagi house is a building that has rare architecture and is the only one that still exists in Lampung, according to the Regulation No. 5 (1992) on Cultural Preservation Objects, the Pesagi traditional house must be preserved and it must be done immediately. The preservation effort conducted is to restore the building. According to a technical study that has been done, the steps of preservation are:

1. The parts of the house with structural damage such as cracks do not need to be demolished totally but only partly. They will then be strengthened and stabilized.
2. Architecturally the building preservation efforts stick to the original shape, materials, working techniques and lay-out.
3. In case there is original material that is damaged and it is technically impossible to reuse it, then a substitute material will be used. This new material must be of the same size, shape, color, quality, and use the same working technique as the original.
4. Maintenance to the building is conducted with conservation activities which include traditional cleaning and, if necessary, chemical cleaning using chemical solutions.
5. In the effort to preserve this site, it is necessary to arrange the environment according to its needs considering the width of the ground.

8. Restoration Implementation

8.1 Structure demolition and reinstalling

As we know, structure demolition is a part of the structural repair process. It is conducted systematically and in a strict order. The structure demolition in the Pesagi traditional house was not conducted on all parts of the building, but only on certain parts which were considered in need of repair. The demolition is conducted after documentation in the form of a floor-plan with marks the parts of the building which are going to be demolished so that the reinstalling will be conducted appropriately and will not change the original form of the building. The building structure demolition is conducted carefully in order not to damage the parts of the building which are not being demolished.

Replacement of roof frame

The reinstalling of the building is conducted after conservation of the building material. That reinstallation follows the registration made before the demolition.

There was a total demolition of the roof of the building. Every beam and plait made of bamboo was replaced with new ones. Before the palm fiber roof is laid, it is first covered with iron sheeting so that it does not easily leak. The palm fiber roof is also totally replaced with new material and laid to 7 cm thickness.

Covering with iron sheeting

8.2 Structural strengthening

The structural strengthening of the Pesagi traditional house was conducted to the parts which have damage in the foundations. We set a rectangular 60 x 60 cm concrete base with a 40 cm thickness under the original foundation. Before setting this concrete, there was building stabilization by jacking up the part which declined, orientating it to the still stable structure. The strengthening with concrete is expected to stabilize the condition of the building. In this restoration, all of foundation (*umpak*) was replaced by a concrete foundation.

8.3 Material care

The purpose of this material care is to maintain the life duration of the material and to prevent the process of corrosion, so that it can prolong the life of the building. This activity consists of::

Cleaning

Cleaning Process

The cleaning process is conducted in two ways, which are the dry and wet cleaning. The purpose of the dry cleaning is to clean the dust sediment sticking to the building material by using brushes. Meanwhile the wet cleaning is conducted using water or chemical alcohol or petroleum ether to clean the grease sticking to the wood. The next step is to clean the poles and the walls which are porous and eaten by termites. They are lubricated with 2 % *Len trek* substance mixed with kerosene. The lubricating process is not conducted to all parts of building but only to the selected parts which have been badly damaged.

Repairs

Repairs were conducted to the parts of broken wood material, by connecting them with the new ones, so the original material can still be maintained or reinstalled. For the material which is impossible to be repaired, there is replacement with new materials which have the same quality as the original ones, not only in the form, size, and color but also in their working technology. These repairs were conducted in the same way as the roof and floor supports.

Lubrication with Lentrek 2 %

9. Environmental Arrangement

Besides conducting restoration to the building, the arrangement of the site and the environment is also planned. This activity is an important part of the preservation effort for archeological buildings after restoration. The planned environment arrangement includes:

9.1 The arrangement of the site area

The arrangement of the site area is the activity of cleaning the site area from any kinds of materials which have accumulated, such as piles of wood, stones, etc. Strengthening of the site area is also planned by making a dike in the garden. The purpose is to prevent the erosion of the land by rain.

Making a dike and iron fence

9.2 The procurement of supporting facilities

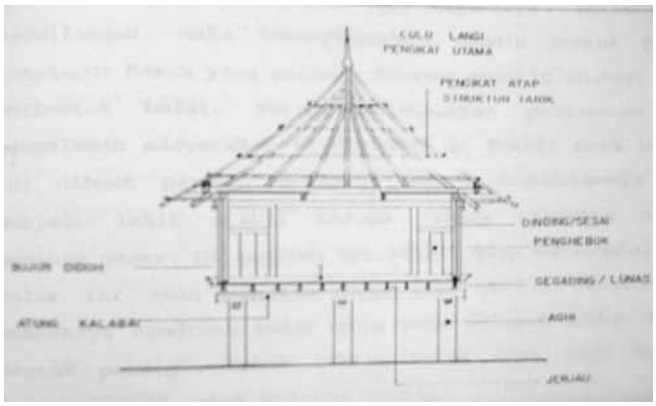
The example of this activity is rearranging the toilets/ restrooms by moving them to a more appropriate place. It is also planned to install a fence around the site. To make it harmonious with the environment, the fence should be made from plant materials (hedge), then we will put an iron fence (BRC) outside that hedge. Besides that, there will be information boards, direction boards and prohibition boards to help visitors who come to the site.

Because there are not enough funds available, this environmental arrangement of the Pesagi traditional house is partly planned to be conducted in the next fiscal year.

10. Conclusion

The Pesagi traditional house is a traditional house which belongs to West Lampung community. It still exists today. The house is full of solid architectural principles and has been reliable for a long time.

The buildings have positive potential either technically or culturally. The architectural type of the Pesagi house can be used as a model for architectural development that can be used by present communities, especially by those who live in areas where earthquakes frequently occur. It is proven that the architectural type of the Kinali traditional house can survive earthquakes. This means that our ancestors had considered and calculated their environmental conditions when they built their houses or shelters, so that they could avoid the threatening dangers in their lives.



Construction of the Pesagi house

Mortar and rice pestle

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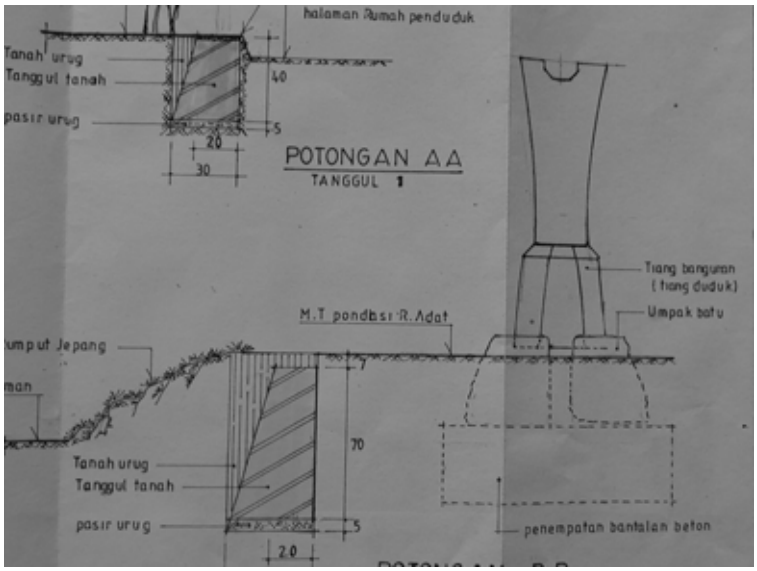
Plafond ceiling, made of plaited bamboo



Structural reinforcement

Kazakhstan

Yelena YATSENKO
State Institute for Scientific Research and Planning
on Monuments of Material Culture (NIPI PMK)
Almaty, Republic of Kazakhstan

Problems and Needs of Cultural Heritage Protection Activities in Kazakhstan

In Kazakhstan the problems of cultural heritage conservation are in the following areas:

1. Legislation and institutions providing implementation of the laws
2. Funding
3. Conservation of monuments
4. Modern utilization of monuments and management
5. In drawing the attention of the public to the problems of cultural heritage protection, to popularize heritage, educational programs etc.

1. Legislative Basis

Nowadays the major law regulating the activities on the protection of cultural heritage is the 'Law of the Republic of Kazakhstan on the Protection and Utilization of Historical and Cultural Heritage'. This Law was adopted in 1992. Until 1992, the country followed the Law on Protection of Monuments, which was passed in Soviet times.

The major difference of the recent Law is in the stipulation of the ownership of objects with heritage value, including immovable ones. Actually all historical buildings and architectural monuments were properties of the state until 1992, but the Law of 1992 allows them to be private property as well.

In our country, historical and cultural monuments can be in the following categories: significant at the national level and significant at the local level. Lack of stipulations about the monuments included on the World Heritage List is a serious drawback of the 1992 Law. However, Kazakhstan did not have heritage on the list at that time. The Khoja Ahmed Yasawi Mausoleum was the first monument included in the World Heritage List in 2003. This Mausoleum is in Turkestan, a city in the southern part of Kazakhstan. The petroglyphs on the Tagamly archeological site (South-East Kazakhstan) are in the nomination process for the World Heritage List. A few more objects are already on the World Heritage Tentative List. The Law on the Protection and Utilization of Historical and Cultural Heritage will soon be amended to reflect these events.

1.1 Institutions ensuring observance of adopted laws

The major state body monitoring the protection and utilization of monuments of historical and cultural heritage is the Department of Cultural Heritage, Libraries and Museums of the Committee of Culture. The Committee of Culture is part of the Ministry of Education, Sport, Culture and National Consent. Personnel of the Committee of Culture comprises 4 people only, which is not nearly enough in a country that has, according to formal computation, more than 5 thousand architectural monuments and historical buildings.

Provincial administrations are assigned to implement the national policy for monument protection at the local level. In Soviet times all provincial administrations had departments on monument protection but nowadays many of them are closed. Therefore many ill-considered decisions are being taken towards monuments, often caused by short term interests. The most typical mistakes are:

- Changing the exterior of facades to meet the taste of its owner or tenant;
- Applying synthetic finishing materials without high enough vapor permeability properties, thus destroying wall structures;
- Changing the inner layout of buildings, so weakening the load-bearing ability of the structure;
- Unqualified refurbishing, for example, bricks in cement mix fill in gars and "unneeded" openings of wooden buildings;
- Erecting multi-stored houses in the protected zone of the monument.

The monuments of local category are most vulnerable to such problems as they are fully controlled by the local administration.

2. Funding

Monument preservation activities (registration, restoration, protection, researches, etc.) are supported by the following sources:

1. national budget
2. budget of local administration
3. budget of private owner of monument
4. non-governmental organizations sponsors

The economies of former Soviet Union countries degraded after the collapse of the USSR. The past decade (1992-2002) was very tough for Kazakhstan. In a background of economic crises and hyperinflation in 1992 – 1996, the state budget was actually suspended for cultural funding, in particular, for monument protection. A few most valuable monuments were left in state care; others were left for local administrations that had no funds for their protection.

Since 2001 the funds allocated for monument protection have been increasing. In 2003 the state budget provided 300 million tenge (i.e. $2 million US dollars) for the conservation and restoration of objects of cultural heritage.

The major share of funding for monument protection belongs to the state; however, it cannot resolve all problems. More active allocation of local budgets is needed as well as establishing relevant non-governmental organizations and support of sponsors.

As for the monuments passed to private ownership or long-term rental – they fully depend on the decisions and law-abidance of the owner or holders. Historical buildings and architectural monuments located in cities and held by respectable protectors (embassies, large companies) have a reliable future, although the lack of professional supervision by the state causes ignorant adaptation of many monuments to current needs and a subsequent loss of historical authenticity.

Monuments of religious architecture leased by a religious community face a special problem. Considering the growth in the piety of the population, leasing communities use their funds to house a larger number of believers and "improve" the exterior of a monument while ignoring its historical and architectural value.

Nowadays, mainly foreign sponsors support monument protection, because such kind of investment is not yet popular among Kazakh businessmen.

The restoration of the famous Mausoleum of Khoja Ahmed Yasawi in Turkestan, financed by the Turkish government, was completed in 2000. Other examples of international assistance in the conservation of cultural heritage in Kazakhstan are the current UNESCO/Japanese Trust Fund Project for the Preservation and Restoration of Otrar Tobe, a medieval Silk Road site (started in 2001), and

also the UNESCO/Norwegian Trust Fund project on the Management and Preservation of the Tamgaly Petroglyph site (started in 2003).

It might be well to point out the use of monuments as tourism objects and for advertising purposes. In compliance with the Law of the Republic of Kazakhstan on Protection and Utilization of Historical and Cultural Heritage, 1992, money earned from them should be accumulated by the State Fund for the Historical and Cultural Heritage of the Republic of Kazakhstan. However, the Fund has not been established yet and the money is being "dissolved" in local budgets, missing the purpose. Nor is money obtained from using monuments for advertising allocated to the Fund because of imperfections in the legislation.

3. Monument conservation

Now the State Institute for Scientific Research and Planning on Monuments of Material Culture ("NIPI PMK" is its Russian abbreviation) is the head institution responsible for conservation issues relating to architectural monuments and historical buildings in Kazakhstan. It was established in 1975. Until 1994 there was a network of regional workshops for restoration. The workshops restored monuments under the supervision of NIPI. In general the quality of restoration was not up to the mark, and the construction materials used did not meet requirements and often were incompatible with the original materials of the monuments. Many workshops have been shut down since 1997 and restoration work as it is fell into decay.

Nowadays many monuments in Kazakhstan need restoration and conservation. The crisis period of 1992-1997 when virtually all monuments were disregarded, significantly affected their conditions. In addition some of them need correction of earlier ignorant restorations that had been done.

The few organizations maintaining restoration activities from former times as well as a few private companies licensed for restoration work are unable to cope with the huge amount of required work. The major cause is not even poor funding but a lack of qualified personnel. Low salaries and lack of specialized training have led to restoration being done either by highly enthusiastic people or by incidental people who failed to find occupation in other areas. Luckily, the latter do not stay for long in such companies, again due to low salaries.

A special problem is that of developing technology for different kinds of conservation. The above mention NIPI leads this type of activities, however, poor logistics and lack of qualified experts hamper the development of such techniques.

4. Modern Utilization of monuments and management

Modern utilization of architectural monuments and historical buildings is regulated by the Law on the Protection and Utilization of Historical and Cultural Heritage. However quite often the Law is violated during the selection of new functions for a monument, or during its utilization, maintenance, repair or restoration.

The fact that a building is a monument is vexatious for many owners or users of it. They do their best to avoid such status for the building. An insufficient number of monitoring bodies allows them to succeed easily. Meanwhile in Kazakhstan there has not been a single law suit on the violation of the law of protection and improper utilization of historical and cultural heritage and maintenance of immovable monuments.

As for the management of monuments, this notion is in the process of being introduced into the practice of preservation activities. Not a single object of cultural heritage has yet obtained an approved management plan.

5. Educational Projects and Public Participation

There is no national program for this area yet. "Monument Protection Society" was a rather influential institution in Soviet times but currently it does not function. Other societies and non-governmental organizations, for the most part, simply declare their concern about monument protection without follow-up action.

For some enthusiasts and professional groups of teachers, historians, archeologists, architects, and reporters, the popularization of historical and cultural heritage is done in parallel with their major occupation. Thanks to their efforts, the population reads articles, sees documentaries, and watches TV broadcasts. Upon the initiative of a private restoration company "Kumbez" (the director is Mr. Timur Turekulov), a journal on the research and conservation of historical and cultural monuments has been published since 1997. However, such efforts are not enough. The state should develop and financially support educational programs on the research and protection of monuments.

Kyrgyzstan

Mr. Arabidin KALANDAROV
Senior Scientist
Kyrgyz State University of Construction,
Transportation and Architecture (KSUCTA)

Cultural Properties of the Kyrgyz Republic

Introduction

The Kyrgyz Republic is located in Central Asia; its neighbouring countries are Kazakhstan, Uzbekistan, Tajikistan and China. The total area of the Kyrgyz Republic is 198,500 square kilometers. Over 90 percent of the area is 1000 meters above sea level. Huge mountain ranges and valleys define the general image of the country, with its climatic peculiarities producing marked differences in its landscape and its economic utilization.

Kyrgyzstan has a rich history dating back to ancient times. On its territory there are more than 5000 archeological and architectural monuments of historic value. Of these, approximately 1,300 are registered and 800 are under the protection of the state. Cultural heritage is one of the main components of national identity and a key factor for the economic development and social integration of a nation. The main purpose of the national government is not only to preserve cultural properties and pass them on to the next generation but also to ensure that they are being actively exhibited and utilized.

Administration System

The present administrative system for the protection of cultural properties in the Kyrgyz Republic was developed after obtaining its independence on 31st August, 1991. The process of restoration, investigation, protection, and use of historical and cultural heritage are regulated by the national Law on the Protection of Historic and Cultural Heritage (26th July, 1999). The protection of cultural properties is administrated by the Ministry of Education and Culture. The Commission for Cultural Affairs under the Ministry conducts activities relating to the selection and designation or registration of cultural properties. Also there are a number of independent institutions such as: Scientific-research project bureau "Kyrgyzrestoration", Specialized office of Osh city "Kyrgyzrestoration", National Commission of the Kyrgyz Republic for UNESCO and the Kyrgyz State University of Construction, Transportation and Architecture (KSUCTA).

Current Problems related to Cultural Property Protection Activities

The Republic of Kyrgyzstan became a state member of the World Heritage Convention in 1995. So far, as of September 2003, six cultural sites in Kyrgyzstan are on a waiting list to be registered on the World Heritage List. Unfortunately the present economical situation in the country does not allow us to solve the problems in the field of cultural property protection on the national and local levels.

Presently, due to recent urbanization and changes of life styles, a great number of historic structures and architecture, especially modern-period buildings of different types and styles, are faced with the danger of being demolished without any identification and evaluation of their cultural values.

Problems related to restoration and conservation of cultural property activities:

1. Lack of reform in the administration system for the protection of cultural properties -

One of the major requirements for the promotion of cultural heritage protection is a well-organized administrative structure that will have a great influence in the further development of these activities. The present administrative structure of the Kyrgyz Republic does not correspond to the demands of the current transition from a centrally planned economy into a market economy.

2. Lack of a strong system for designating and protecting cultural properties in local areas -

Because cultural properties are located throughout the country, a close cooperation between the national and local governments as well as the owners is indispensable in the protection of cultural properties. Since cultural properties are intimately connected with the local culture of thearea in which they are found, their preservation and utilization are extremely important for the development and advancement of local culture. Unfortunately the present situation shows that there is no strong cooperation between the national and local governments and owners. So far, some work has been done over the past few years towards achieving closer cooperation but significant progress has not yet been achieved. This effort should now be reinforced and systematized.

3. Lack of the preservation and succession of traditional techniques -

Conservation techniques for cultural properties refer to the techniques and skills required for the maintenance, preservation and restoration of cultural properties. It is very important to preserve and pass on to future generation such traditional techniques and skills. A selection of those traditional techniques and skills which are essential for the preservation of cultural properties and for which protection is required, is not conducted. There are no special programs by the national or local government to handle the situation.

4. Lack of human resources development -

Human resources development is necessary for the preservation and restoration of cultural properties. We need to provide various types of training courses on modern methods of restoration and conservation.

5. Lack of promotion of international exchange and cooperation -

Cultural and historical heritage is the property of everyone in the world. Neither national nor ethnic boundaries should hinder the work of their protection and conservation, which must be accomplished through international cooperation. Conducting international research and exchange is essential to promote the preservation and utilization of cultural properties.

6. Lack of financing at the national and local levels -

As with many developing countries of the world, in the Kyrgyz Republic one of the main problems is the lack of funding for conservation and maintenance of cultural heritage.

Some Examples of the Cultural Properties of Kyrgyzstan

Christian Church (1871)–
Wooden structure, Issyk-Kul region.

Dungan Mosque (19th century) –
Wooden structure,, Issyk-Kul region.

The City of Karakol

The architectural monuments of Karakol include a Dungan mosque (19th century) in the form of a Buddha pagoda, and a Christian church erected in 1871. There are also many archeological and architectural monuments including the ruins of a fortress dating back to the 16th century.

The National Kyrgyz House "Yurt"

In the second half of the 19th century, the Kyrgyz people used to live in two types of dwelling: portable and permanent. During the nomadic and semi-nomadic periods, the portable yurt was the basic dwelling of a nomad, whose entire life was spent in it. During following centuries, the nomads improved the wooden construction and added a felt cover to the yurts; this construction can be easily and quickly taken into separate components, so they were very convenient for transportation from place to place and could be easily assembled again. To move from one pasture to another, a yurt with all its contents were routinely loaded on a camel or horse.

External decoration of Yurts

Tunduk (timber set on the top of a Yurt)

Internal decoration of Yurts

The structure of a Yurt.

The Burana Tower

This minaret belongs to 10th – 11th centuries. The tower is located 12 kilometers southwest of the city of Tokmok. This tower belongs to the period of domination of the Karakhanid tribes, which owned the biggest part of Central Asia 900 years ago. The tower was made from baked brick and juniper bars.

The Burana Tower (10^{th} – 11^{th} centuries)

The height of the tower is 21 meters, the diameter is 9 meters; its original height was presumably l44 - 148 meters. Remnants of three mausoleums and half-destroyed living premises dating back to the 11th - 12th centuries were excavated around the tower. Apparently, the Burana tower used to serve as a vertical landmark dominating the ancient city of Balasagyn, a northern capital city of the Karakhanids' states. In 1976, the ancient Burana settlement was designated as an important cultural property and restored in 1977.

Located six kilometers northwest from the Burana Tower is the **Ak-Bashim ancient settlement**. This area was one of the cultural and economic centers of Chu valley (6th- 7th centuries). The total area of the city is 35 hectares. The city area enclosed with a powerful wall created a symbiotic unit of the urban and rural population. During archeological excavations remains of two Buddhist temples, a Christian church, a palace, massifs of residential blocks, irrigation network, and other attributes of medieval architecture were discovered.

The Krasnorech'e ancient settlement - remains of an ancient city, which was situated 38 kilometers east of the city of Bishkek. It is representative of a settled culture (5th – 10th centuries). During excavations, fragments of Buddhist painting and sculptures were found, as well as a huge statue of Buddha (12 meters tall) made from cast clay with subtly finished colorful drapery.

Tash-Rabat – caravan-saray, 15^{th} century, is located 80 kilometers southeast from At-Bashy (the Naryn oblast) and 18 kilometers from the Bishkek – Torygart Road. The Tash-Rabat was erected by the local governor Mukhamed Khan between 1409 - 1415 on an ancient caravan route, which led from Semirech'e to Kashgar.

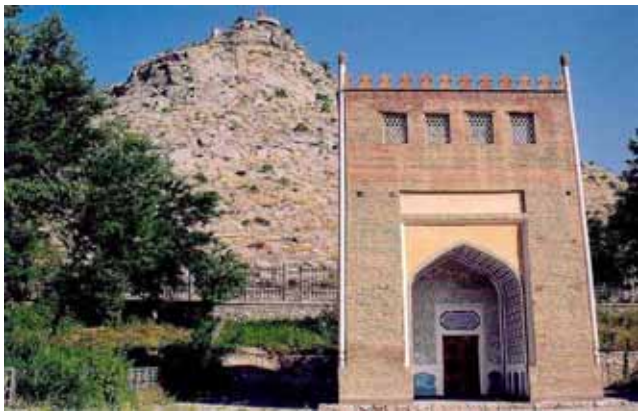
The ancient settlement Koshoi-Korgon, 20 kilometers west of the city of At-Bashy, there are remains of an ancient fortress (250-250 meters) dated between the 10^{th} – 13^{th} centuries.

The Manas Ghumbez, (mausoleum) is 20 kilometers from the city of Talas at the bottom of the mountain Karool-Choku. The monument belongs to the memorial-spiritual architecture of 14^{th} century. It represents a portal –domical brick mausoleum with an internal lancet dome and an external ribbed tent on a ribbed drum crowning an almost cubic space. After the reconstruction in 1970, the memorial complex "Manas Ordosu" was opened. The complex includes the Manas Kumbez, the reserve-museum "Manas", and a mosque. According to some data, in 1334, an emir's daughter and other persons were buried in this Kumbez.

The Ken-Kol Burial Ground (the Talas oblast) consists of more than 60 kurgans (burial mound), dating as back to the 3^{rd} – 2^{nd} centuries B.C.

The City of Osh is one of the most ancient Asian cities. 3000 years ago, at the bottom of the four-headed mountain Bara – Kukh (160 meters high), the first settlements were established. In the 14^{th} century, Suleiman-Sheikh was buried in the depths of the mountain and the mountain received the name Takht-i-Suleiman (Suleiman' s throne). Since then people began to regard the Suleiman-Too as a holy mountain. The mosque of Ravat Abdullah-Khan (16^{th} – 17^{th} centuries), the mausoleum of Asaf-

ibn-Bukhria (17th – 18th centuries), the mosque of Alymbek-Datka (19th century) and about 30 historical monuments are still preserved in the city. The ancient Osh (4th century B.C. – 5th century A.D.) was an important settlement on the Great Silk Road.



Mausoleum of Asaf-ibn-Burhia (17th – 18th centuries)

Uzgen is also an ancient city of Kyrgyzstan. It was located on the caravan route from Samarkand to Kashgar in the 8th – 9th centuries A.D., and had the appearance of a mighty fortress. In the 11th – 12th centuries, Uzgen strengthened its position by becoming the capital city of Ferghana. The central part of the city represented a picturesque settlement with narrow, intricate streets and market square and caravans–saray along the streets. At present, only a minaret and 3 mausoleums located 100 meters away from it, which are among the best examples of 11th – 12th century Central Asian architecture, remind us of the city's former grandeur. The design of a portal-domical memorial building with a square hall and carefully designed decor on the main facade can be observed in the Uzgen architectural complex.

Between Uzgen and the village of Kara–Kulja is located the **Kara–Darya ancient settlement** (3rd – 4th centuries B.C.). This is an example of the Kushan culture.

Between Uzgen and Jalal-Abad, one can see the ruins of a large ***ancient settlement Shorobashat***, which is an administrative, military and religious center dating back to 4th - 5th centuries B.C.

The Shah–Fazil Mausoleum in the village of Safid-Bulend (the Jalal-Abad oblast) presumably dates back to 11th – 12th centuries. It is made from square bricks on an octahedral drum, and has a domical ceiling. The mausoleum is notable for its absence of exterior decoration while there is an abundance of interior decorations.

Saimaly Tash ("Embroidered stone") is one of the world's largest petroglyph galleries. On the northeast slope of the Ferghana valley, 91900 petroglyphs were found. Presently there are about 107525 petroglyphs dating back to the 3rd – 2nd centuries B.C.

Uzgen historic and architectural complex (11th – 12th centuries)

Mongolia

Luvsanjalbuu MUNKHZUL
Culture and world heritage site program officer
Mongolian National Commission for UNESCO

Nomadic life and wooden architectural heritage in the territory of Mongolia

1. Introduction:

The nomadic cultures of Central Asia have made immense contributions to the world. For many thousands of years they have been the main culture over a very large part of Asia. Through trade, conquest and the transmission of ideas, they have also greatly influenced the major sedentary cultures which they adjoin. In Central Asia, vast highlands of semiarid steppe extend over thousands of kilometers and are surrounded by the dense forests of the south Siberian taiga, Lake Baikal and northern China. The nomadic tribes from which the Mongols descended inhabit these huge Eurasian steppes. Their lands are not suited for agriculture so they raise horses, sheep, cows and camels. Nomads spend their lives moving their herds from one area of pasture to another, sometimes covering vast distances within a year. Over time this nomadic style created a very unique culture, which is now recognized as “Nomadic culture”. One of the most mobile and powerful forces in history, the Central Asian nomads, including the Mongols, played an important role in the history of Eurasia and in ethnic, economic, political and cultural links, including architecture. Mongolia is the homeland of nomadic architecture. The Mongol dwelling (ger) is an ancient wooden and felt structure which is ideally suited to the country’s extremes of climate and the people’s nomadic way of life. Mongolia has a rich experience of developing nomadic architecture, but also has permanent wooden architecture such as monasteries. Permanent national dwelling (ger) districts have long co-existed with the nomadic gers in the Mongolian territory. The major sedentarisation of the general Mongolian population and the shift to permanent residences occurred primarily in the latter half of the twentieth century, following the 1921 People’s Revolution. This trend has been increasing in recent years. With urbanization proceeding at an increasing rate, further shifts away from the traditional home environment are quite likely. As a result of continuing economic and cultural exchanges between nomadic and sedentary peoples, the gers and urban settlement have exercised important influences on one another’s development, reflected both in their physical structures and in their associated customs.

The present paper aims to identify present day management issues for conservation and preservation, specifically techniques related to traditional wooden architecture.

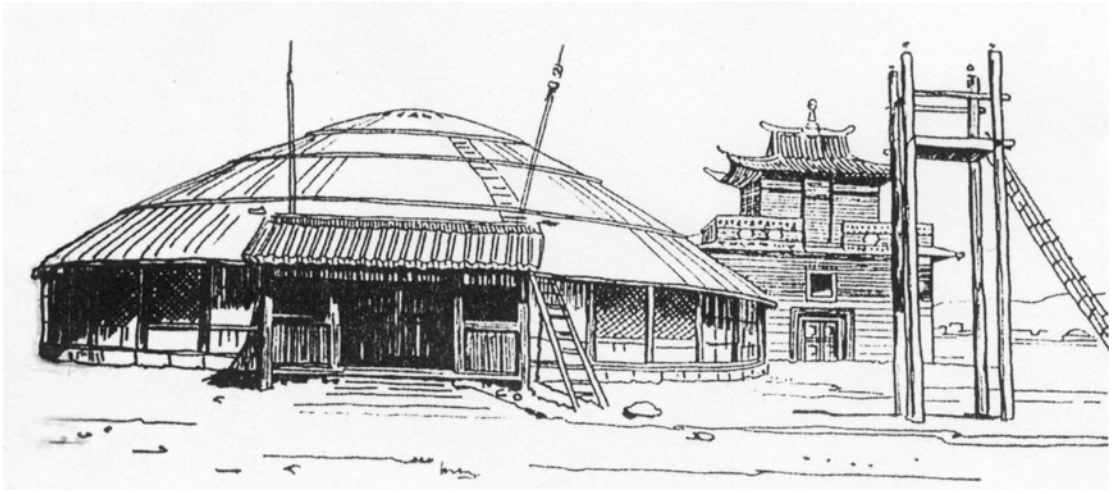


Fig. 1 ‘Ger’

2. The emergence of wooden nomadic and permanent buildings in the territory of Mongolia

Although nomadic and sedentary dwellings visibly represent separate cultural traditions, they can be presumed to share common prehistoric origins. The emergence of the first shelters of a definite "ger" type likely corresponded to the domestication of animals; such dwellings were constructed of piled-up branches covered with animal skins and bits of wool, and eventually felt.

The nomadic "ger" has, for the past several centuries, been constructed and furnished largely using wooden materials produced in urban centers; meanwhile urban settlements have developed in intimate association with their function as centers of trade, religion and politics servicing the nomads. Moreover the influence of traditional architectural principles associated with the "ger" can be detected in many of Mongolia's historical buildings and settlements.

The "ger" is a multi-purpose dwelling that can be easily collapsed, transported to another place and put up again fully preserving its original shape. Historically, being constantly on the move with herds of animals or being on military campaigns compelled the Mongols to build "gers" on carts. The "ger" has 2 key components:

1. The wooden framework
2. Felt cover

The wooden parts are the walls (Khana), the long poles (uni), the round smoke escape (toono) and its supports (bagana). One wall consists of 10-15 wooden poles, each about 1.5 meters long, bound together in a way making it possible to fold it for transportation and unfold it like an accordion. The unfolded walls are connected to form a circle. The long poles are fastened to the upper part of the walls with the other end passed through the round support at the top of the ger, the only window and smoke escape in the ger. Two posts prop up the round support. All parts which form the wooden framework of the ger resemble an open umbrella.

In parallel to the nomadic wooden ger, permanent settlements of wooden buildings have existed in Mongolia since at least the time of the Xiongnu (3rd century BC –1st century AD). Xiongnu building remains are concentrated in the central part of the territory of Mongolia. Whereas wooden structures associated with the development of the Mongolian traditional dwelling and its furniture date back to ancient times, large-scale permanent wooden structures did not become established in Mongolia until the 7-8th centuries. The biggest town including wooden structures in the territory of Khar Khorum, Mongolia was completed in 1235 and was declared the capital of the Mongolian Empire A number of local and foreign scholars have investigated the site of Kharakhorum since the end of the 19th century. Since the 13th century, wooden religious permanent buildings were built at an increasing rate. One good example is the Buddhist monastery Erdenezuu which was founded in the territory of the Empire's capital city in 1586 by Avtai Sain Khan with the aim of spreading Buddhism throughout Mongolia. In this sense the Monastery is a fascinating complex of Buddhist architecture, which preserves the culture, customs, canons, beliefs and relics of one of the largest cultural traditions of human civilization.

Fig. 2 Traditional wooden structures

3. Wooden structures in the cultural and natural heritage of Mongolia: tentative list for inscription on the World Heritage List

In 1996, cultural and natural sites were listed in the cultural and natural heritage tentative list of Mongolia for inscription on the World Heritage list. Three examples of wooden architectural heritage were included, namely the Erdenezuu, Tuvkhen and Amarbayasgalant Monasteries. From that time, conservation issues have been more focused on the list involving the preparation of world heritage nomination dossiers, legal protection, various types of intervention, and regular monitoring and maintenance.

Fig. 3 Erdenzuu Monastery

The first Mongolian Buddhist monastery, Erdenezuu (fig. 3), was established on the ruins of Takhai near the ancient Kharkhorum city ruins in 1586. The monastery is surrounded by stone walls linking together 108 stupas, and has a large gate in each direction. At the peak of its development in 1792, there were 62 temples and buildings inside the fortified walls, housing over 1000 lamas. The monastery was twice severely damaged, first in the 1680s during the Inter Mongolian wars, and again in the 1930s and 1940s with the Stalinist religious purges. The monastery was taken under State protection in 1944, and in 1965 was opened as a Monastery Museum. In 1973, following an investigation into the condition of the monastery, the Laviran, Eregsumgombo, Nomun Khan, Tsamba, Ayush, Gaagai, Narkhajid and Gurvan Zuu temples were restored. Additionally, between 1996 and 1998, restorative work was performed on two tombs, Gurvan Zuu Turtle fortress, the stupa in front of the golden stupa, East Zuu and other main temples. Currently there are 18 buildings standing, two tombs, plus 108 stupas and a few stelae that are on public display. Besides this, these temples contain over ten thousand valuable exhibits.

Due to the natural and climate impacts and lack of restoration work in recent years, the condition of several temples has been deteriorating. In particular, roof water leakage has caused some damage to painted timbers and paintings in the Middle Zuu, Janraisag and Dalai Lama's temples. The greatest damage has occurred to these three buildings, five stupas and the triple tower gate. The appearance of the temples and buildings has suffered as a result of worn-off layers of paint, wall cracks, and so forth.

The surrounding walls of the monastery have not been repaired, and indeed several temples and some parts of the wall have sunk into the earth to a depth of 50-80 cm. Inside the wall, there is no interpretation or presentation board to guide visitors to the exact locations of historical, cultural and archaeological sites and ruins. During the peak summer tourist period, untrimmed vegetation growth obscures many elements of the buildings.

Fig. 4 Tuvkhen Monastery

Since the 1990s, following a resolution of the President of Mongolia, religious activities at Erdene Zuu Monastery have been restarted – a significant step towards the restoration and development of the traditional religious customs in the Orkhon Valley Cultural Landscape. Although the temples of worship at ErdeneZuu were destroyed in the 1930s, the Laviran temple is now used as a residence for lamas. But this temple is not adequate for worship and moreover, sometimes the strict religious customs and rules cannot be executed. There is consequently a need to restore the

Tsogchin temple of Erdene Zuu, the former site of religious worship.

Tuvkhen Monastery was established in the seventeenth century and restored in 1760 and 1786. One undamaged temple (temple studio) and the foundations of the buildings, wooden floors and ruins of some temples have been under the protection of local authorities since 1971 and of the State since 1994. Investigative works were carried out in 1967 and 1971. A restoration design for the undamaged temple-studio was made in 1992. The hermit monastery was largely restored between 1997 and 2001 on the basis of historical illustrations and photographs. The number of visitors and pilgrims has been steadily increasing in recent years.

The complex of Amarbayasgalant Monastery was built during 1727 -1736, in honor of Under Gegeen Zanabazar, the religious leader of Mongolia. Originally, Amarbayasgalant Monastery consisted of over 40 temples built on a special terrace, surrounded by a wall, measuring 207 x175 m. Only 28 temples now remain and they have been under State protection since 1944. The monastery has a symmetrical construction. The size of its main temple is 32 x 32 m. Its construction expresses the planning features of traditional Mongolian architecture and the engineering solutions are very original. One of the interesting solutions is the routing of roof water through the inside of four columns, under the floor, through stone grooves and away from the main temple. There needs to be some discussion of the case for restoration: presumably restoration is necessary in order to maintain the original religious use of the site and therefore supports part of its significance. Nonetheless, there is also a need to be clear on policies as to how restoration is to be carried out without unduly affecting the surviving fabric and without introducing a disruptive element.

Fig. 5 Amarbayasgalant Monastery

For the above-mentioned wooden monasteries, there is a need to point out how the buildings are to be serviced and whether any of the arrangements, e.g. electricity supply or the use of candles, pose a danger which needs to be covered in the Management Plan. Establishing a continuing maintenance regime is also an issue which needs to be covered.

4. Management issues for wooden structures in the Orkhon Valley proposed sites for World Heritage inscription

The wooden structures of Orkhon Valley have different conservation problems from the ruins of Kharkhorum, the ancient capital of Mongolia and Erdenezuu Monastery, whose many temples were destroyed under the ideological reprisals. The key to their conservation is to prevent water penetrating into the core of the wall, where it can wash out mortar and cause damage wooden parts during the frost and snow melt seasons. To maintain their authenticity, ruins should also be repaired in a manner which preserves their existing appearance, although there may be occasions in which the insertion of hidden strengthening elements is essential to prevent their collapse. In addition, for the ruins of Kharkhorum, the ancient capital of Mongolia, photogrammetry is ideally suited.

Except for the massive destruction of the historical sites of Mongolia, wooden structures were preserved relatively well until the beginning of the 20th century. Several factors have accounted for this preservation:

1. Human impact on the landscape has been minimal due to extremely low population density, lack of industrial or agricultural development, and absence of permanent settlements.
2. Traditional nomadic cattle-breeding, the primary means of livelihood in the region, has had little effect on ancient historical and cultural remains.
3. According to the teachings of Shamanism and Buddhism, it is prohibited to disturb mountains, rivers and the earth or ancient memorials.

Nevertheless the heritage sites have experienced some damage, particularly in recent years, due to the following conditions:

- Natural weathering: Through weathering and loss of their original shapes under the influence of natural factors such as sun, wind, water and temperature changes, historic buildings, stelae and statues are deteriorating gradually. Soil minerals, microbes and rodents have also caused some damage.
- State policy and activities: Under the ideological banner of building a socialist society, through a policy denying national history and culture, several hundred Buddhist temples with unique architectural characteristics were completely destroyed. The few surviving buildings such as Erdenezuu, Tuvkhun and Baruun Khuree have had to undergo restorative works.
- Urbanization and increasing population density are affecting the sites negatively through the installation of high-voltage poles, roads, garbage dumps, etc.
- Vandalism and theft: In some cases local people are destroying ancient graves, burial markers and temples by using the stones and timbers as construction material for buildings, roads and bridges, livestock fences and houses. In addition, some sites have been damaged by looters.

Challenging issues for Conservation and Protection of the Heritage Sites

- Establish adequate legislative and regulatory conditions meeting the criteria of World Heritage for the protection and use of the cultural sites.
- Integrate nomadic culture with modern technology, and a coordinated system of tourism, culture, education, science and health services will be maintained in close conjunction with nomadic culture and lifestyle.
- Develop a long term sustainable conservation policy to redress the problem and enhance management capacity.
- Develop a long-term sustainable tourism industry that supports the future conservation of the sites, placing priority on improving access to and within the sites.
- Implement systematic measures to ensure the protection of forest, soil and biodiversity, discontinuation of pollution, soil erosion and local desertification; reforestation, rational management of pastures, fire prevention and general wilderness conservation.
- Establish an exchange program with other world heritage sites which share similar conservation challenges.
- Improve capacity building of professional conservators.

Nepal

Ramesh THAPALIYA
Architect
Department of Archaeology
Ministry of Culture, Tourism and Civil Aviation

Problems and Needs On Cultural Heritage Protection Activities in Nepal

Nepal extends for 800 kilometers along the Himalayas whose culminating heights dominate the landscape. The parallel ranges of varying heights and extent traverse the country east to west. The topographic extremes of the country have resulted in a vertical distribution with the tropical, temperate and tundra zones the major climatic types. The extreme variation of topographical setting and climatically ruled environment influenced the settlement pattern of the people and the cultural processes of the country from the very beginning of human occupation in this land. Right from the beginning, the population of Nepal appears to be the outcome of successive migrations of Caucasoid peoples from the southwest and groups of Mongoloid stock from the northeast.

Being the birthplace of Lord Buddha, Nepal is regarded as one of the holiest places by the Buddhists of the world. Hindus all over the world also pay their spiritual respect to Nepal as the only Hindu Kingdom. The materialization and practice of both Hindu and Buddhist philosophy is the main outcome of the Nepalese Cultural Heritage. Beside this, the people of Nepal consist of about 50 ethnic groups; almost the same numbers of dialects are spoken and all the ethnic groups have their own cultural traditions. Thus the practices, beliefs and other physical creations of all the ethnic groups and subgroups of the country are considered as the Cultural Heritage of Nepal. This diversity has influenced religious practices and their manifestation in art and architecture, creating variation in minor form among the different ethnic groups within the same religion.

The history of Nepal really begins with the evolution of the Neolithic cultures of the river valleys of Bagmati, Narayani and the Rapati. Polished stone tools such as hand axes, cleavers and scrapers are the silent testimony of this bygone age. Then, with the close of the Christian era we get a list of thirty Kirat kings who ruled over the Valley of Kathmandu for a period of a little more than a thousand years. Two rulers of the Kirat period have been associated with Lord Buddha (sixth century B.C.) and Emperor Ashoka (third century B.C.) They are Stunko and Jitadasti. With this one enters into the ancient Nepal stretching from the first century A.D. to about the ninth century A.D. This is called the classical period in Nepalese history; and the Lichhavis, Thakuris, and the Guptas helped to mould the tapestry of this civilization. The plasticity in the stone medium reached a point that was never surpassed in any other period. Other mediums like bronze and terracotta were executed with precision, beauty and grace.

In the early medieval period, the Malla rulers were able to maintain a unified political culture over the valley of Kathmandu. But in the later period Kathmandu valley disintegrated into three city kingdoms of Kathmandu, Patan and Bhaktapur. Though politically in ruins, Kathmandu Valley did exhibit a strong economic base that was nourished by the profits of the Trans-Himalayan trade. This material posterity was materialized in the form of palace complexes, Buddhist viharas, stupas and Hindu temples of Vishnu, Shiva and the Shakti piths. The Malla bronzes and wall paintings are the present living witnesses of a period when religion provided the fountain of expression of all forms of art whether literary or material.

Architecture

A study of any culture or civilization would be incomplete without studying its architecture for architecture reflects the matrix of any civilization. So is the case of Nepal. The buildings of Nepal with their innumerable original features played an important role in shaping building art in Asia as a whole.

Nepalese architecture has its unique art and techniques of design and building, as distinguished from the skills associated with construction. The practice of architecture is employed to fulfill both the practical and expressive requirements of people. It embraces both utilitarian and aesthetic aspects that cannot be separated, and the relative weight given to each can vary widely in temples, stupas, viharas, palaces, patis and residential houses.

The main Nepalese architectural style, which varied according to its function as private dwelling, palace, Buddhist monastery, or Buddhist or Hindu temple is basically a brick and wood construction with a tiered, sloping roof.

The cultural heritage of Nepal, particularly the contributions made by the Newar of the Kathmandu Valley to sculpture, painting, and architecture, is a source of great pride. Hindu and Buddhist religious values have provided the basic source of inspiration to Newar artisans. The themes of most artistic works have been primarily religious; the lives of the gods, saints, and heroes and the relationship of man to society and to the universe are expounded in sculpture, architecture, and drama. In the Kathmandu Valley, some 2,500 temples and shrines display the skill and highly-developed aesthetic sense of Newar artisans.

The capital city of Kathmandu is famous for its wooden temples. As the legend goes the name Kathmandu derived from Kasthamandapa temple, which is said to have been built by the wood of a single tree. Kasthamandap means "House of Wood" and the name Kathmandu owes its origin to this house. However, the earliest wood carvings in Nepal come from Panauti, which is about thirty miles south-east of Kathmandu. Among others, the Indreshvara Mahadeva temple of this township is rich in wood carvings. The wooden roof struts of the temple are among the finest wood carvings in Nepal. These carvings date to the period of its renovation in A.D 1401. The close-up roof struts in this temple show Shiva in the form of Kali as a partial skeleton. Wood carving in Nepal perhaps finds its best expression in the countless number of windows of every shape and type. The windows are of the latticed type with circular, square and rectangular frames and having a peacock or the sun at the center and other animal motifs at the base or the sides.

While talking about architecture of Nepal one has to mention the seven storied Kailaskut Palace of Amsuvurma of the seventh century A.D. This building today has not survived; but it has been very well described in the Tang annals and in the Nepali chronicles. It was apparently roofed with metal, decorated with sculptures and perhaps precious inlay and equipped with an elaborate and sophisticated water system. The Malla rulers of Nepal without exception took a leading role in patronizing Nepali architecture.

The major Nepalese architectural types along with a brief description of the world heritage sites are mentioned here.

Temple Architecture

Nepal abounds in temples of the traditional Nepali multi -roofed and Sikhara styles. The two styles are found side by side.

Pagoda Style

Temples are usually two-storied and only seldom rise to a height of five stories as in Kumbhesvar Mandir in Patan or the Nyatapola in Bhaktapur. The roofs are of copper and often gilded or covered with tiles. A number of small bells are affixed to the edges and tinkle when moved by the very gentlest of breezes.

Nepalese pagodas are the most important and significant features of Nepalese architecture. The pagoda style of construction is most probably a creation of Nepalese architecture. Chinese travelers who visited Nepal in the seventh century have left us their impressions in the ancient documents. They speak of magnificent palaces and temples of several stories and many roofs built one above the other. Therefore it could be easily concluded that buildings in the pagoda style were already in existence at that time.

Their descriptions and the praise of the architecture indicate that the Chinese were totally unacquainted with this style of building and lend weight to the belief that the pagoda originated in Nepal and later spread to the other parts of Asia.

It is believed that the ancient builders were motivated more by a desire for beauty and splendor than by utilitarian consideration. The style was developed in the first centuries of the Christian calendar and reached its full flowering in the Middle Ages.

Most of the temples of Nepal are built in the pagoda style. The pagoda style of architecture refers to multi-roofed structures given further height by tiered brick bases. Pagodas look like a stack of pyramids piled one above the other. On each storey of the tower-like structure, wooden beams and struts (a structural piece designed to resist pressure in the direction of its length) support a widely projected slanting roof, the struts ascending diagonally from the central structure to the edge of the tiled roof. The majestically tapered, ascending profile of the structure, with its strong contrast of light playing on the roof and masses of shade looming below, is peculiar to Nepal. Rich in textures and colours, the temples are embellished with carved and painted struts, carved doorframes and window frames, and embossed gilded copper sheets.

The struts of the roof form in many cases the symbolic images of the deities of the main shrines and sometimes the heroes of the Mahabharat and other female or mythical beings. The Nepalese art of wood carving achieved its finest expression in these countless roof struts of such pagoda style temples. Most often the temples are decorated with images of both the Hindu and Buddhist pantheon with added dragons, mythical figures and erotic cameos. The ground floor of the pagoda is considered the abode of the god for whom the temple was built. Only a few instances are available where the Sanctum - Sanctorum of the deity is found on the upper floors of a temple.

Pagodas were usually constructed in Kathmandu in response to the need for higher structures. Although they do not seem like high towers in today's skyline, they were tower-like structures in ancient times. Hindus believed that the gods lived up in heaven and in order to provide easy passage between the heavens and the temples tall temples were needed.

The oldest Pagoda temple built in Nepal was the Pashupatinath Temple, which was built around first century AD. Other records also have proved that many pagodas-like structures were present in Nepal by the seventh century. They were primarily developed and flourished during the Malla dynasty. We can find very few pagodas in Nepal from before the Malla period. Nepal is the only country having so many temples made in the pagoda style. Among the most representative examples of the multi-roofed architecture are the Pasupatinath and the Taleju temples of Kathmandu and the Nyatpola temple of Bhaktapur.

The temple of **Pasupatinatha** (Pashupatinath) situated in the Kathmandu Valley on the Baghmati River, just east of Kathmandu, is regarded as the holiest place in Nepal. It is the site of an ancient Saivite (*i.e.,* devoted to the Hindu god Siva). The temple is built in pagoda style with a gilt roof, and the banks of the Baghmati are paved for several hundred yards. There are numerous other shrines in the vicinity. The Sivaratri festival in February or early March attracts Hindu pilgrims from India and other foreign countries. Pious Hindus also go there to die, believing that they will find salvation if they expire with their feet in the sacred waters of the river at Pashupati.

Pashupatinath

Nyatapola temple is a typical example of Nepali temple architecture built in A.D. 1702 (822 N.S.) by the contemporary king of Bhaktapur King Bhupatindra Malla. This early eighteenth century tiered temple is situated at the Taumadi Square, southeast of Bhaktapur Durbar Square. The temple is dedicated to Goddess Siddhilaxmi who represents prosperity and good fortune and also represents the Goddess of War. It is the tallest tiered temple built in the pagoda style, standing on five huge plinths with a five-storied roof and a polished gold brass pinnacle at the top. The base of the Nyatapola temple is a rectangular terraced platform of stones and has five stages or folds with a steep stone-paved stairway. Nyatapola Temple has to be assessed with regard to its role in the architectural history of Nepal. It modified the age-old canons and found new ways of expression. It shows significant innovations such as increase of roof storeys and plinth steps on the one hand and the introduction of an open gallery surrounding the shrine cell on the other. Bhupatindra Malla integrated various styles of near-contemporary monuments to make a convincing political and religious statement while erecting this temple to his personal deity. The result is a building of the utmost harmony, defining mature rules and canons of temple design to be observed until the end of the Malla rule.

Nyatapola

Shikhara

Shikhara

This is primarily a stone and brick construction. The world Shikhara means a mountain peak and thus it indicates to a certain extent the shape of the temple. It has either five or nine sections. The final section consists of a bell-shaped top. This architectural style is actually Indian in origin.

The most representative, finest and best-known construction in this style in Nepal is the Krishna Mandir in Patan. This stone built temple stands on a three-tiered platform and has three open verandas, each smaller than the one below and is supported by pillars. The stone reliefs on all sides of the building depict motifs from the two epics, Ramayana and Mahabharata.

Stupas

Except for the relics of Tilaurakot and Piprawa the stupas are the oldest monuments of architectural importance. The stupas are in the shape of a hemisphere constructed out of bricks on a plinth of bricks or stone and devoid of architectural decoration. At the top there is a small chapel and on the four sides of the garbha there are similar chapels. The top chapel is dedicated to Vairochana. At each lateral chapel attached to the hemisphere are the four meditating Buddhas: Amitabha, Ratnasambhava, Aksobya and Amoghasiddhi. The Swyambhunath and Baudhanath stupa have been thoroughly restored but conservation is of a convincing nature and the old form has been retained. Its chief character lies in the substructure, which comprises a number of concentric terraces with turrets at

Bouddhanath Stupa

Swayambhunath Stupa

the angles, the whole approached by a simple and dignified flight of steps. Above the harmika is a stepped pyramid in thirteen storeys typifying the thirteen heavens of the devas (gods). This is surmounted by the finial. It then supports the Kalasa finial.

The popular stupas Swoyambhunath in the west and the Bouddhanath in the east of Kathmandu were built during the Licchavi period. Characteristic of the large stupa like the one at Boudhanath is the low base from which it rises and its crowning dome-shape. The small stupa was generally set in the courtyard of a Buddhist monastery.

Originally, the stupa of Swayambhunath must have been a simple earth tumulus erected on a hillock. This rough mound is now crowned with an immense finial previously described and stands amidst a complex of temples, shrines and alcoves of which it forms the central feature. On both the stupas one sees a pair of painted eyes looking in four directions. They are today interpreted as the all-seeing eyes of Buddha. This is a very distinctive feature of the Nepali stupa architecture not found in the other stupas of the world.

Palace Architecture

The royal palace in each of the three cities of Kathmandu Valley served not only as the residence of the monarch but also as the seat of government. It seems that the three palaces were built in the mid - seventeenth century. The three palaces have a similar plan of construction. The palaces are four storied and consist of many courtyards. It is said that the palace of Bhaktapur had as many as a hundred courtyards; but all of them have not survived. Each palace has the Mul chowk (principal courtyard) on the side of which is raised the temple of Taleju Bhavani. Next to it is the Sundari chowk which served as the private apartment of the monarch himself. There were also many other courtyards named after deities like Bhairab and Narsinha. The struts of the roof and the doorway of the palace are carved with deties of tantric origin, the eight mother goddesses, and the Mahavidyas, Ganesh and Bhairava.

Nuwakot durbar of Nuwakot district and Lumjung durbar of Lumjung district are also constructed in similar designs as the durbara in Kathmandu valley. When we come to the modern period many Hindu temples in Nepal were built in a dome-shaped structure like the Vishwarupa temple, Jang Hem Heranya temple at Thapathali, etc. Again the Janaki temple of Janakpur shows a strong impact of the Mughal architecture. When we come to the end of the nineteenth century Nepal was invaded by a wave of western architecture; this is seen in innumerable Rana palaces like SinghaDurbar, Lal Durbar, Phora Durbar and Seto Durbar.

Basantapur Bhawan

Rani Durbar, Palpa

Patan Durbar

Fifty-five Window Palace

Seven Storied Palace, Nuwakot

The Vihara architecture

The architecture of the Vihar constituted a part of the monastic system. It consists of the main shrine and the chambers around the courtyard. The temple site was just opposite the entrance. The temple might be of one or multiple stories with all the carvings in wood and paintings on the walls inside. The courtyard often has at the center a tumulus or a Chaitya. The temple doorways were profusely decorated as the frame, lintels, the sides and the cornices as well as the tympanums (toranas) were carved with floral designs and minor or acolyte deities. The entrance was the open hall with pillars supporting the storey above it. One could reach the temple through the courtyard or through the platform. The buildings of the Vihara were generally double storied. The stores of the structure on the three sides of the courtyard are meant to provide rectangular chambers where images and manuscripts belonging to the vihara were deposited. A part of the upper storey often was used by the priest to accommodate his family. It should be remembered that the main deity of the Vihar is always the Sakyamuni Buddha or the Bodhisattava of the age.

The entrance to the court was through a door which was either wood or hammered brass. The hall adjoining the door has one of the niche deties like Mahakala, Hariti, Ganesh and Hanuman, who are there to protect the Vihar. The Vihar architecture today can be dated to fourteenth century A.D. Some vihars are 30 ft. x 30ft while the large ones cover several acres. Some of the important vihars include Na-haha, Wu-baha, and Baga -baha, Bhinche -baha and Tavabaha in Patan and Itum -Baha, Tara - baha, Tava - baha and Yatka - baha in Kathmandu. There are also some important vihars in Kathmandu and also in Bhaktapur, but small vihars are scattered throughout the cities of the Valley.

Lumbini

Lumbini, which is located about 28kms west of Bhairahwa in Eastern Terai of Nepal, is the birthplace of Lord Buddha who was born in 623 BC. Because of this Lumbini has been inscribed in the World Heritage List in 1997 as the second World Heritage Site of Nepal. The birth of Lord Buddha has made this place a world famous pilgrimage site for Buddhists living around the world. This place has also been a place of veneration for all the peace seekers of the world. Emperor Ashoka of India came here in 249 BC to pay homage to the place and he erected an inscribed stone pillar near the spot where Lord Buddha was born. This has been stated in the inscription and is the first historical evidence of its kind ever found in our country. During the third century, the temple of Mayadevi was constructed on the place where the Lord was born. An image of Mayadevi also stands here, which is known as the "Nativity Sculpture". A conglomerate stone located deep in the sanctum Sanatorium indicates the exact spot of the birthplace of Lord Buddha. It is said that Mayadevi took a bath in the "Sakya Pushkakini" pool just before giving birth to Lord Buddha, which makes it more holy and precious. This holy site is surrounded by a row of stupas and other archaeological ruins from the third to fourth centuries BC onwards.

Lumbini

With ever-speedier communications and faster means of transportation, the world has grown smaller. It is becoming a global village. It has grown richer in many ways, and poorer in many others. Throughout the continuum of change in human civilisation over the ages, cultural treasures have been created and destroyed. Wherever these treasures may be located, they constitute a heritage. Our heritage is what we have accumulated from the past, what we live with in the present, and what we pass on to future generations to enjoy. Our national heritage embodies our touchstones, our cultural points of reference, and our identity. Some of the most representative expressions of these heritages having outstanding universal value are listed in world heritage lists. So such treasures needs to be embraced and defended, cherished and protected.

The physical cultural heritage is, basically, a non-renewable, irreplaceable resource. More and more, our sites are at risk of degradation as a direct or indirect result of urbanisation, natural resource exploitation, population growth, pollution and other phenomena of modern industrial civilisation. Theft of art and archaeological material, and petty theft and vandalism are also common threats to cultural sites. Fires are a direct threat; one of our monuments in the Svayambhunath protected monument zone was badly damaged by fire recently. Sites are menaced by water, chemicals, insects, plants and micro-organisms, any numbers of which cause damage or deterioration. Our cultural heritage's physical and cultural integrity also faces an array of indirect threats: atmospheric pollution, traffic vibration, encroachment and intrusive commercial development. To these threats are added

natural disasters, some of which are caused by unsustainable and environmentally harmful human practices, and armed conflict.

For these reasons, site management must take into account local and national plans, forecasts of demographic growth or decline, economic factors, traffic projections and industrial zoning and preventive measures to mitigate various types of manmade and natural disasters. Successful protection and maintenance require continuous assessment, inventory, information management, research and administration. It is this process that guarantees a World Heritage Site's survival as a sustainable resource. A key element of the process is planning for sustainable tourism, starting with sound legislation and regulatory measures that ensure the integrity of protected areas.

The scope of the subject certainly requires a detailed discussion on and about the problem and needs to be identified in the conservation of all types of cultural heritage existed in Nepal, which is quite impossible in this small paper. Therefore, allow me to confine this paper within the scope of Nepalese cultural heritage that is inscribed in the 'World Cultural Heritage' list and their adjacent areas declared as Protected Monument Zones.

In 1978, Nepal accepted the UNESCO's Convention concerning the Protection of World Cultural and Natural Heritage 1972. Immediately after the acceptance of the convention, Nepal proposed to inscribe the Katmandu Valley with its seven different unique cultural monumental sites in the list of World Cultural Heritage of UNESCO and the proposal was accepted and inscribed in 1979. Likewise in 1998, Lumbini, the birthplace of Lord Buddha, was also included in the World Heritage list. The act of listing Nepalese monuments in the World Cultural Heritage list generated more enthusiasm to the Nepalese authorities in conserving and safeguarding the heritage. All the monuments included in the list and their particular adjacent areas have been declared as 'Protected Monument Zones'. Special legal and technical measures have been undertaken for safeguarding and preserving the authenticity and environment of the Protected Monument Zones, Technical and financial resources have been mobilized through national as well as international sources. All these activities have resulted in considerable improvement in the physical condition of the monuments. But the historic environments of privately owned houses in the Protected Monument Zone are not properly maintained. At the same time, during the end of 1993, a Joint UNESCO/ ICOMOS Review Mission came to Katmandu and reviewed all legal and scientific measures adopted for the conservation of the Protected Monument Zones, and made sixteen recommendations. Nepal sincerely considered the sixteen points, and most of them were executed. In 1997 the World Heritage Committee again commissioned a Joint Mission comprising experts of the UNESCO/ ICOMOS/HMG- Nepal, and the Mission reviewed all activities, procedures and management systems regarding the protection and conservation of the World Heritage sites in 1998. This mission studied the situation of all the seven sites and legal and technical measures adopted for the conservation of world heritage sites of Nepal and made 55 recommendations incorporating the 16 suggestions of the previous mission. Considerable progress is being achieved in the 55 recommendations. Nepal is trying its best to protect the monuments and their authenticity as well as the environment of the World Heritage Sites in accordance with national and international conservation principles and norms.

Despite all the efforts, the WHC meeting held in Paris in 2002 put the Kathmandu Valley World Heritage Site on the List of World Heritage Sites in Danger. The reason given for taking this step was the serious deterioration of the historical setting of the monuments and their surrounding fabric by new building activities that are permanently altering the historical character of this site.

Consideration of an urban cultural heritage conservation strategy cannot be made based on conservation needs alone. Developmental issues have also be taken into the picture in terms of the strategy required to overcome both conservational and developmental problems. The problems of urban heritage conservation must also be considered as developmental problems. The strategy for the conservation should be based in the context of urban development.

The number of inhabitants in the heritage area is actually growing, and the historical core still is the city's centre for economic activities and growth catering for the city and its upland. The inner

cities are "generative" rather than "parasitic". The city centers are "growth centers" as they are developing fast, with economic potential and a positive generative role. The middle and higher income population has invaded the well-located and attractive low-income areas. The result is that economically weaker sections are marginalized. The small-scale economy represents a local economic potential, but is also a threat to conservation and housing needs.

Nepal is a market-oriented economy and the administration is like a "soft state". The role of the centre as well the local government is marginal. In the process of conservation and developmental efforts, it becomes essential to work "with the people".

During the course of implementation of the plans and programs concerning the conservation of World Heritage sites as per the nationally and internationally accepted principles and norms of historic monument and site conservation, many challenges have been encountered and all possible efforts have been made to meet them. The buildings located in the Nepalese World Heritage sites can be categorized mainly into two groups in terms of ownership; they are (a) Public monuments and (b) Private houses. The challenges identified in conserving the private houses are more complicated in comparison to public monuments. In this paper, efforts to discuss some major challenges are made.

Problems in conservation of public monuments –

The Nepalese World Heritage sites consist of a main monument surrounded by other monuments or groups of monuments. This group of monuments including the main monument falls in the category of public monuments. The major challenges identified in the conservation of these public monuments can be thus discussed under the following sub headings.

Lack of sufficient funds:

It is a well-known fact that the conservation of cultural heritage is highly expensive. The funds made available by the government always prove to be insufficient in comparison to the number of monuments and expensive conservation materials and craftsmanship. The constant appropriation of some amount of the government's annual budget and a few donations from different donor agencies have enabled us to keep the public monuments of the World Heritage sites normally in good condition. But a big amount is needed to conserve them properly and improve the condition of such sites. Therefore, the managers are bound to work with insufficient money and thus, unsatisfactory results. Thus the insufficient investment in conserving the cultural heritage has always remained a major challenge.

Lack of proper documentation:

Advanced architectural conservation is based on experience of architectural heritage recording and information management. The first conservation levels are associated with knowledge. Knowledge entails documentation as a fundamental aspect for preserving cultural heritage. Architectural records, and information generated from them, play vital roles in the conservation process. In that context, and prior to any conservation measures, architecture must be documented, analyzed and viewed as the result of its evolution and history. The conservation of architectural heritage entails a consideration of the material as well as the immaterial aspects of the heritage. The physical aspects of architectural heritage and its symbolic meanings in historic, cultural and social contexts make up the cultural memory and legacy left to future generations. Such important aspects got little attention in the past. Conservation became even more complicated with the absence of such recording. Thus the development of recording and documentation skills by conservationists is needed at present as it helps them to manage the information scientifically so that they can be re-accessed and diffused in the future.

A detailed inventory of the monuments of the World Heritage Sites, including private houses, is yet to be completed. Though the DOA has started this job and an inventory of two sites has been

already completed, six more sites are yet to be inventoried and it will certainly take time to complete all the sites. Until and unless the documentation is completed properly it is impossible to categorize the monuments and treat them in accordance with their category value and importance, which is very necessary to formulate plans and programs in conserving the World Heritage of any place. Thus the lack of an inventory of the monuments of the protected monument zone is also a challenge for the conservation of the Cultural Heritage of Nepal.

Lack of public awareness:

Another challenge in implementing the plans and programs for conservation of the Cultural Heritage of Protected Monument Zones of Nepal is lack of public awareness about their heritage. Unless an effort is made to make the people living in and around the protected monument zones or World Heritage Sites aware of the importance, value and direct and indirect benefits of their cultural heritage, they neither appreciate the efforts made by somebody else in conserving the Cultural Heritage nor do they participate themselves in such conservation. If the support and appreciation of the local public is not gained, the conservation of cultural property remains incomplete. Therefore one among the challenges faced by Nepal in conserving the cultural properties of the country is lack of public awareness. Several measures have been taken to create awareness among the people. Information on and about the cultural heritage of protected monument zones has been broadcast on radio, television and in newspapers. Likewise, several posters, pamphlets and brochures have been distributed. Cultural heritage and its importance have been included in the high school level curriculum. It is hoped that a positive result of these activities will be realized slowly in coming days and that this challenge will be changed into positive support from the people.

Living Cultural Traditions:

The Katmandu Valley, being inhabited by people since the beginning of the Christian era or even earlier, has produced different types of architecture and construction techniques. The combined nature of the settlement pattern and the execution of secular and religious buildings within a cluster shows the closeness among the palace, temple, stupa, public rest houses and private houses. Thus, the entire monuments of Katmandu Valley included in the World Cultural Heritage list are not isolated but surrounded by a series of private houses and other public monuments. Conservation of any cultural site does not mean just maintaining and keeping intact any architectural monument or tangible heritage but also to preserve or make regular the functioning of traditional activities or intangible cultural practices at the site. All the Nepalese cultural monuments in the World Heritage List are living heritages. It is accepted everywhere in the world that conservation and management of living cultural sites is a great challenge. Local people living in the cultural heritage zone are one among the most important elements in conserving such intangible cultural heritage. Without people a cultural World Heritage Site will remain like a dead monumental zone and the traditional living cultural heritage will disappear from the scene. Therefore, the job of the Nepalese World Heritage Site managers is also to retain people's living pattern and their livelihood within the protected monument zones. This compulsion is the outcome of the long history of occupation and tradition, which has created many challenges in conserving the sites. Thus, the living cultural traditions of the World Heritage sites of Nepal are also a burning challenge in the conservation of cultural heritage.

Lack of co-ordination between different agencies:

Traditionally, as well as legally, different governmental and semi-governmental organizations are responsible for maintaining and conserving Nepalese cultural heritage. Nowadays some international, national and local nongovernmental organizations are also coming forward to share such responsibility. The Department of Archaeology is the only government authority responsible in this matter. The Guthi Corporation, several municipalities, Pasupati Area Development Trust and Lumbini Development Trust are the semi-governmental organizations who are involved in the conservations of cultural properties. Also the Nepal Heritage Society, Federation of Swayambhu Management and Conservation, Boudhanath Development Committee and some other NGOs are ready to participate in

this field in their respective capacities. The conservation activities of all such organizations should be coordinated and harmonized to achieve better results. But the semi-governmental organizations have their own by-laws and policies that have sometimes created confusions in formulating plans and programs of site and monument conservation. To face this challenge the Department of Archaeology is playing a coordinating role as well. It is intended to prepare a master plan for the conservation of all the World Heritage Sites. Such plans for Soyambhunath area, Pasupatinath area, Patan Durbar area, Changunarayan area, and Limbini area are already in execution and the master plans for Boudhnath and Bhaktapur palace area are being prepared. This sort of master plans will be helpful to formulate programs on a priority basis and the proper utilization of resources in such World Heritage sites and they may serve as the guidelines and basic documents to coordinate the governmental and semi-governmental organizations as well as the NGOs and Ingos.

Another burning challenge caused by the lack of proper coordination is in the field of controlling modern construction and the encroachment of urbanization. To control such activities, the active support of chief district officer (District Administrative Head), local police force, and Municipality authorities is necessary but this sort of activity does not count as one of their priorities. This tendency has created a very difficult challenge. To meet this challenge, the Department of Archaeology is to constitute a high level committee that may coordinate with all these authorities.

Technical and Logistic Support:

Providing technical and logistic support to local people is necessary to preserve the vernacular architecture. Training of the people in the heritage areas in income generating activities such as making handicrafts, guiding tourists, managing motels and lodges in a local set-up to give an ancient flavor for the tourists, making souvenirs relating to the monument, etc, is necessary to educate the people on the conservation objectives so that they will be able to deliver the services, and manage and protect the environment.

Problems Related to Private Houses –

It has already been mentioned that a number of private residences exist within the World Heritage sites of Nepal. The local inhabitants are maintaining their age old cultural tradition which is also an important aspect to be conserved at the site. The people who are living inside the protected monument zones are another important element in conserving the cultural properties of the sites. Therefore, it is necessary to retain people's accommodations and their livelihood within the World Heritage sites. This limiting situation has created several challenges and most of these are related to the construction and reconstruction of their private houses. The major activities of inhabitants that cause serious threats are outlined below.

- The traditional fabric and setting of the monuments and their surrounding environment are being seriously affected by new building activities which are permanently altering the historic character of the World Heritage Sites.
- Open public spaces are encroached for public as well as private purposes.
- The demolition of historic houses in and around the World Heritage Sites and their replacement by unsuitable new buildings and additions of floors to historic buildings is another serious problem.
- Lack of maintenance to old buildings and a failure to understand their cultural value have increased the damage.
- Traffic pressure has increased tremendously with the increase in population and vehicle numbers.
- Overhead electrical wiring, and the placement of poles and transformers in the immediate vicinity of monument as well as in the streets are intrusive.

- The installation of satellite dishes and telephone cables on historic facades are detracting from their character.
- Monuments are being increasingly encroached upon by commercial vendors and advertisers are seriously defacing the historic character of the monument zones.

Some selected problems are discussed in brief as follows.

Nature of construction materials and the tradition of reconstruction:

The main construction materials of Nepalese traditional architecture are bricks, timber, terracotta tiles and stones. The binding medium in almost all the traditional buildings is mud and very often lime surkhi is found. They are constructed in a load bearing system. When old buildings are damaged, deteriorated or dilapidated due to the nature of construction materials and the load bearing system, there was a traditional practice of reconstruction after complete demolition of the building instead of in-situ conservation. The construction materials used in traditional buildings, as mentioned above, are reversible and replaceable. The age-old timber components of traditional buildings are almost always found in a rotten condition and need urgent replacement. It was traditional practice to demolish such houses and reconstruct them again. If people are permitted to demolish their dilapidated houses they do not follow the conservation norms while reconstructing them but if permission for demolition is not granted they will develop negative attitudes against the conservation policy. Therefore, the tradition of reconstructing old houses and the scarcity of old construction material is also a source of challenge in conserving the World Heritage Sites of Nepal.

Problems adjusting between owner demand and governmental codes and regulations:

As the perceived need for the structure has changed considerably, the design professionals are unable to find solutions within the framework of current governmental codes and regulations.

The design of a building begins with its future user or owner, who has in mind a perceived need for the structure, as well as a specific site and a general idea of its projected cost. It is the challenge for the design professionals to develop from them a set of construction documents that define the proposed building exactly and from which it can be constructed within the framework of current governmental codes and regulations. If design professionals are able to incorporate standard criteria for human comfort such as thermal environment, lighting levels, damp proofing etc., the job to implement the approved design becomes that much simpler.

Changes in house use system:

Another challenge in conserving private houses in the World Heritage Sites is generated from changes in the traditional house use system. The ground floors of almost all old private houses were not in use until the recent past. Therefore, only a few small windows were provided on the ground floor and it remained always damp and dark. The ceiling height is also around six feet. Nowadays, the dampness can be checked by providing damp proof courses and the ground floor of a house can be used in a more comfortable way. Almost all the areas of the World Heritage Sites are developing as tourist centers and the ground floors of the private houses can be changed into profitable shops. They need bigger size windows for more light; they also want to increase the floor height of their houses and they try to add different modern commodities in their houses, most of which cannot be used due to the size and shape of their traditional houses. Thus the intention of prescribed conservation norms and people's needs could not go together and it creates confrontations between the house owners and managers of the World Heritage Sites. In this situation public support to implement plans and programs of conservation in heritage sites is impossible and to meet such challenges is a very difficult task.

Scarce and expensive materials and craftsmanship:

The bricks and terracotta tiles used in old houses are of special type and quality. Another construction material used in the traditional buildings of heritage sites is stone. The stone itself and the carvings on it are of high quality. Though the timbers used in the old houses are of large quantity and low quality, the carvings and designs on them are very beautiful. The production of such qualitative and beautiful construction materials is two to three times more expensive than the modern construction materials. To get these materials and craftsmen in the market is very expensive. Therefore, this has become a burning challenge to convince the people for maintaining the historical environment in World Heritage Sites. To meet such challenges different measures are being executed. Under such measures the following facilities will be provided to those who follow the DOA's norms in conserving and constructing their houses.

1. Necessary timber and traditional bricks will be provided at subsidized rates.
2. The government will provide 10% of total costs to the house owner.
3. If someone conserves or constructs his/her house following the prescribed rules and regulations and the conservation norms, they are encouraged and honored by certain prizes.

But such provisions could not attract the people and they remain unsuccessful. Therefore we are thinking about meeting this challenge in another way.

Socio-economic changes:

The rapid changes in the socio-economic life of the people living within the World Heritage Sites has also generated several challenges in conserving the cultural heritage. The agriculture-based economy of the local inhabitants has changed into an industrial and commerce-based economy. Almost all areas of the World Heritage Sites are developing as tourist centers. Therefore, the commercial value of the private houses of the World Heritage Sites is increasing day by day and people want to change the unused ground floors of their houses into shops or other commercial facilities. Thus the changes of social life style of the people have pressured families living in the World Heritage Sites to acquire modern commodities like refrigerators, modern furniture and so on which cannot go inside their houses through the small traditional doors. This sort of economic ability and social pressure for modern commodities have encouraged the local people to change the size and design of their original houses. To meet such challenges it is necessary to create public awareness and educate people about the value and importance of traditional houses and the historic environment in the World Heritage Sites. Such information has been publicized through radio and television and posters and pamphlets have been distributed. These activities are showing some positive results.

Conclusions

As a whole, the art and architecture of Nepal, whether the buildings of the royal palace, the humble house of a merchant, or the numerous patis (rest houses) for travelers are all indicative of supreme quality. The beauty and grace found in these works of art makes Nepal a spokesman of the traditional art of the Orient. Both the tangible and intangible cultural heritages of Nepal are mainly the outcome of the practices of Hinduism and Buddhism. Among the rich wealth of various cultural properties, some monuments and monumental sites are inscribed in the World Cultural Heritage list. The Government of Nepal is paying special attention to their conservation. The monuments on the World Heritage List and their adjacent areas are declared as protected monument zones. Not only plans and programs but also special rules and regulations were introduced and are being executed for the conservation of such cultural heritage. During the execution several challenges have been faced by the conservation managers, and some such challenges were discussed above in this paper. Among the challenges some are administrative and managerial in nature and others are related to certain technical problems. Both the administrative and technical problems are again categorized on the basis of type of ownership of the monumental buildings as challenges related to public and private monuments.

Meeting the challenges related to the conservation of private houses in World Heritage Sites is more painstaking because of their deep relation with the changing life patterns of the people. As the problems in conserving the cultural heritage of the protected monument zones are challenging, so are the Nepalese authorities actively trying to meet them with several measures. The challenges and need of conservation efforts have increased with the decision of the WHC to include the Kathmandu Valley World Heritage Site in the list of monuments in danger. Though it cannot be claimed that the conservation of our world heritage sites will be free from challenges in the future, I believe that almost all the challenges will be solved and the condition of the monuments and world heritage sites will be considerably improved.

Philippines

Candido H. CASTRO
Sr. Restoration Engineer
National Historical Institute

Conservation of Wooden Structures in the Philippines

Introduction: The National Historical Institute

The National Historical Institute is a Government Cultural Agency created in 1972 by Presidential Decree No 1. The Institute has the general responsibility of preserving and promoting the Philippine Cultural heritage by undertaking studies on the promotion of Philippine History and national heroes, and the preservation, maintenance, management and protection of historic objects, sites and structures, including those that are declared national shrines, landmarks and monuments. The institute undertakes the promotion of Philippine History and other historical activities through research, translation, publication and commemoration of historical events and personages.

Different Divisions of the National Historical Institute:

- Administrative Division
- Research and Publication Division (RPD)
- Monuments and Heraldry Division (MHD)
- Historical Education Division (HED)
- Historic Preservation Division (HPD)

The Historic Preservation Division is composed of 3 sections:

- Survey and Documentation Section
- Architectural and Engineering Section
- Material and Conservation Section

The main functions of the Historic Preservation Division:

- Survey and documentation of historic sites and structures;
- Declaration of historical sites and structures as historic sites, monuments, shrines and landmarks.
- Preservation, restoration and protection of historic monuments, shrines and landmarks (Immovable objects)
- Restoration, preservation and conservation of relics and memorabilia of national heroes and other illustrious Filipinos. (Movable objects)
- Maintenance of National Registry of Historic Structures in the Philippines.
- Provision of technical assistance on historic preservation.
- Conduct scientific experiments and research works relating to the conservation of both movable and immovable objects.

The objectives of the Institute are:

- To serve as a leading government agency dealing with Philippine History with regulatory and consultative functions.
- To research and write about the lives and works of Filipino heroes and illustrious men and women.
- To research and compile histories of provinces and municipalities, structures and institutions for Publication or for use in scholarly papers.
- To compile historical materials and information for future use by historical researchers and the public, and to acquire books, manuscripts and oral histories from all available sources about historical events and personages for research purposes.
- To initiate the translation and editing of works on history for purposes of publication.
- To publish books, brochures, and manuscripts on the history of the Philippines, historical events, the lives of Filipino heroes and other illustrious personalities with the aim of promoting historical consciousness and national pride.
- To identify, designate and appropriately mark historical sites in the Philippines and to publish them in the national registry; to initiate their conservation and preservation and to maintain national monuments, shrines and historic markers in coordination with the Local Government Units concerned.
- To undertake the scientific restoration and preservation of historical sites and structures, as well as relics and memorabilia of heroes and other illustrious Filipinos.
- To maintain historical sites, landmarks and monuments as history museums in honor of our country's heroes and great men and women.
- To put up exhibits, both permanent and temporary, as a way of disseminating the ideas of the great Filipinos and other historical event
- To undertake fitting activities to honor our heroes.
- To stimulate historical awareness among the general public and to enhance public appreciation of the Filipino Heritage.
- To acquire relics, memorabilia and other mementos of heroes and heroines in order to preserve them for patrimony.
- To undertake heraldry works of the government including its political subdivisions and instrumentality.

Case Study: The Restoration of Syquia Mansion

Vigan, Ilocos Sur

Project's Goals and Objectives:

It was the objective of the National historical Institute to restore the Syquia Mansion and save it from further deterioration, while at the same time carefully retaining the original architecture and the character of the house. The Syquia Mansion was envisioned by the NHI to be a model of restoration for other colonial houses in Vigan. The Mestizo quarter is a source of historical and cultural pride among Vigan's citizenry and a tribute to the builders, owners, artist, and craftsmen who first conceived and developed this house to become one of Vigan's pride.

Syquia Mansion: Before Restoration

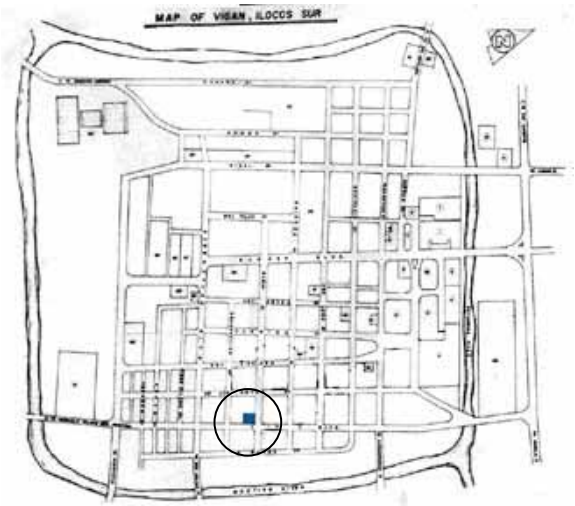
Syquia Mansion: After Restoration

Location of the Project:

Syquia Mansion is located in Northern Philippines. The provincial capital city of Vigan City is known for its rich culture and history, beautiful centuries old churches, watchtower, houses, and other historic edifice and sites of Spanish colonial vintage. Vigan has a mestizo quarter where history is kept alive in its century-old buildings in brick and timber. It is notable that Vigan has been declared among other historical and cultural sites in the Philippines as a World Heritage Site for its unique cultural and historical attributes.

Region I: Ilocos Region

Map of the Philippines

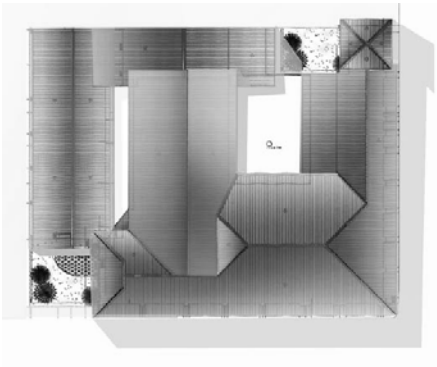


Vigan Ilocos Sur: Syquia Mansion site

Historical Background of the Structure:

The Syquia Mansion stands out as a typical example of residential houses in Vigan. The architectural type is characterized by walls of brick or of combined brick and wood, with high relief, cornices and pilasters that divide continuous streams of windows into several bays. It is the 'Bahay na Tisa' or 'house of brick' with its well defined architecture, which developed and flourished in Vigan, ultimately giving the city its explicit character and charm. For its distinct architecture of the Spanish period, the Mansion also become the historic setting for several film productions, among which was the 1950 film version of Noli Me Tangere, a novel about 19th century colonial Philippines by the foremost Filipino hero, Dr. Jose Rizal.

The original house, which stood on the lot now occupied by the mansion, was a simple bahay kubo or thatched house built in 1774 by the family forebears. In 1930, the house became a two storey structure made of brick and wood. The mansion underwent improvement from the late 19th to the early 20th centuries. The adjacent spaces which include a larger dining room, more bedrooms, a larger kitchen, servant quarters, tower and expanded azotea were added to the original 1930 structure. Thus, over the years, the house grew to accommodate the needs of its occupants.



Development Plan

Syquia Mansion: First Floor

Original part of structure bujlt by Don Justo Angco in 1830

Part of the structure added by Tomas Syquia in 1910

Part of the structure added by Elpidio Quirino in 1948

Part of the structure added in the late 1970's

Syquia Mansion: Ground Floor

View along Quirino Blvd.

Rear View

External Tower

View along Salcedo St.

Beneficiaries of the Project:

The direct beneficiaries of this restoration project would be the heirs of Gregorio Syquia who own the building, the City of Vigan and the Filipino people. The Mansion's preservation will also aim to give support to the City of Vigan, which has been inscribed on the World Heritage List as one of the significant heritage sites in the Philippines.

Conservation Program:

In 1997, the national Historical Institute's technical staff conducted a survey and documentation of the Syquia Mansion. These included:

- Preliminary researches;
- Photographic documentation;
- Visual inspection;
- Assessment (basic consideration)
- Existing local ordinances and guidelines on the preservation and conservation of Vigan
- Ancestral Houses. Local and national Building Code requirements.
- Preparation of restoration plans (in coordination with the Vigan Conservation Council under the Office of the Mayor, Vigan city and the Syquia-Quirino families)

Physical Condition of the Structure:

- Chipped painted walls exposing the masonry underneath
- Misaligned windows, doors and vents (ventilation opening below the window sill)
- Termite and dry rot infested wooden parts in major and minor structural members
- Soot-blackened walls near the kitchen (pollution)
- Exposure to harsh climatic condition (intense heat, rain and moisture)
- Leaky roof
- Cracks in masonry walls
- Deteriorated and damaged tile works
- Sagging and rotten floors
- Dilapidated plumbing and hazardous electrical systems

Causes of Deterioration:

1. Direct exposure to the elements and extreme weather –
   - Discoloration;
   - Decay of the painted walls;
   - Weakening of the plaster and mortar of the brick walls.

2. Structural defects –
   - Sagging and weakening of girts and floors;
   - Weakened structural shear walls.
3. Natural calamities such as earthquakes and typhoons –
   - Earthquake in the past caused cracks in the brick walls;
   - Typhoons seriously weathered the house and its structures.
4. Man-made causes –
   - Absence of the owners;
   - Leaving the house in the hands of caretakers.
5. Termite and dry rot infestation –
   - Termite and dry rot infestation was wide spread up to the second story level.

Roof condition

Details

Restoration Program:

1. Doors, windows and flooring;
   - Re-alignment of windows and ventanilla;
   - Removal and cleaning of loose paint;
   - Removal and patching of loose paints;
   - Repair of louvered windows;
   - Repair and re-alignment of doors.
2. Restoration of walls;
   - Removal and cleaning of loose paint;
   - Patching of cracks;
   - Consolidation of walls.
3. Replacement of deteriorated roofs;
4. Repair and replacement of deteriorated ceilings;
5. Rehabilitation of columns;
6. Architectural treatment; waxing, repainting and application of preservatives to timber components;
7. Connection to utilities;
8. Conservation of house furnishing and memorabilia of the Syquia and Quirino;
9. Provision of furnishings.
10. Mechanical cleaning;
11. Thermal insulation to prevent material deformation due to extreme heat, and to reduce heat radiating inside the house (to improve comfort level inside the house)

Courtyard

Dining (additional structure)

Technical Problems encountered during restoration:

1. The building structure is quite large and the degree of deterioration of wooden components varies;
2. Termite infestation (common problem in Vigan Houses)
3. Buildings that were added later were quite different. These conditions, particularly the
4. wooden floor frames and plank deteriorated faster than the older counterparts;
5. Sourcing of repair/replacement materials was difficult. Resulted in some substitution
6. and restructuring works;
7. Scheduling of pest control treatment was delayed because of local accreditation requirements;
8. Some wooden structural parts had to be replaced, spliced or restructured, particularly the roof frames that are rotted due to aging and extreme climatic exposure;
9. Window panels and sills had to be reworked and adjusted to restore them to good working order.

Present needs of the house after restoration:

- Conservation Management / Maintenance Program;
- Comprehensive periodic treatment.

Present Thrust:

The Syquia-Quirino families plan to convert the house into a lifestyle and presidential museum, which will showcase the memorabilia of the families, especially those of the late President Elpidio Quirino. It is planned that a minimal fee will be charged to the museum visitors to generate funds, which will help in the maintenance of the house. Preventive maintenance work shall be included in the management plan for the Syquia Mansion Museum.

Photographs showing the restoration work: (top images – during restoration , bottom images – after restoration)

Exterior Floor framing Stair balustrade

Republic of Korea

Young Hun JUNG
Deputy Director of Division
Modern Cultural Properties Division
Cultural Properties Administration

Problems and countermeasures of cultural heritage protection activities in Korea in relation to architectural properties

Architectural properties in Korea can be divided into wood architectural properties and stone architectural properties. These are classified as either national cultural properties, which have been managed by the central government, or local cultural properties, which have been managed by the local governments.

A. Wooden architectural properties

1. Uses: Palace, temple, government office, shrine, house, etc.
2. Number: National Treasure (21), Treasure (110), others. Total (140)
   These include: Temples (77), Palaces (19), castles (5), the rest including government offices (39)

Kim-Je Kumsan temple

B. Stone architectural properties

1. Uses: Pagoda, bridge, castle and wall, etc
2. Number: National Treasure (64), Treasure (446), others. Total (510)
   These include: Stone pagoda (184), Stone lanterns (25), Stone Buddha (76), Tombstone (67), Stone bridge, others (89).
   The number of cultural properties includes the asset assigned only by the central government, not those of local governments (2002/Cultural Properties Administration).

The number of architectural properties maintained by the local governments is 619 wooden architectural properties and 658 stone architectural properties. There are some problems in preserving and maintaining the architectural properties because they are scattered all over Korea and properties are privately owned, especially religious organizations of Buddhism, which own over 50 percent of architectural properties in Korea. Moreover, the interval of repair has been shorter than before because the worsen circumstance of preservation has been accelerated by global warming, erosion, weathering, and air pollution.

For the above reasons, this report will discuss the problems and countermeasures for cultural heritage preservation and reconstruction.

Preservation of architectural properties, mainly about wood building

Bong-Jeung temple Kuk-Rock Jeon(National Treasure)

The best policy to protect wooden architectural properties is to conserve the original forms, but the durability of cultural heritage has a limit because of damages and destruction. In this case, we try to keep the original form with minimized repair/reinforcement. The following are the main reasons for the damage of wood and stone architectural properties.

Reasons for the Damage of architectural properties –

1. Wood architectural properties
   - Damage by insects: White ant, hornet, etc
   - Erosion
   - Fire
   - Earthquake, Impact load of traffic
2. Stone built architectural properties –
   - Biological damages: Moss, weeds, ivy, acacia, etc
   - Chemical damage: Acid rain, sea wind, etc
   - Physical weakness caused by long term weathering

We have to measure the present condition of the building, the reasons for the damage, the current state of cracks, and exfoliation to protect the architectural heritages efficiently from further damages. Also, we should make more efforts in conducting regular diagnoses of structural stability and the degree of deterioration to identify problems in a structure.

Damages to wooden structures caused by insects.

A. Aspects of hardware –

1. Aspect of material

The characteristics of old wood don't differ from those of normal wood, but it's different depending on different circumstances. This is due to the biological degradation of the wood due to external influence. Biological degradation of wood is accelerated when it is exposed to hot and humid conditions. But, the result is opposite when it is in a cool and dry condition. For example, the wooden statue of Buddha in northern India has lasted 1,200 years because of the cold and arid condition in that region (Maylyon 1986). But the conservation of wood is more complicated due to the following reasons:

- Decay: rotting by microbes such as bacterium
- Harm by insects (white ant, Lasioderma serricorne, etc)
- Weathering: deterioration caused when the surface of wood is heated by ultraviolet rays
- Combustion

In this way, we call the state of wood losing its original quality "deterioration". The most ancient architectural property in Korea is the Kuk-Rock-Jeon (Heavenly paradise building) in Bong-Jeung temple which is assumed to be built in the 12^{th} century, so its age might be over 900 years. But this kind of case is very rare in Korea and most of the ancient architectural properties have not been preserved because of artificial or natural disasters such as fire, erosion, damage by insects and so on throughout the long history of Korea. So, we have encountered the needs of using chemicals to preserve architectural properties, such as the anti-flame chemicals and insecticide.

Use of chemical processes to lengthen material life of wood

- Fumigation : this method is usually used to eliminate insects such as white ants
- Anti-flame treatment: a wooden structure processed by an anti-flame agent is hard to be ignited besides surface carbonization when it catches a little flame. A good example is Kum-San temple in Kim-Je. An arsonist had set Kum-San temple on fire several times, but the Kum-San temple had little damage apart from surface carbonization from the incendiary fire. It was due to the reaction of a boron compound which changed the process of cellulose pyrolysis and promoted carbonization instead of producing a flammable gas. If the surface of wood is covered with carbon layer, the inner part of wood will be protected from heat and oxygen.

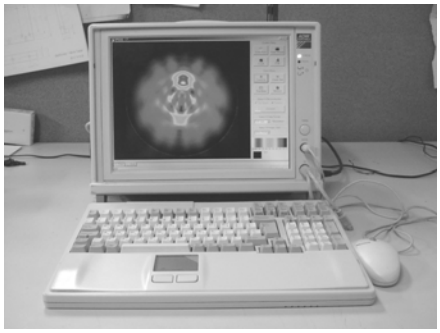
Korea have taken the measures of using chemicals when they have been needed, but we have to be prudent in using those chemicals because they can cause severe damage to the colors painted on wooden architectural properties that decorate them and make them grandiose.

2. Structural problems and measures

We can usually observe structural changes due to the self weight of the structure, uneven sinking etc. The followings are some of the factors for deformation.

- Uneven dead load of roof
- Use of new materials such as compressed roof tile
  - Compressed roof tiles increases the self weight of the structure
  - Uneven load which might be caused by a mixture of new and old roof tile, originally installed to prevent overall renewal and to preserve the original parts of buildings.
- Uneven sinking of the bases of the buildings.
- Impact load caused by traffic, train, subway, and earthquake.
- Deformation of joints and connections caused by the decay or combustion of the main members, and damage from insects

We have looked at the problems of wooden architectural buildings. We have to ensure that the main structural members such as beams, girders and eaves structures, which mainly affect the life span of the building, should be in a sound condition. The main, rotten structural members should only be replaced by new members that is of the same species of tree, size, and carving style. But this replacement should be limited due to the concept of preserving original parts. Of the damaged parts, we have to decide how much of the main structural members should be replaced. To determine the extent of repair, we are trying to use more scientific methods and non-destructive methods to diagnose wooden structures before repair.



CT(Computerized Tomography) with Ultra Sonic

3. Analysis method for wooden structures in Korea

- Non-destructive methods: Ultra sonic method, Computerized Tomograhy method (Visual inspection of the inside of the wood with Ultra sonic)
- Destructive method: Drill resistance method

These analytical methods are more efficient when we simulate the structure of wooden building with structure simulation programs such as SAP2000. This process will guarantee a more scientific method of repair. Furthermore, we are making more efforts to invent new devices and softwares which can be properly used and enhance repair work.

B. Aspects of software in maintaining architectural properties –

In Korea, owners have the primary responsibility for the cultural heritage, and the government has a secondary role. The following parties are involved:

- Owner
- Religious organization as a nonprofit organization
- Local and Central governments

In addition to the above, there are other problems of preservation:

- Requirements for renovation and illegal changes
- Disagreement in repairing architectural properties that are in use
- Maintenance and utilization

Firstly, it is not appropriate to allow the owners to imprudently alter buildings that have been classified as treasures. We have to take administrative measures to prohibit illegal changes to architectural properties. However, it is also difficult to totally ignore the owners' needs to enhance their living circumstance. For these reasons, we have to find a compromise between the needs of conservation and the protection of private right of possession.

Secondly, in some cases the owners oppose the government's decision to repair their architectural properties, because their business, commercial or religious activities might be limited during the repair works.

Thirdly, government owned architectural properties are hard to be maintained properly because nobody reside in the building, unlike the private buildings. For this reason, Korea has to seek some policies to utilize the architectural properties as tourist attractions as well as small pavilions, that could be used to teach about cultural manners and so on. However, we have to try to search for more efficient policies to utilize the architectural properties.

C. Aspects of restoration in architectural properties –

Here are the principals of restoration we have to consider in Korea:

1. Scale of Restoration

Scenery restoration will become an important matter in Korea, even though mainstream restoration work only involves units of architectural properties till now.

2. Maintaining the original forms in architectural properties

i) The importance of the original arrangement of building groups.

In the reconstruction of groups of buildings, we should know the arrangement and scale of the

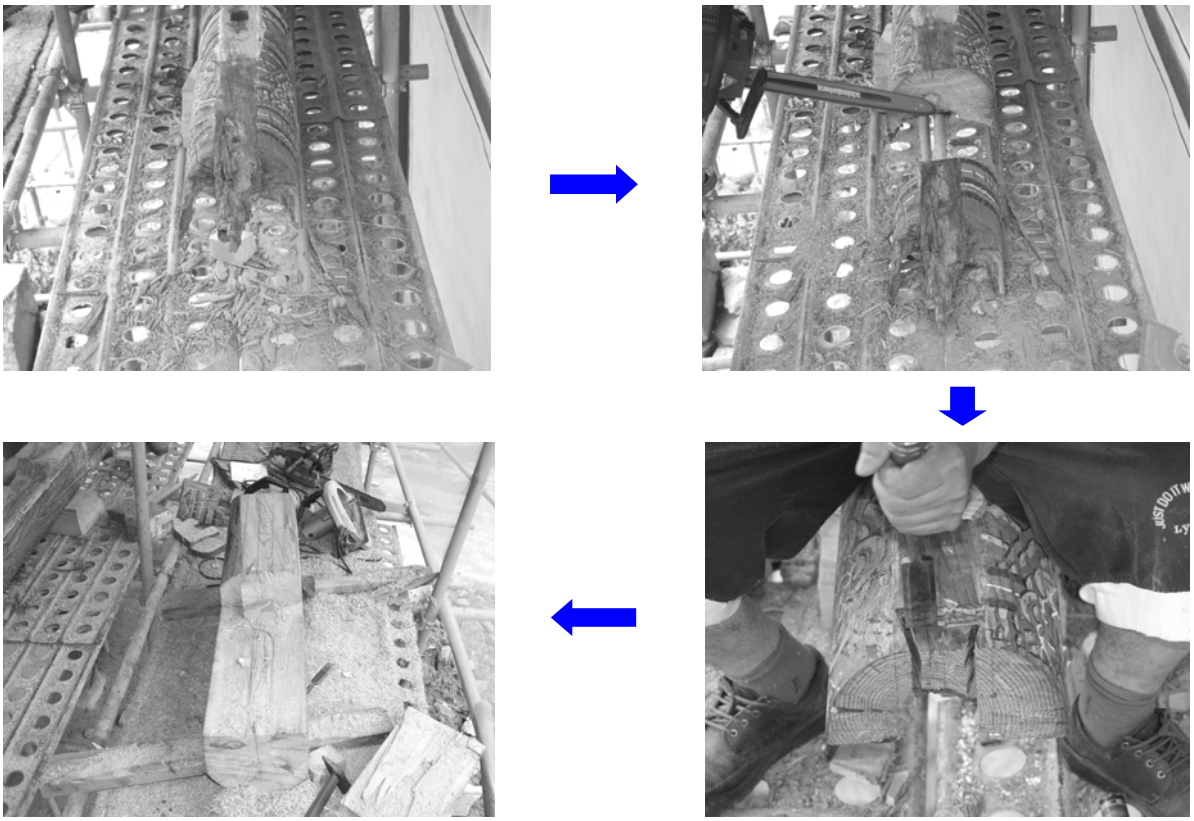
original form. These can be applied to the style and scale of a group of buildings. So we have to research and excavate building sites using historical documents, drawings, etc.

ii) The importance of keeping the original form of wooden structures.

We have to select proper architectural structure style after an analysis of the building arrangement.

iii) The importance of original materials.

It is recommended to use the same species of trees which were used in former times.



Repair case in Korea: Hye-Jeon Mun in Cheung-Pyung temple

Here are Korea's official policies to protect architectural properties:

3. New direction of repair work in Korea

A. Conducting repair and restoration with the principal of keeping the original form through the research and verification of experts.

B. Restrict new constructions on historical sites if possible. It would be possible if there is a need to keep the historical scenery surrounding a group of buildings.

C. To make careful preservation of stone properties and to revive their ancient antique style.

D. A yearly detail programs for the repair of individual architectural properties should be planned by local governments, with consideration of a unit's character and the status of preservation after field investigations.

E. The establishment of a scientific management system is needed to enable inspections that ensures the long term safety of architectural properties.

Sri Lanka

Jeewana Deepal WIJETHILAKE
Assistant Director
Architectural Conservation Division
Department of Archaeology

Problems and Needs of Cultural Heritage Protection Activities in Sri Lanka (Mainly about Architecture and Buildings)

Introduction

Sri Lanka is an island of about 25,332 square kilometers situated between 5^0 55' and 9^0 51' north and 79^0 43' and 81^0 53'east. The climate is tropical with monsoonal rains, and occasional cyclones and floods. The maximum rainfall in certain areas is approximately 5000 mm, while in other parts it remains at about 600mm

Historical Background

The history of Sri Lanka can be divided into prehistoric, protohistoric and historic periods. According to the chronicle records, the king Pandukabhaya built a planned city which later became Anuradhapura, in the north-central part of Sri Lanka. Buddhism was introduced officially during the reign of king Dewanampiyathissa and a totally new civilization evolved after that.

Within two centuries of its introduction, Buddhism was following a new direction towards scholarly life in the monastic communities nurtured by royal patronage. This resulted in the creation of massive monastic establishments on the one hand, and the stimulation of high-level literary activities on the other. Anuradhapura was the capital of the country from the 5th century B.C. to the 11th century A.D. Seegiriya is another kingdom made by king Kashyapa in this period which has now been included on the world heritage list. The entire city of Anuradhapaura and its great wealth of monastic ruins have also been inscribed in the world heritage list.

The transfer of the capital from Polonnaruwa was the beginning of political instability in the country. This is well reflected in the location of the capital city in 6 different places within 5 centuries.

The Dambadeniya Kingdom was made by converting a natural mountain into a fortress city to house the palace in 1236 A.D. But this city did not last for more than 36 years and was shifted to another safe, but similar site at Yapahuwa (1272- 84AD). Then the capital was again shifted to Kurunegala (1293- 1314 AD), and from there to the hill country, Gampola (1341-1408 AD).

Kotte, a coastal city, was the capital from AD 1415-1597. During this period Sri Lanka experienced foreign invasions from the West, the first, by the Portuguese, in 1505. Numerous peace agreements as well as hostile activities with the invaders did not allow the king to hold a coastal capital any more, and it was finally shifted to a strategically safer place, Kandy.

The country experienced the second western invasion by the Dutch in 1656. The Dutch controlled the maritime provinces of the country from 1656. They made qualitative changes in the architecture of the country and left a number of fortifications, some of which were built on top of Portuguese remains. One of them, Galle, is now in the World Heritage list.

The third invaders were the British who invaded the maritime provinces governed by the Dutch in 1796 and finally captured Kandy in 1815, thus ending the Sinhalese rule. Since that time, Colombo became the capital of the country.

Sri Lanka gained her independence from the British Empire 1948, and in 1972 became a republic totally independent from the crown, yet had a parliamentary tradition similar to that of Great Britain.

Cultural Heritage of Sri Lanka

The cultural heritage of Sri Lanka can be defined as all the material evidence related to its history. These materials can be divided into two eras, prehistoric and historic. These materials should be protected as archaeological evidence and as the cultural heritage of the country. The historic period proper starts in the 3rd century B.C. with the official introduction of Buddhism. Thereafter many religious and non-religious buildings were constructed in Sri Lanka which have now become ancient monuments. The religious monuments of Sri Lanka constitute the major proportion of her archaeological heritage, One distinctive characteristic of most of these archaeological sites is that they are the result of a living religious tradition. These comprise four out of the seven world heritage sites of Sri Lanka, namely Anuradhapura, Polonnaruwa, Dambulla and Kandy.

The ancient monuments of Sri Lanka consist of massive domed shrines (stupas), extensive monastic complexes, vast cave temples with exquisite mural paintings, opulent places, pleasure gardens, bathing ponds, fortified cities, and so forth. Among them are six unique sites which have been declared as sites of world cultural heritage. The number of movable antiquities which include priceless and unique objects such as metal images, coins, ethnological materials, ornaments, utensils, furniture, etc. scattered all over the island, either in private possession or state owned, can be counted in millions.

Protection of Cultural Heritage

Protection of the Monuments in early periods

Conservation of monuments is an essential element of Sri Lankan historical archaeology which follows a historical chronology based on kingdoms (capital cities) and the monuments found in relation to such periods, most of which are remnants of Buddhist monasteries.

New works as well as repairs to monasteries had been conducted by rulers who thought it was their responsibility and by the public, for whom it was a meritorious act. It is an interesting phenomenon to note that existing villages were granted to a newly-built monastery to provide for its regular maintenance. There were grants of properties made exclusively for the purpose of repairs to monastic buildings. Taxes from some of the properties were set apart for the maintenance of monasteries.

The actual meaning of some of the terms cannot be interpreted in relation to the present day context, but what is significant is that the ultimate objective had been the protection of the monuments and the prolonging of their life against deterioration caused by human acts and weather. Also for the purpose of preservation there had been permanent groups of skilled carpenters, masons and superintendents; special villages were established for these workers.

Colonial rule had a devastating effect on monuments and sites as the occupying powers' attitudes toward them were different. After independence in 1948, the state began to influence the restoration of religious monuments. Money for restoration work was given through the Department of Archaeology.

The Protection of Cultural Heritage Today

Archaeological activities in Sri Lanka commenced in the early 1860s, but systematic work began with the establishment of the Archaeological Survey Department in 1890 with a permanent staff

and financial support. Since then the Department has acquired a great wealth of materials and knowledge on various aspects of conservation.

Today the Department of Archaeology is the statutory custodian of all cultural property of Sri Lanka. The Central Cultural Fund Act of 1981 (under which the Sri Lanka UNESCO Cultural Triangle project operates) provided the opportunity to collect money for the protection of cultural heritage. Currently, cultural heritage protection activities are conducted by both the Department of Archaeology and the Central Cultural Fund. Funds from the government, from the Central Cultural Fund, and from other countries, organizations and individuals are used for these activities. Some world standard heritage protection techniques as well as traditional Sri Lankan techniques are being used for these tasks.

Problems of Cultural Heritage Protection

The cultural heritage of Sri Lanka is endangered at the moment due to different reasons and problems. This cultural heritage is threatened in Sri Lanka as it is throughout the world by numerous factors such as population pressure, irregular planning, haphazard development and expansion, ill-managed tourism, changes of attitudes, values and lifestyles of dwellers/ owners, functional changes, and many other reasons. The problems encountered by the custodians of cultural property in Sri Lanka can be summarized as follows.

1. Religious Influences

Attempts to restore religious sites and monuments endangered the historic aspects of these ruins due to their “sacred” nature which made them important to the majority of the public. Most of our monuments are inseparably tied up with the religion of the majority of the citizens and this often makes it difficult to maintain a balance between the conflicting interests of science and religion.

2. Influence of Tropical Climatic Conditions

The condition of many monuments is alarming due to their age and the tropical climatic conditions. Regular maintenance on a permanent basis is necessary in a tropical climate with a lot of rain.

3. Problems due to Private Ownership of Monuments

Some of the most important historical monuments in the Island are not owned by the government. These still remain in the hands of private individuals who may not extend the appropriate respect that is due to such buildings.

4. Lack of Financial Resources

Many cultural heritage properties are threatened with degradation or destruction because of lack of financial resources for their preservation and restoration.

Lack of finance is one of the major threats to the upgrading of conservation activities. The Department of Archaeology, the main state body responsible for conservation programmes in the country finds it difficult to start more conservation programmes due to lack of finance. Also there are no suitable funds available to lend to private owners to repair scheduled buildings.

5. Lack of Required Staff

The Department of Archaeology has a very limited number of staff. Lack of qualitative and quantitative capacities is therefore another problem. The handling of protection activities of cultural heritage has become a very difficult task with this low number of staff.

6. Lack of Training Programmes

The officers and junior staff engaged in protection activities of cultural heritage do not get enough opportunities to be trained in their work. Therefore their technical and theoretical knowledge is not sufficient. This directly affects the protection of our cultural heritage.

7. Lack of Public Awareness

A decrease in respectful attitudes to public property, lack of public awareness about their cultural properties, and immunities enjoyed by the diplomatic community also seriously affect the protection of cultural properties. Lack of sufficient public awareness programmes in this regard may be the main cause of this situation.

8. Deforestation

Colonization of forest areas is progressing very rapidly due to rapid population growth, and this destroys ancient sites and monuments.

9. Agricultural Activities

The burning of large tracts of land for cultivation also destroys ancient sites and monuments.

10. Negative Effects of Cultural Tourism

Hasty tourism-oriented preservation policies have also badly affected cultural heritage. Tourism has been called the world's second largest form of economic activity, second only to oil. The conservation of historic landscapes, sites and monuments has therefore become an important aspect of the economy of the country.

Cultural tourism can be an instrument for bringing about change, due to its economic importance, although when the motives are too heavily biased towards economic gain, this may signal a threat to the cultural heritage itself. At the same time, the increase of tourist traffic has increased the number of souvenir hunters, thereby encouraging the local suppliers to sponsor the sale of genuine objects of cultural heritage.

11. Uncontrolled Human and Animal Intervention

12. Spreading of Population

13. Civil conflicts

The ethnic problem which has been experienced by the country for the last few decades has minimized conservation and other cultural heritage protection activities within areas affected by civil war.

14. Popularity of Archaeological Trade

At first, treasure hunters destroyed these places to find valuable things but today this is happening because of the demand in the local and international markets. Another reason for this is the reduced penalties for treasure hunters. Over the past two decades, there has been an alarming increase in organized and conscious theft and vandalism and in the illicit trade and traffic of cultural property. This has now become a great threat to our precious heritage and demands the immediate attention of all authorities and professionals involved.

15. Weaknesses in the Conservation Procedures

Weaknesses in the conservation procedures are also affecting the protection of cultural heritage. Due to lack of training, funds, skilled personnel, modern appropriate techniques and machinery, etc. the conservation procedures have many weaknesses. These affect the protection of cultural heritage.

16. The inadequacies of Existing Legislation

Various kinds of acts have been prepared by the institutes which have the legal power to conduct archaeological works in Sri Lanka. But the inadequacy of penalties and some weaknesses in rules and regulations are still creating problems.

17. Influence of Large-Scale Development Processes

As Sri Lanka is a developing country, the archaeological landscapes we have inherited are critically threatened by large-scale development projects.

The archaeological environment is a totally non–renewable resource. A cultural landscape, created by human activity in the past, can never be replicated once modified or destroyed. Once lost, neither archaeological data nor their 'contextual' information can ever be replaced. Some instances of haphazard development are a critical problem in Sri Lanka. Modernization and vulgar industrialization and development, urbanization and so forth have affected cultural heritage.

18. Conflict between Residents and Heritage

The cultural heritage sites of Sri Lanka fall in a broad sense into two categories, namely 'living' sites and 'dead' sites. The 'living' sites constitute monuments with which the local population associates itself in a participatory manner, either in a residential or a ritualistic sense. In certain cases this may result in a change of use from the original purpose of the monument. The 'dead' sites constitute monuments where the original or changed usage is no longer functional or valid; the site is visited purely for its archaeological, artistic or historic value.

The sectors of historic monuments and sites of the living cities still have public properties and thus it is a difficult task to enhance cultural heritage and conserve and renew the historic physical fabric of the cities, while facilitating the needs of the people of the area. Minimizing this conflict and managing visitors at cultural sites where such a conflict prevails is a major problem in terms of protecting cultural heritage.

The problems of living cultural heritage sites can be categorized as follows.

- Unauthorized renovation and new construction damage to the heritage value of the area.
- Lack of restoration and maintenance of privately owned old buildings.
- Lack of awareness of the public in the restoration and maintenance of buildings which they own.
- Limited finance available for protecting cultural heritage. (These historic buildings entail need high maintenance costs).
- Lack of skilled labour, machinery and equipment.
- No incentives for restoration of privately owned buildings of historical interest.
- Inadequate technical staff for relevant authorities.
- Insufficient land area for further extension of existing buildings to handle population growth.
- Lack of public participation in protecting cultural heritage.

19. Expansion of Commercial Activities to the Heritage Zones

The archaeological value of monuments and sites is being destroyed by these activities today. Some commercial activities damage valuable ancient monuments.

20. Private Restorations:

Some privately owned ancient buildings are being restored and improved by ardent but non-artistic and unscientific people, without informing the relevant authorities and getting their instructions.

21. Cultural Property Theft

Theft of cultural property and the difficulty in apprehending and convicting the offenders are major problems.

Needs

More facilities should be provided in following areas:

- Intergraded protection policies
- Legislation and economy
- Survey
- Investigation
- Maintenance and conservation
- Preservation and reconstruction
- Professional qualification and international cooperation

2. There should be more programmes to educate the general public and to create an awareness among them about our cultural heritage and the importance of protecting it. In this regard, programmes such as public awareness campaigns can be organized on the value and advantages of cultural heritage protection with examples from other countries. These programmes are particularly essential in living heritage sites to maintain the characters of those sites. The participation and commitment of local populations are essential to achieve this. More modern information and communication technologies should be used for these public awareness programmes.

3. Expedite work on registering cultural heritage properties and expedite the declaring of all ancient monuments and sites of our cultural heritage as archaeological reserves.

4. Conduct training programmes for officers and other staff members involved in conservation work. They should be trained in efficient and systematic local and international strategies and techniques for the conservation, presentation and management of cultural heritage. Developing scientific and technical studies and research will help those specialists to counteract the dangers that threaten the cultural heritage.

5. Making more plans to conserve historic buildings and structures and use them for the present day needs of society such as for housing, commercial activities and even for cultural tourism. Since Sri Lanka has a series of coastal cities with "Mutual Heritage", the professionals have a challenging task to retain their historic character and the only way to justify their safeguarding is the meaningful use of these buildings and structures for the economic and social development of the people.

6. Since we have only a small number of experts, we should accept the help of outside experts in identifying the instruments that would help prevent the items of heritage deteriorating further. Encouragement of the exchange of experience and expertise in the field of archaeological heritage management is needed in this task.

7. Incentives to individual historic building owners should be given for their upkeep.

8. Provide facilities to domestic and foreign tourists while safeguarding the interests of the residential population without harming the cultural heritage properties. In this regard, the following needs can be pointed out.

- A friendly welcome and help with any problems or accidents
- A clean, litter-free and well-maintained site
- Presentation of the story of the monument / site and its treasures in a way visitors can understand
- Guidance on local taboos and religious or cultural attitudes
- Security and protection for themselves and their possessions.

9. More protection should be given to our cultural heritage properties to protect them from treasure hunters. Also programmes should be implemented to increase public awareness of the importance of protecting them. For this task appropriate trained staff should be recruited.

10. With improvements in cultural tourism, a significant proportion of revenue from tourism can be applied for the benefit of cultural heritage protection.

11. Development plans should be improved as far as possible to minimize potential damage, bad visual effects, and pollution of cultural heritage properties.

12. More opportunities must be given to the conservators to find skilled craftsmanship, traditional materials, appropriate traditional or modern techniques and tools. In this regard the administrative procedures and regulations must be flexible enough to cater for the needs of protecting cultural heritage.

13. The legal framework should be enhanced to regulate the respective rights, responsibilities and conflicts between the concerned parties who are involved in cultural heritage properties and to protect those properties from treasure hunters.

14. More funds should be allocated to protect cultural heritage. The governmental allocation is not enough for this. International and local institutions and the general public should be involved in funding for this task.

Architectural Conservation

Architectural conservation within Sri Lanka can be divided into two areas:

1. Exposure of Ancient monuments and sites
2. Conservation of Ancient monuments and sites

The conservation of ancient monuments can be divided in to several categories, primarily:

1. Conservation of stone monuments
2. Conservation of brick monuments
3. Conservation of timber monuments

This report will discuss only the conservation of timber monuments because this training course is on the conservation of wooden structures.

Ancient Timber Monuments in Sri Lanka:

Timber is an important material which is used for building construction. It is one of the oldest building materials. In Sri Lanka, recorded timber construction, date back to a few centuries before Christ.

The Sri Lankan wooden structures can be categorized into several types:

1. Timber used as the base of a building
2. Timber used for superstructure
3. Timber used for the roof where the superstructures can be any material
4. Others

1. Timber used as the base of a building

The base of this type of building is made by placing two logs of timber transversely on four or more stone pillars or rock boulders. The height of these stone pillars varies from building to building. The purpose of lifting the base from the earth is to protect the timber from dampness and termites.

Examples: a) Temple on pillars ("Tampita vihara")

b) Wayside rest places ("Ambalama")

(a.) Temple on pillars ("Tampita Vihara")

Tampita Viharage is a shrine room on stone pillars or boulders of varying heights. This is a building which has usually four cross beams and a wooden floor placed over the stone pillars. Wattle and daub walls are constructed on this timber floor. Sometimes a verandah runs all around the building with a wooden railing or half wall. Then a roof is erected on wooden pillars fixed to horizontal timber beams. Clay tiles were used to cover the roof. About 1000 examples of this type of Tampita Vihara are known in Sri Lanka, most of which are conserved by the Department of Archaeology.

(b) Wayside Rest Places ("Ambalama")

These are public buildings used as simple resting halls. The construction method is basically similar to the Tampita Vihara. The simplest method employed is resting four cross beams on large round stone boulders or pillars. Timber pillars were set in these base timber beams and supported the beams and rafters of the roof. Raising of the foundation beams provides seating facilities and ventilation while protecting the timber parts from damp and termites.

2. Timber used for superstructure

This case comprises two or more rows of timber columns that are fixed on a raised platform to hold the roof.

Example: Dancing / Drummer's Halls (Dig-ge)

Dig-ge or "Magul Maduwa" are long halls. The "Dig-ge" is usually a feature of a "Devala" used for drumming and other rituals. The "Dig-ge" can be open, walled or half-walled. The woodwork of such a building is of very careful and detailed construction and is ornamentally carved.

3. Timber used for the roof where the superstructure can be of any material

Most of the roof structures of ancient buildings were made of timber and roofed by using clay tiles.

4. Others

There are other building elements made of timber which are not included in the previous categories: doors, windows, railings, ceilings, etc. Most of these timber parts are ornamentally carved. The only evidence of an ancient timber bridge is situated in the hill country in the village of Bogoda.

Problems and needs of the conservation of wooden structures

There are number of problems connected with the preservation of timber buildings:

- Timber is a material which can be subjected to many decaying procedures
- Timber components are often used over large spans and these are continuously subject to various stresses and strains
- The scarcity of identical varieties of timber as those used in ancient monuments
- The special unusual sizes of timber elements which are needed for conservation are currently not available on the market: they have to be specially ordered and prepared
- Inefficiency of current procedures of purchasing required timber
- Financial problems arising because timber is an expensive building material
- Scarcity of skilled craftsman for the conservation of ancient timber structures. Lack of training in required traditional and modern techniques of conservation of wooden structures

Common types of damage found in woodwork and their remedies

Damage to old timber can be categorized as follows:

1. Fungus growth – This is encouraged by the presence of moisture, a moderate temperature and poor ventilation. This type of decay can be prevented by providing healthy ventilation and a dry atmosphere. To avoid fungus, an appropriate type of chemical treatment must be used.
2. Insect attack- Mostly roof timbers are damaged by insects such as beetles that create bore holes in timber.
3. Termites – Most ancient timber monuments attract termites which cause decay.
   Appropriate types of chemicals should be used to prevent this problem
4. Damage due to burning – Avoid fire sources in the structures. Replace the parts which are burnt.
5. Decay due to water- Appropriate types of chemical should be applied.

Conclusion

A large number of ancient monuments and sites in Sri Lanka which are part of our cultural heritage are endangered at the moment due to different kinds of problems. Insufficient financial resources, lack of qualified staff, lack of awareness in relevant traditional and modern techniques, and so forth, directly affect this situation. At the same time, population growth, haphazard development, poor management, changes of life styles, etc. have also influenced this problem.

Therefore archaeology should be oriented towards the protection of threatened cultural heritage. Making appropriate legal, scientific, technical, administrative and financial measures are necessary for solving these problems.

In this regard, it is important to take action to find more local and international financial resources, to train personnel engaged in the protection of cultural heritage, and to arrange programmes to increase the awareness of relevant authorities and the general public about the importance of protecting cultural heritage.

As most Sri Lankan ancient wooden structures have faced problems in their protection, it has become a very important task to take immediate action to protect them. Therefore this kind of training programme for professionals engaged in the conservation of wooden structures is greatly appreciated because the knowledge obtained thereby can be used for protecting ancient wooden structures.

Thailand

Sudchai PHANSUWAN
Civil Engineer
Engineering and Construction Group
Office of Architecture and Traditional Arts
Fine Arts Department Ministry of Culture Thailand

The Problems in the Conservation of Historic Buildings in Thailand

A. Introduction

The idea of conservation in Thailand can be traced back to the reign of King RAMA VI when he declared the area of Ayutthaya City. The Fine Arts Department was established in this reign with the purpose to preserve and take care of all historical monuments in Thailand. Nevertheless, conservation has developed rather slowly until recently; actual conservation has been increasingly realized as more and more valuable heritage has been damaged, neglected or left to deteriorate due to lack of awareness. King RAMA IX has given the Act on Ancient Monuments, to protect historic buildings and monuments in 1961 and given the definition of ancient monuments, which means immovable property that, by its age or architectural characteristics or historical evidence, is useful in the field of art, history or archeology.

B. Nature and Condition of Historic Buildings in Thailand

Most historic buildings and ancient monuments were built of brick. Wood was also used for roof structures especially in the Sukhothai and Ayutthaya periods. Almost all pre-Rattanakosin Monuments are dead monuments, which have deteriorated due to the passage of time, adverse environmental conditions and human destruction. Some are relatively stable and can be maintained in their present condition.

Historic buildings and the monuments which are still in use today are architecture, engineering works and building complexes constructed in the late Ayutthaya and Rattanakosin periods. Due to the influence of modernization, many living monuments have been repaired and have added modern functions. Almost all historic buildings are owned by governmental offices, which have been managed to keep their architectural and artistic values.

C. Organization for Conservation of Historic Buildings

The Fine Arts Department of the Ministry of Culture is directly responsible for the conservation of monuments. The Office of Architecture and Traditional Arts and the Office of Archaeology, which are divided according to region, are active in this field and work jointly on the same projects to provide specialized skills where necessary.

D. Conservation Procedures

Due to the number of monuments and the shortage of conservation budgets, a priority system is necessary in the conservation programs. Three rationales influence the priority consideration at policy level:

1. The archeological, historical, architectural, artistic and social values of the monument.
2. The role of the monument in present Thai society
3. The physical state of the monument in anticipation of further deterioration and destruction.

The third rationale has given rise to serious controversy between the Fine Arts Department and conservationists in both academic and private sectors. The latter are of the opinion that the Department over-emphasizes the need to structurally strengthen monuments, especially ruined monuments, and further that the restoration techniques used by the Department interfere directly with nature and the content of the monument. The Fine Arts Department realizes this argument and set up a committee for controlling monuments. The committee is responsible for approving conservation plans, controlling the use of monument areas, and following up the conservation works. In terms of restoration techniques, the Department follows practicable, accepted guidelines and principles such as the ICOMOS Charter and recommendations made in various workshops. In monument conservation, the process can be categorized as follows:

1. Categorization and Registration

For the convenience of conservation and site management, monuments and sites in Thailand are categorized according to their characteristics namely Single Structure, Group of Buildings, Area, Community and Historic Town, Archeological Site, and Historic Landscape. In each category, existing functions are considered to define each monument and site as “dead or living”.

2. Collection and Analysis of Information

Survey, collecting data, and analysis of the problems in each site come as the next steps in order to find means for conservation of each particular monument or site. This step includes archeological work, historical study, physical survey and drawing of the existing condition of monuments, with the aim to find out as much evidence as possible and to collect information data before the conservation and restoration process which will, more or less, change the monument's original condition.

3. Conservation Design and Specifications

There are different kinds of site management and maintenance according to the owner of each monument. For instance, a temple is under the ownership of the temple office and thus, after restoration, the maintenance and management are their responsibility. However, there are some sites under the responsibility of the Fine Arts Department such as historical parks, historic cities, etc. Those sites are often managed and maintained not for academic purposes, but also to present the monuments to visitors for tourism purposes as well. Thus, it is necessary to provide some special facility apart from the basics such as an information center, which exhibits comprehensible information on the site and provides highlights to make the visit more beneficial and meaningful.

The categories mentioned are general conservation processes and from these procedures, conservation can be done by various means. For example, in some cases, usually archeological sites or ruins where no appropriate means of protection or restoration can be determined to be more suitable than preservation in their original condition, some kind of shelter is designed to protect the site, making it serve as a site museum for academic and tourism purposes. On the other hand, reconstruction can also be done for living monuments where there is enough evidence remaining.

As for sites which cover areas with important historical background, archeological evidence, and monuments, the Fine Arts Department has established the historic park projects to administer the management and carried out works as part of a master plan prepared by experts in every field concerned.

E. Deterioration of Building Materials

There are a number of factors causing deterioration that continuously act upon building materials. Various types of building materials all undergo physical and chemical changes and finally decay. The goal of the conservation of monuments is to describe and understand all causes of damage, to simulate such damage in field tests and laboratory studies, and to evaluate conservation, consolidation and cleaning procedures used on them.

The investigation of the deterioration processes of monuments revealed that the most serious technical problems are weathering of the building materials, moisture movement, salt efflorescence, and bio-deterioration. The major causes of deterioration of building material are as follows:

1. Weathering of the building materials

It was observed that the influence of outdoor conditions, such as temperature, rain, wind, sunlight, atmospheric gases, and microorganisms have caused considerable damage to all kinds of building materials in Thailand. The deterioration of exposed building materials was due to the action of water, changes in temperature, chemical dissolution, ultra-violet radiation exposure, and mechanical erosion by driving rain.

The heating and cooling of building materials by daily and seasonal changes of temperature set up strains in materials, with resulting gradual breakdowns. In the presence of water, repeated heating and cooling of building materials lead to exfoliation. The water apparently enters the cracks, causing chemical activities at the inner portion, resulting in preliminary weakening.

Wooden buildings and wooden structures are materials which suffer severe weathering damage. Wood is highly sensitive to changes in humidity and extremes of temperature; when it is unprotected by coatings and exposed to atmospheric agents and sunlight, a slow chemical and physical disintegration occurs near the surface. The areas that are frequently wet by rain develop a damaged surface as a result of the varying expansion and contraction of the wood. Long periods of exposure result in finely broken surfaces that are easily eroded by wind. These situations are complicated by the action of solar radiation, and by the presence of microorganisms. East and west facing areas are destroyed faster than those facing north and south.

The major events associated with weathering are photochemical damage to wood cell wall components, oxidation of breakdown products, leaching of soluble decomposition products, and related mechanical damage of surface elements from the swelling and shrinkage of wood associated with surface wetting and drying.

These problems are really serious. The application of appropriate waterproofing materials and wood preservatives is the most efficient method for the conservation of wooden buildings. Coating of films that absorb or reflect the damaging ultraviolet portion of light and reduce surface moisture changes and application of water-repellents are the most effective methods of preventing weathering in outdoor wood exposures.

2. Moisture Movement

The presence of moisture on monuments is indicated by clearly visible signs such as damp patches on walls, peeling and blistering of wall decorations, patches of efflorescence and algal growth.

It is well known that water, either in the solid, liquid or gaseous state plays a prominent role in the behavior of porous building materials. It can function in many different ways, both chemical and physical, those are all interrelated and have a strong influence on the effectiveness of other chemical, physical and biological deteriorative agents. Water is extremely active in promoting reactions between other substances, in entering into chemical reactions itself, and in serving as the medium for the interaction on many materials. It is also noted for its ability to dissolve more different substances than any other liquid. Water also has a very great influence upon deterioration by biological agents because the nutrition and metabolism of all plant and animal life rest upon the properties of water as a solvent. It is evident that water seems to be always involved in all deterioration processes.

The presence of water in any of its various forms causes or accelerates the deterioration of building materials. The access of water may be caused by rain, floods, capillary action, condensation, and deposition of aerosols such as mist, fog, or salt spray. The porous building materials absorb more water due to excessive permeability. This permeability has developed slowly with time to chemical reactions.

Rising damp is the main problem to solve when preserving mural paintings and historic buildings. Certain parts of mural paintings were found to be in a very fragile condition, caused by rising damp, previous percolation of rain water though the roof, windows or cracks which had caused large losses of paint layers. The damage was most prevalent in areas of contact with moist soil or in locations where moisture collects and is readily evaporated. The lower part of walls and mural paintings are usually susceptible to humidity attacks because of capillary action.

The water table in Thailand is very high. The capillary action because of the high water table is therefore very strong. The water usually rises to a height of 2 - 3 meters or more. Moisture-containing mineral salts, organic substances and by-products of human activities fills the pores of the paint layers, plaster and stucco and brick walls. It obvious that rising damp in masonry is frequently accompanied by efflorescence of salts and damaged brick walls.

Water penetration in building materials through cracks and leaks is another main cause of their deterioration. When building materials become wet they expand and conversely when they dry

out they shrink. This moisture movement causes destruction of weakened materials.

High porosity and high pore connectivity facilitate the water absorption, increasing the capillary pressures in the inner part of the materials, and finally giving rise to expansion.

3. Salt Efflorescence

The decay of stone, mortar, bricks, stucco, plaster mural painting and other porous materials on most monuments is clearly attributed to the action of soluble salts present in the materials. Moisture picks up soluble salts and carries them to the surface through the capillary tubes. Evaporation or hydrostatic pressure causes the solution to move. When accumulated in porous building materials, soluble salts can cause physical and chemical reactions. The crystals form and grow from the pores and cracks, filling the void areas, and expanding outwards. The dissolved salts may hydrolyze or react with other compounds in the material and give rise to altered products with a greater volume than the original. The repeated crystallization and dissolving can cause the material to disintegrate and the soluble salts to effloresce. The damage can be observed both on the surface and within the porous structure of the building materials.

Accumulation of soluble salts in porous building materials can, therefore, cause loss of cohesion or loss of cementing, dissolution, decomposition, precipitation and deposition of mineral components. Physical factors such as migration, hydration and crystallization of salts generate mechanical stresses, which result in cracking and cleavage of porous structures.

It was observed that salt efflorescence was prominent in the summer months. Salt crystals mainly appeared as white powder on the surface of brick, mortar, plaster and stucco. Crystal morphologies and conditions of crystallization in efflorescence were also studied. Salt crystals were formed as large crystals, granular crust in isometric crystals, fibrous crust of columnar crystals, and whiskers. Salts may have been originally present in the building materials, or they may have been produced by the reactions of weathering. In many cases, efflorescence was due to Portland cement mortar.

Other sources of soluble salts are animal and human activities, industrial and agriculture processes. The result of investigations revealed that sodium nitrate was found in brick. It is highly possible that birds and bats living in buildings are responsible for the production of this salt.

Several complex salts were identified from specimens taken from monuments situated near rivers or canals. These complex salts might be related to polluted water and human activities.

Several monuments in northeastern Thailand have long been damaged by salt efflorescence. Sodium chloride from rock salt is the agent of the stone and brick disintegration. Microscopic investigation showed that small cavities in bricks, mortar, plaster and stucco were filled by a powdery mass of sodium chloride.

4. Bio-deteriorations

4.1 Insects

Insects are one of the key causes of the deterioration of wooden buildings. They often cause extensive and irreparable damage. It was observed that subterranean termites and powder post beetles mainly contributed to the destruction of wood. Subterranean termites attack wood that is in direct contact with the ground or adjacent to crevices, in masonry or concrete, through which they travel to reach their food. As they chew and tunnel through the wood, termite workers deposit small amounts of soil and fecal matter into the wood, giving the damaged wood a characteristic dirty appearance.

Dry wood termites, so called because of their ability to attack dry wood, produce distinctive barrel shaped fecal pellets that are pushed out of the gallery through small holes, which are immediately resealed. The deposition of the fecal pellets outside the wood is an excellent indication of termite attack.

Powder post beetles and woodborers, and other beetles infest wood under a wide range of conditions. The larvae or grubs of these insects bore through wood for food and shelter, leaving the undigested parts of the materials in the form of a fine powder. Since the larvae work in the inner portion of the wood, considerable damage has already occurred before they are discovered.

Adult powder post beetles attack hardwood sapwood to obtain the free sugar in the ray cells. They usually infest wood at moisture contents ranging from eight to thirty-two percent. Wood damaged by powder post beetles is filled with small tunnels loosely packed. Woodborers also attack hardwood sapwood, utilizing the starches present in the ray cells. Wood damaged by these beetles has numerous small tunnels filled with tightly packed xxx???.

4.2 Algae

The most obvious appearance of micro bio-deterioration on monuments is the formation of black-green layers on the surface. Their presence is more apparent on the horizontal surfaces of monuments which have been damp for most of the time. Their presence not only darkens and disfigures the exterior surface but also weakens the materials on which they grow. The activity of algae on building materials is vigorous and obvious. They form stains, which vary in color from light green to black. Sometimes they entirely mask building surfaces. Algae have been found to produce and secrete a variety of metabolic products, among which predominate organic acids i.e. lactic acid, oxalic acid, etc. These acids either directly dissolve building materials or increase their solubility.

4.3 Lichens

Lichens are very common on sandstone and laterite. They have caused deterioration in different ways. Heavy growth of lichens hastens the decay of stones by excreting organic acids, most commonly oxalic acid. It is obvious that the stone surfaces beneath their colonies are softer and more friable. Chemical reactions between the stones and the organic acids are the casual agents of disintegration. They also slow down the drying out processes after rain. Their presence is an indicator of wet conditions in the building materials.

The majority of lichens on sandstones and laterite are classified as crustose lichens. They appear as green, gray, white, and yellow velvety patches on the exposed surface. Crustose lichens are crust type and strongly attached to surface so that they cannot be readily removed. In some cases, they are established within porous stone.

4.4 Moss and other plants

Algae and lichens grow on building materials and build up humus in which larger and more damaging plants can grow. It was observed that mosses, liverworts, ferns, grasses and various dicotyledonous plants also contributed to deterioration of building materials. Their growth not only obscures carvings and details of the structure but also affects the stability and durability of the monuments. Their roots and rootlets enhanced the mechanical action in the pores of the porous building materials and between structural elements of the monuments.

4.5 Fungi

Fungal attack is the principal form of bio-deterioration of wooden buildings. Fungal spores are present in the atmosphere all the time, but generally remain dormant. They become active and start developing as soon as conditions of humidity and temperature favorable to their growth occur.

Various groups of fungi attack the wood cell wall constituents in different ways and sequences that result in several types of decay. Decay fungi disintegrate the cell walls and thereby change the physical and chemical characteristics of the wood. The normal color of the wood is more or less modified. Fungi activities often darken and disfigure the exterior surface of wood. The decomposition of the wood by fungi usually causes shrinkage, wrapping and cracking. The strength and density of the wood is reduced. The wood is friable, light and falls to powder under pressure.

5. Man- made causes of decay

Man - made causes of decay are complicated and have widespread implications in the conservation of historic buildings. As well as vibrations by vehicle wheels acting on the road surface, damage may occur in normal building construction. Vibration damage of pile driving may be the most common cause and source of danger to historic buildings, particularly if the buildings have poor foundations, cracked walls and spreading roofs.

F. Structural Problems

It was observed that structural failures of monuments in Thailand have been principally caused by the following factors:

1. Foundation Problems

The foundations of most monuments in Thailand have been constructed by a widening of the wall into a shallow foundation which is supported on compacted soil. It was observed that most foundations were composed of either sandy soil or lateritic soil. These materials were carefully compacted before construction. The load-bearing wall is the commonest type of building construction element.

If the soil surrounding foundations undergoes change, e.g. through excavations for drainage, or laying of pipes, that will cause settlement. Lime mortar is extremely moisture absorbent and transmits moisture from the ground with its content of dissolved salts upward into the masonry above. This is a process which is very difficult to combat.

The thick walls with shallow foundations have an inherent tendency to lean outwards. This is because the weight bearing qualities of the soil that is repeatedly saturated by rain. The effect of this destructive action leads to roof structure failures.

2. Problems of Masonry

Old masonry often contains large amounts of moisture due to the highly absorptive nature of old mortar. The moisture content movement in masonry is the cause of a vast range of serious types of damage. It was observed that deterioration of most monuments is associated with moisture. Deterioration may take the form of progressive erosion so bondings between masonry are weak and the wall may collapse.

3. Problems of Timber Structures

The failure of timber structures in Thailand mainly resulted from deterioration of materials and was due to outside factors such as the settlement of foundations or changed functions of building without reinforcement.

Old beams often have a sag or deflection. However, this alone does not entail a risk of causing the whole structure to collapse. A timber beam sags most in the first few years it is subjected to load. After this, further deflection takes place infinitely slowly. This may cause damage to the other parts of the structure.

Properly ventilated structures of old timber seldom prove to have suffered damage. In older times mortar was often used to fix the ends of beams and sills into walls. Since old walls are often damp, it was found that timber parts set in them have rotted away.

G. Conclusion

There are several major causes of deterioration of building materials in Thailand. These problems are really serious and require urgent intervention. At this point, the importance of intensive cooperation among engineers, architects, restorers, and scientists, has to be emphasized so that in depth investigation can lead to more effective results.

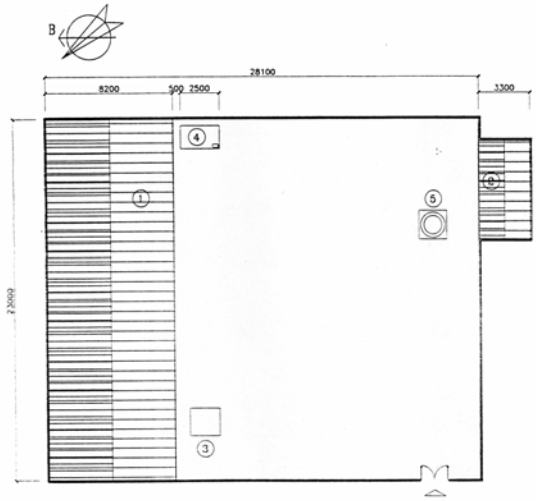
Vietnam

Anh Dung NGUYEN
Architect
Department of National Culture Heritage of Vietnam
Ministry of Culture and Information

Pilot investigation, research, preservation and conservation of traditional folk houses of Vietnam

A. Introduction to the house of Mr. Nguyen Thac Sung:

Map of the location of the Dinh Bang Commune



General Plan of the House

1. The main house
2. Kitchen and animal husbandry
3. Alter in the open
4. Water tank
5. Well

1. Geographical location:

The house is situated in Dinh Bang Commune, Tu Son District, Bac Ninh Province, and 20km to the South of Hanoi, 20km to the North of Bac Ninh Town (cultural and political center of Bac Ninh Province).

2. General plan of the house:

The house is located on a rectangular plot of land, it includes: the main house, gate, kitchen, a yard and a water tank. The architectural plain of the main house is arranged following the (—) character (Chinese character meaning one); the main facade faces south.

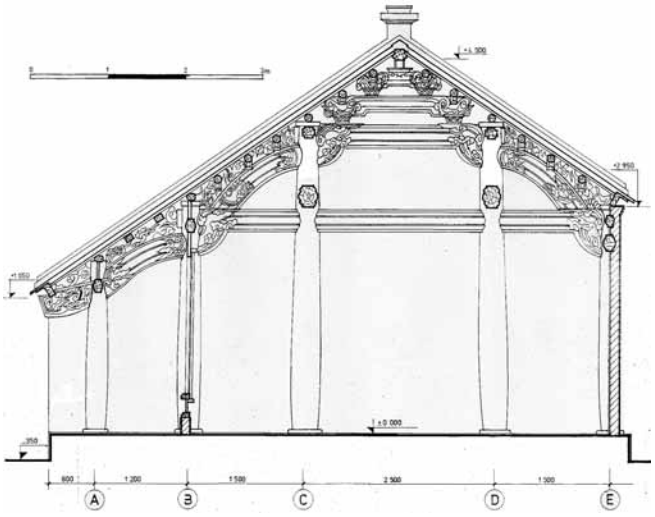
3. Historical and cultural values:

The first owner of this house was Mr. Nguyen Thac Luong, who was a governor of the Thanh Hoa Province under the Le Dynasty (18th century). He had his house built as a model for the construction of the Dinh Bang community house (a famous community house of Vietnam dating back 1736). Therefore, we have defined that the house was dated back nearly 300 years since its construction.

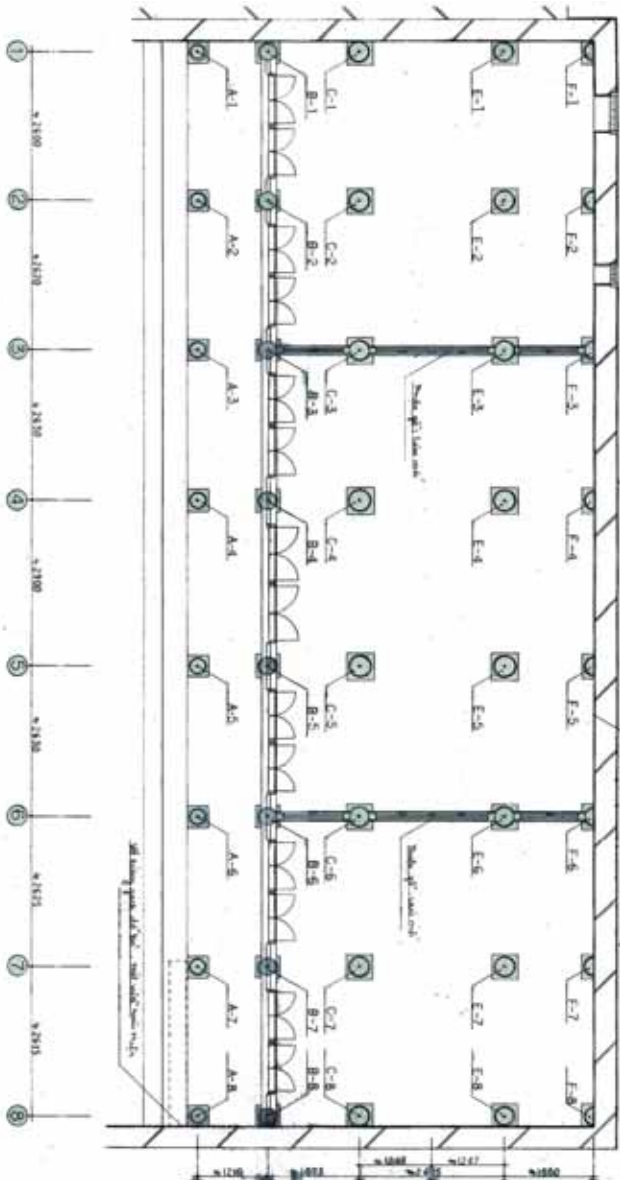
4. The architectural value of the house:

The house has 7 parts (3 main spaces, 4 subsidiary spaces). The dimension of the main and subsidiary part is 2.5 x 5.6m. The ***"vi keo"*** (system of wooden frames) consists of five rows of pillars, designed following the traditional style of ***"chong ruong, ke bay"*** (beam over beam with lever beam). On the architectural members of the house such as beams, lever beam, lever beam of the veranda, there are many patches of traceries and sculptures that have typical artistic values with the following themes: stylized cloud bunch, flower and leaves, dragon. These are still rather intact, contributing to highlight the architectural characteristics of a traditional folk house of the 18th century.

Conclusion: This is one of the few traditional folk houses of Vietnam that have still maintained rather intact architectural and artistic features of the 18th century and survived up to now under severe natural environmental impacts for nearly 300 past years. Through this house, we have gained more knowledge on the lifestyles of ancient people; moreover we can study and know more about the building of ancient wooden houses. That is why the discovery and conservation of this house is very important. In 2001, the People's Committee of Bac Ninh Province decided to issue a certificate of "Historical - Cultural Relic" (architectural and artistic genre) at the province and city level for protection of this house as a cultural property with the aim to keep it for future generations.



Section of the house



Plan of the house

B. Investigation and survey of the current situation of the house:

1. Current architecture:

Since it was built, the house has remained in its original position. The investigation shows that at present the house still maintains rather intact form, size and architectural features, and it has not been through major repair, since only the roof has its tiles periodically changed. Therefore, the house has maintained intact structure, materials and typical artistic decorations that represent the architectural characteristics of traditional folk houses of the 18th century.

2. Current quality of the house:

The house is based on the structure of ***"vi keo chong ruong"*** (wooden frame systems with beam over beam), ie. a system of load-bearing prolong beams and crosscut beams made of ironwood (this is a precious wood of Vietnam: it has high density and long life, and is very difficult for termite and moth to attack. However, it has the disadvantage of being easily hollowed in the core, and is susceptible to water damage).

Through a general survey of the house, by drilling to measure the wood quality and by using traditional manual methods (by experience and using the hammer to knock) to check the wood quality, we found that:

Facade

- With the ironwood pillar system being nearly 300 years old, there are damages such as: some force-resistant pillars now have more or less hollow cores due to age. Some pillars are damaged due to rainwater from leakages through the tiled roof, which infiltrated into the capitals, and gradually the capitals became rotten or degraded, and create a favorable condition for termites attack. This makes the hinge systems here loose their connection capability and force resistance, causing the sagging and displacement of structural members.

Some pillars sink due to weak ground or high humidity which causes the pillar base to rot. Moreover, some pillars are fully damaged and has been replaced by the house owner with brick pillars that are not appropriate to the characteristics of the house.

- Other architectural members include: The system of wooden frames and system of prolong beams, crosscut beams is in a similar condition to that of the pillar system, moreover they often have garbage cover that results in part damages. There are many valuable decorative artistic sculptures on the wood that are also in degraded conditions, and need to be conserved. For example, the wood has started to rot, some design patterns on the sculptures have been broken and lost, the artistic value of these members has thus decreased.
- The system of ***"hoanh"*** (beams connecting system of wooden frames) and ***"rui"*** (beams over ***hoanh***) are partly rotten due to the infiltration of rainwater at places where the pillars has sunk.

3. Assessment of structure quality:

The structure quality is noted and presented on drawings from investigations and surveys of the house structure, and identified by unified signs and colors on all drawings of the house structure members. For example, red: fully damaged (need to be replaced), yellow: partly damaged (need be reinforced, restored); green: still good (preserved and reused). Moreover, we also make statistic tables for each kind of structural members of the house (this table has the specific positions, ordinal numbers, and type of structure member, dimension, damage conditions) as the basis for formulating projected budget as well as methods of preservation, conservation and plan of execution.

Carved decoration on beams

Interior

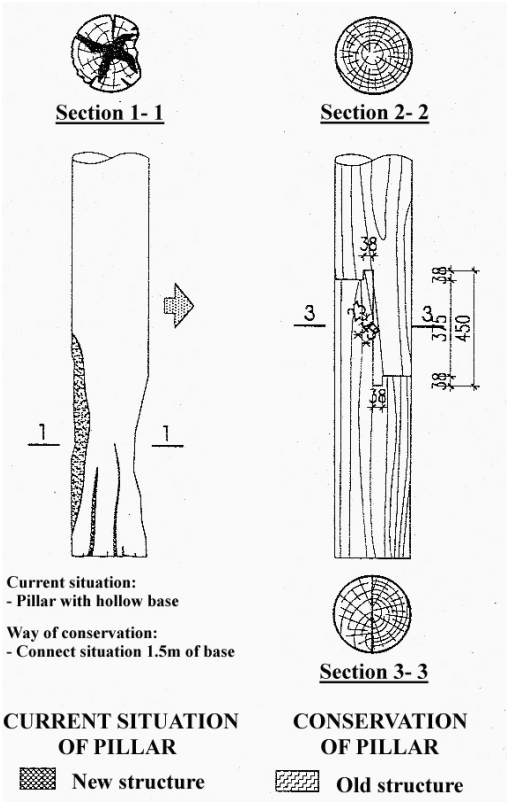
C. The process of preservation and conservation:

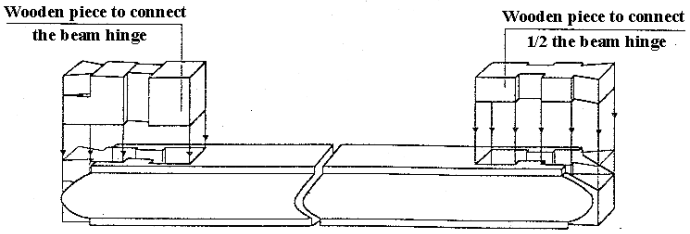
1. The principles of preservation, conservation and some conservation and reinforcement measures:

1.1. Principles:

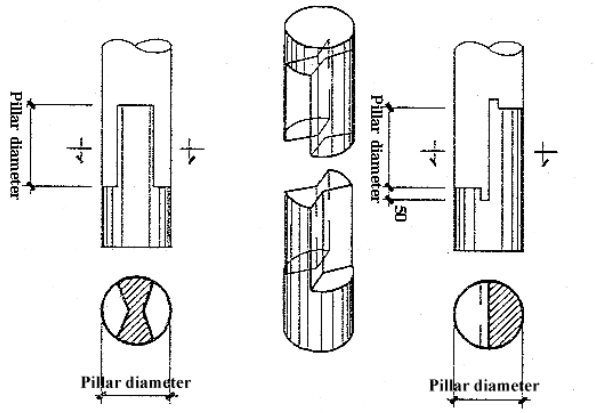
- Our ultimate objective is to maintain and ensure the longevity of the house; therefore it is necessary to keep as much as possible the original members and elements of the house.
- To minimize interference with the original members of the house. Interference, when necessary, should not decrease or change the basic features and the intrinsic values of the house, priority should be given to conservation and reinforcement, after that, conservation and restoration.
- The replaced and added members should be differentiated from the original ones, avoiding future confusions.
- Every decision on conservation and restoration should rely on authentic fact, not on suppositions.
- This process has been realized on the basis of researches, surveys, analysis and a comprehensive assessment of historical, architectural, artistic and technical aspects. There should be complete documentation before the interference, during the process and afterward (final document).
- Priority should be given to the use of traditional materials, traditional technical and executing procedures.

1.2. Some conservation and reinforcement measures:

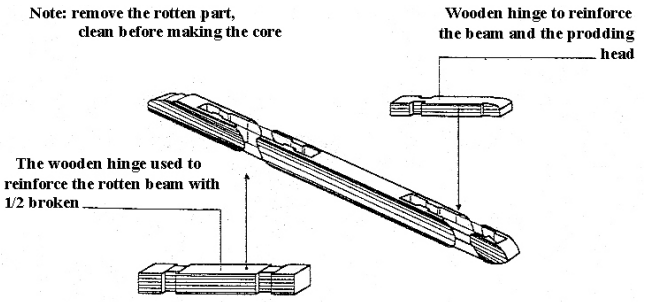




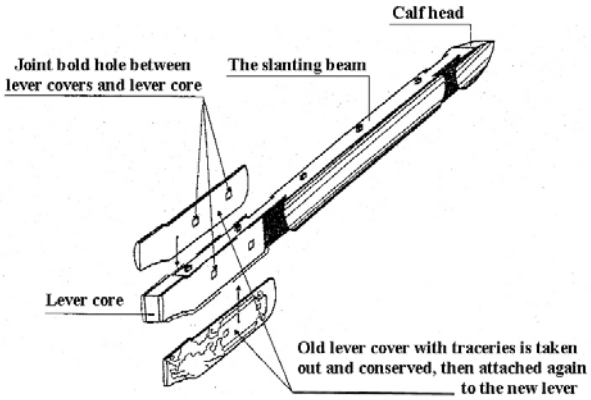
Connection method for broken / rotten beam hinge



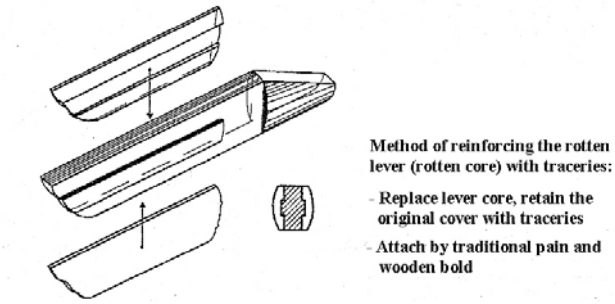
Connection methods for rotten pillar base



Wooden hinges used to reinforce beams



The replacement of lever core with traceries outside



Reinforcement of rotten core with traceries

2. Conservation:

1. Build shelter to protect the structure from rain, sunshine and adverse environment impacts during the process of executing preservation and conservation.
2. Build storage for preservation: the store is built near the construction site for keeping and protecting wooden members of the house after disassembling to avoid lose and damage due to humidity, termite, moth and adverse environmental impacts.
3. Preserve the intact structural members: Clean the surface of structure members that have not been attacked by worm, moth and fungus.
4. For structural members that have been attacked by worm, moth and fungus: process the wood surface with anti-fungus chemicals and preservation chemical substances such as: PBB, LN2, LN5 or SOLTOX from Poland, TERMIDOC produced by RHONE POULENC, France. These chemical substances are applied many times on the surface of wooden members with brushes by the workers, and then these members are put into the preserving store.
5. Put the structure members that have been processed into the preserving store during the conservation of the structure.

1.

2.

3.

5.

4 .

1. Storage shed 2 / 3. Structural members stored for preservation storage
4 /5. Workers cleaning the structural components before storage

3. Conservation of wooden members:

3.1. For partly damaged architectural wooden members that can be reused:

3.1.1 For architectural wooden members where the damaged part is at a force bearing position:

a) Pillars: Use the traditional method (crab pincer joint) to attach new wooden parts to repair pillars where the foot is damaged no more than 1.5m. The replacement part should be the same kind, shape and size to the original. For pillar foot with hollow core, scrape away the damaged part and use a new foot with the same size to fill in the hollowed part (method of driving in the core). In the case where the pillar has a fully dissipated core, but its cover is still good (thicker than 2.5cm), use the method of replacing the core by splitting the pillar into two parts, scraping the damaged parts inside and replace it with a new core, then use adhesive and hinge hidden inside to join them.

b) Wooden members of connecting beams, beams, slanting beams, levers: Use the method of replacing the core, i.e. cut away the force bearing core of the structural member and replace it with a new core of the same wood to ensure good force resistance capability; retain the surface as a cover with artistic decorations. The new force resistance core and the old covers of the structural member are joined by the traditional method of using hinge and bolt. They can also be reinforced by traditional paint (traditional paint of Vietnam) and adhesive Epoxy Risen which is popular in the world.

This method has the advantage of preserving cultural values by retaining the outside decorative parts, while the new core ensures good force resistance capability for stabilizing the structure. This method can be used to conserve almost all wooden architectural members of the house.

3.1.2 For architectural members with damages at non force-bearing positions:

Often we use the method of patching the face: Chisel away damaged wooden parts without artistic decorations and replace them with new wooden parts with the shape, size and materials that are similar to the original (adhesive or hidden hinge can be used for joining). If the wooden part on the damaged architectural member has artistic decorations that cannot be conserved because the aged wood can no longer be reused, we still use the above method but it is we must reproduce the carving following the original patterns, then use adhesive to join them.

Replacing the core with new timber

Joining new pillar foot to the pillar

Using Epoxy Resin as an adhesive

Hinge hole on the restored structural member – made as a copy of the original

3.2. For architectural members that cannot be reused: replace them with new structure member reproduced as a copy of the original damaged one, based on the principle of ensuring the authentic features are preserved. Those damaged structural members that can not be reused will be classified and preserved for exhibition when possible.

Note: All the new joining, patching and replacement materials should be marked with the date of restoration (e.g. 'Restored in 2003').

D. Conclusion:

Until 2003, Vietnam has had more than 2780 national relics, 5 world heritages, and traditional folk houses registered as important parts of the cultural heritage of Vietnam. Wooden architectural heritage has a rather big number. However, Vietnam is a country situated in the monsoon tropical area, and it is humid and warm all year round. This creates a favorable condition for fungus, moth, termites and insects, therefore those factors harmful for wooden structures are easily developed, and are the main causes of the damages and degradation of the Vietnamese wooden architectural heritage.

In order to preserve and conserve its cultural heritage, including wooden architectural heritage, Vietnam has made legal documents such as the Law on Cultural Heritages, and Regulations and Standards of Preservation and Conservation of Cultural Heritages, and at the same time has supported researches into history, culture, and archaeology.

It is possible to say that up to now, Vietnam has had many achievements in the protection of national cultural heritage. Many tangible cultural heritage have been protected against degradation; they have been preserved and their values have been promoted. National cultural heritage treasures have prospered.

IV

Lecturers' Papers

1. The Tradition of Wooden Architecture in Japan
   Mr. Satoshi YAMATO
2. Cultural Heritage Preservation and Restoration
   Dr. Shin'ichi SHIMIZU
3. Preservation of Waterlogged Wooden Relics
   Mr. Yohsei KOHDZUMA

1. The Tradition of Wooden Architecture in Japan

YAMATO Satoshi
Senior Specialist for Cultural Properties,
Agency for Cultural Affairs, Japan

The Tradition of Wooden Architecture in Japan: Outline

Outline of the history

With a large number of evidence obtained through scientific excavation and research, it has been proved that the history of Japanese architecture began with the pit-dwelling, which is known to have existed as early as 10,000 years ago. In around the third century B.C. irrigated rice cultivation and iron artifacts were introduced from the southern part of the Korean Peninsula. The use of raised-floor structures also began about this time. These structures became established as the main form of dwellings and were later adopted for Shinto shrines; they still represent an elemental part of the Japanese culture today.

In the middle of the 6th century, when Buddhism was introduced through the Korean kingdom of *Paekche*, the general style of architecture then prevailing on the continent (in China and Korea) was introduced to Japan as the Buddhist temple architectural style together with the associated religious institutions. Because many Buddhist temples were constructed under the patronage of the Central Imperial Court, the local architectural styles then in existence were influenced strongly by the imported Buddhist culture, which was rapidly absorbed in the process of producing a unique form of Japanese architectural development.

In the latter half of the l2th century, the next period of major change began when a new wave of Buddhist culture was introduced mainly from the Chinese Kingdom during the Southern Song Dynasty. At this time the two new Buddhist temple styles known as *Daibutsu-yo* and *Zenshu-yo* were also introduced. Thus Japanese architecture, in which temples were the dominant architectural type,


Fig.1


Fig.2


Fig.3

was again influenced by the imported styles from the continent.

After this period there were no further significant outside influences for the next seven centuries, until Japan opened up to foreigners in the latter half of the 19th century and began to introduce aspects of European culture. During that 700-year period of isolation the architecture of Japan evolved into unique and highly-developed forms, including such very specialized types as temples, shrines, vernacular houses, tea-houses and castle architecture.

Wooden Architecture

Wood is the elementally material of Japanese architecture, a product of the rich forest environment of this country. Japanese wooden buildings range from the smallest architectural spaces, tea-rooms (such as *Tai-an*) with a floor area of only two *tatami* mats (about 3.3 square meters), to one of the largest wooden existing buildings in the world (the *Todaj-ji Daibutsu-den*), a great Buddhist temple 57 meters in width and 46.8 meters in height, with a floor area of 2880 square meters. The largest wooden structural members reach one meter in diameter with a weight of approximately six tons.

Among Japanese wooden architectural monuments, the oldest existing example is the western temple precinct of *Horyu-ji*, built at the end of the 7th century. The buildings in this precinct are also the oldest remaining wooden buildings in the world.

As of the end of 2003, there are 3844 individual historic buildings designated as Important Cultural Properties by the Japanese government. Among them, approximately 80 were constructed between the 7th and the 12th centuries, about 1500 from the end of the 12th century to the end of the 16th century, 1900 from the end of the 16th century to the end of the 19th century, and about 400 from the late 19th century to the present. Nearly all of Japan's remaining wooden buildings which date back


Fig.4


Fig.5

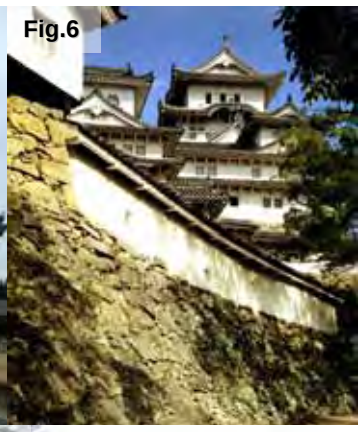


Fig.6


Fig.7


Fig.8


Fig.9

to at least the end of the 16th century and have been preserved in good conditions have been designated by the national government as Important Cultural Properties. The categories of designation include religious architecture such as Shinto shrines or Buddhist temples, castles, upper-class residences, vernacular farmhouses and townhouses, and western-style buildings including structures for industries or civil engineering.

Among these, wooden buildings represent approximately 90% of the total. These numbers refer only to individual monuments. Besides these, 62 historical towns and villages have been selected as national preservation districts, which comprise of approximately 10 thousands houses and other structures that have been recognized as having historic importance. Moreover, many single buildings and historic towns or villages have been designated by local governments at the prefectural level or at the municipal level in accordance with their own legal regulations.

The Tradition of Wooden Architecture in Japan: Characteristics

Post-and-Beam Structure

The fundamental characteristic of Japanese architecture is the wooden post-and-beam structure. This type of structure uses a system of joinery in which the structural members meet at right angles and are joined by means of mortise-and-tenon connections using wooden wedges and pegs to secure the joints. Where long members are required, spliced connections with wedges and pegs are used to join shorter lengths of wood together. Metal fasteners such as nails and cramps are sometimes used, but only for relatively small members which have no primary structural role.

One of the main characteristics of this structure is that it is a structure which is “reversible”,

Fig.10

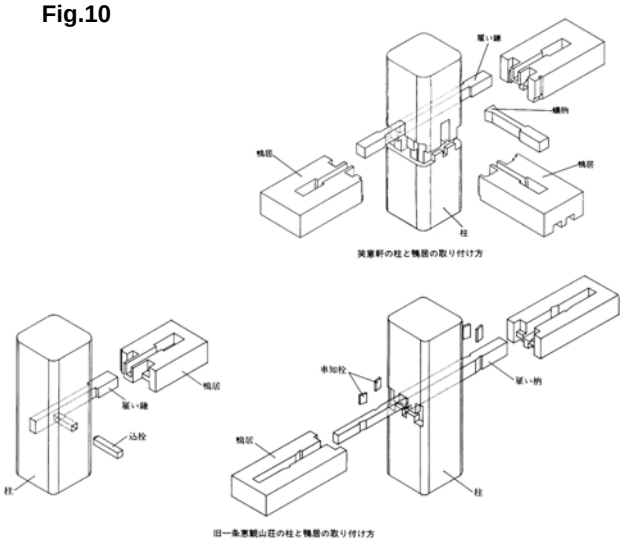
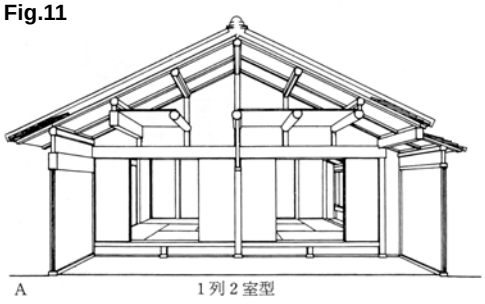
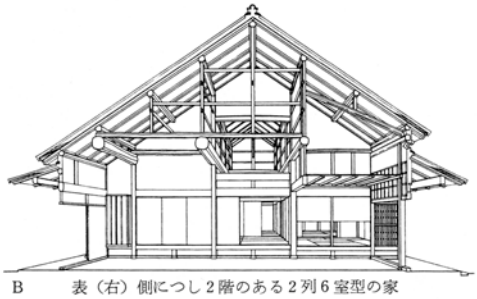


Fig.11


A　1列2室型


B　表（右）側につし2階のある2列6室型の家


C　2階の発達した1列3室型の家

in that it can be disassembled and reassembled without damage to the members. Because of this structural characteristic, it is possible to adopt the technique of “repair with dismantlement” which is common in the conservation of buildings in Japan.

The basic system of the frame structure composed of posts and beams is known as a “rigid-frame structure”, constructed to resist bending moment at each joint; but in effect the overall system acts as a flexible structure which allows a certain degree of flexure and sway in response to lateral external forces. This is a very practical type of system in an earthquake-prone country such as Japan.

In Japan, with very few exceptions, buildings have been traditionally constructed with this type of structural system. Among those exceptions were storehouse structures which used a type of “log-house” construction. Also, in rare cases, truss structures with diagonal bracing similar to European structural systems have been used.

Another fundamental characteristic of Japanese architecture is that the structure itself is the main element of the architectural design, where the structure is not hidden within the walls but exposed to express the form and pattern of the traditional design aesthetic -- an aesthetic based on the unique character of geometric composition and spatial openness which gives Japanese architecture its special sense of beauty.

Roof Structure and Materials

Like the post-and-beam frame system, the roof is another important element which characterizes the design of Japanese architecture. The large triangular volume of the roof with its deep overhangs makes the roof form the dominant element of the exterior composition. The deep eaves that evolved in response to the rainy climate provide a sheltered "indoor-outdoor space" which

gives traditional houses a sense of unbroken continuity with nature, and the subtly curved profiles of the roof forms in general reflect the sensitivity of the Japanese cultural aesthetic.

Traditional roofing materials originally included organic materials such as miscunthus thatch, cypress-bark shingles and wooden shingles, but together with the introduction of Buddhism the techniques of clay-tile roofing construction were brought from China via Korea. Whereas tile roofs were customarily used mainly for Buddhist temples, with Shinto shrines and aristocrats' residences continuing to use organic roofing materials, it later became common to use clay tile for general roofing applications in urban areas for reasons of economy and fire prevention. For important shrines and for important residential buildings such as palace structures, however, traditional organic materials are still used. For ordinary farmhouses, where roofing work was done by local labor using locally-obtained materials, thatching was still in common use until very recently.

Craftsmanship

Before the introduction of architectural techniques from the continent, even in the pre-historic periods, certain construction techniques had already developed independently in Japan. Notwithstanding the strong continental influences on architectural style, the basic techniques for wood construction -- including joinery techniques, usage of tools, etc. -- continued to evolve in a uniquely Japanese manner. Because of the critical tolerances required to produce the carefully expressed exposed post-and-beam composition, it was necessary for the Japanese carpenters to develop their craftsmanship to a high degree of perfection. Not only the techniques but also the tools for wood carpentry were highly developed, together with an intimate knowledge of wood as a material and an appropriate sensitivity to design and proportion.

The Development of *Kiku* and *Kiwari*

The roof in Japanese architecture is composed of complex curves -- the curved profile of the sloped roof plane itself combined with the up-turned curves of the eave lines at the corners of the roof--requiring a sophisticated geometrical system to determine how to cut precisely the surface angles where the framing members meet. Carpenters need a highly developed knowledge of this geometry in order to connect these members exactly, by working out calculations of the depth of the eave, the degree of the curve, and the shape of the cut surface of each member. This system is called *kiku*, one of the most important subjects in the training of traditional carpenters.

The *kiku* system was fully developed as a system of mathematical and geometrical calculation by the latter half of the 18th century, but prior to this development, actual construction had long been carried out using a practical method of measurement and line drafting using a standard carpenter's square to draw the cut lines on the surface of the lumber.

Also important for designing building especially in a post and beam structure was the *kiwari* system, a system of modular proportioning of the overall structure, the spacing of the columns, and the proportions of each member.

As a result of the adoption of this proportioning system, architectural construction became a comprehensive, unified, rationally organized industry, in which everything down to the sizes of wooden members available in the lumber market was controlled.

Legal Protection Systems for Architectural Monuments in Japan

The Law for the Protection of Cultural Properties

The systems of legal protection for architectural monuments in modern Japan began with the enactment of a law, namely the Ancient Shrines and Temples Preservation Act in 1897, which covered buildings and artworks possessed by shrines and temples.

The current law, the Law for the Protection of Cultural Properties was enacted in 1950 for the systematic protection of properties in each official classification, as well as to combine and unify the individual protection systems which were already in existence prior to the enactment of this law; those included the National Treasures Preservation Law (enacted in 1929), the Law for the Preservation of Historic Sites, Places of Scenic Beauty and Natural Monuments (enacted in 1919). The new law was established immediately following the fire which damaged the *Horyu-ji* Main Hall, built around the latter half of 7th century.

This law covers a broad range of properties, from fine arts to natural monuments and from tangible to intangible cultural properties including traditional dances and musical performances as well as practical skills such as traditional conservation techniques.

The designation of buildings was at first limited to shrines, temples and castles, but after World War II the law was broadened to cover ordinary vernacular houses and the early-modern-period architecture which had been influenced by European architecture. In 1975, a system for the protection of preservation districts for groups of historic buildings was introduced for the protection of historic towns and villages. Also recently, a wider variety of buildings and other structures have been designated and protected under this system including industrial facilities, civil engineering structures, such as factories, steel bridges, dams or tunnels so on.

Regulations for the Protection and Support system

The national government has designated 2,250 sites, including 3,844 buildings and other structures as of December 2003, including either National Treasures or Important Cultural Properties.

In accordance with the provisions of the law, the permission of the Commissioner of the Agency for Cultural Affairs is required for any alteration to the existing state of these designated buildings or action that would affect the value of the designated building. Major or minor repair work is carried out by the owners of the designated Important Cultural Property or their custodial bodies, and as financial support to cover large expenses for the repair work, subsidies are granted by the national government for the project.

About 90 % of nationally designated buildings are made of wood and approximately half of them have roofs made of plant materials such as thatch, wooden shingle, cypress bark so on, which are extremely vulnerable to fire. For this reason, the national government provides necessary subsidies for owners or custodial bodies to install or maintain fire-prevention facilities and other disaster-prevention system that are required.

Besides providing such subsidies to owners and custodial bodies, the national and local governments have a tax incentive system that features a reduction in inheritance tax and an exemption of fixed assets tax, city planning tax or special land holding tax to encourage the continual ownership of cultural properties and to promote owners' positive commitment to the preservation and utilization of their cultural properties.

The Advisory Council for the Protection of Cultural Properties

Decisions on new designations and the approval of alterations to the existing state of designated properties are made through investigations and deliberations by the Council for Cultural Affairs. Only the Minister or the Commissioner could give permissions after he/she presents the issues to the Council. The Council's membership is composed of "those who have wide and eminent views on, and knowledge of, culture". The Counci1's approvals of alterations to the existing state include any alterations required for restoration or reconstruction work which is necessary for the proper conservation of the designated buildings.

Authorized Conservation Architects

In the case of conservation projects which are subsidized by the national government, it is a requirement to retain an authorized conservation architect to design and manage the whole project. The responsibility of the conservation architect includes undertaking investigations (such as analysis of deterioration, measurements of members, studies of historic techniques and traces, reference to historic resources, etc.), design, documentation, supervision of the restoration work and publishing of documentations. In Japan, from the long and rich history of experience in scientific investigation and the repair of architectural cultural properties, a very detailed and systematic program of architectural conservation has been developed.

The national government directly provides a training course for these top-level conservation architects. The conservation architects who have completed this course are assigned by the national government as site managers of conservation projects. Of the conservation architects who take this national course, most belong to a nation-wide non-profit organization of conservation management specialists, the Japan Association for the Conservation of Architectural Monuments (JACAM). Others are members of local organizations, including the conservation divisions of three prefectural governments (Kyoto, Nara and Shiga Prefectures) and one local non-profit organization (Wakayama Prefecture). These four prefectures have a particularly high concentration of architectural monuments. The total number of people in these organizations and government agencies now stands at approximately 150, including trainees at the entry level.

Traditional Conservation Techniques

For the repair of architectural monuments the fundamental principle is to use traditional techniques and materials. In Japan, where there has been rapid economic progress and significant changes in the industrial structure, there has long been an awareness of the problem of a growing shortage of traditional materials and craftsmen.

In 1975 the legal system for the protection of conservation techniques was implemented as part of the revision to the Law for the Protection of Cultural Properties.

This is a system under which the national government may designate the traditional techniques or crafts which are indispensable for repair work on and the maintenance of cultural properties (Selected Conservation Techniques), and may officially select the possessors or practitioners of those techniques, whether they are individuals or preservation organizations (holder or holders of the traditional conservation techniques). The national government grants subsidies to those selected individuals or organizations to be used for conservation-related projects such as refining skills and for the training of successors to carry on the tradition.

The designated traditional techniques related to historic buildings include those in the following fields: wood carpentry, architectural painting or coloration, geometric proportioning, cypress-bark and wood roof shingling, miscanthus thatching, plaster work, metal ornamental manufacturing, fitting maker, metal molding, blacksmith, bamboo nail making and the production of clay roof tiles.

Kyoto and Nara Prefectures have established teams of skilled craftsmen who are hired as full-time government employees to protect their status and to improve the efficiency of the succession of techniques.


Fig.16


Fig.17

Buddhist Buildings in the *Horyu-ji* Area:

Monuments on the World Heritage List

History

Buddhism was introduced to Japan in the mid-sixth century from China by way of the Korean Peninsula. In the seventh century in the area around *Horyu-ji*, the Emperor's son and regent Prince *Shotoku* founded *Horyu-ji* and *Chugu-ji* temple. The Imperial Family later founded *Horin-ji*, dedicated to the recovery of the Prince from illness. After his death, *Hokki-ji* was founded on the site where the Prince's palace had formerly been located.

Horyu-ji, which Prince *Shotoku* founded at the beginning of the seventh century, is presumed to have been destroyed by fire in 670. The temple was rebuilt in the new location from the latter half of the seventh century to the beginning of the eighth century. The rebuilt temple is known today as the *Horyu-ji Sai-in*, the west temple.

The other major sub-temple at *Horyu-ji* is the *Toh-in* the east temple, which was built in the first half of the eighth century at the site of Prince *Shotoku's Ikaruga* Palace in dedication to the Prince. Besides *Sai-in* and *Toh-in*, there are several monasteries at *Horyu-ji*.

In ancient times, *Horyu-ji* received the protection of the Imperial Family because it was revered as the temple which guarded the empire. Moreover, from about the twelfth century people's respect for and belief in Prince *Shotoku* became very strong, drawing believers to the temple in great numbers, and *Horyu-ji* began to prosper due to its fame as the temple which had been established by the Prince.

Imperial authorities and successive governments have always offered generous patronage for the maintenance and repair of the temple.

During the Meiji Restoration, which marked the birth of Japan as a modern nation, Shintoism began to rise in influence as a state religion. On the other hand, movements rejecting Buddhism became prevalent as it was regarded as the dominant religion of the old political order, and *Horyu-ji* began to decline as a result of this trend. But the new government, acknowledging the need to protect cultural properties, enacted the Law for the Preservation of Ancient Shrines and Temples in 1897. With this law, the way was opened for the support of scientific investigations and the protection of cultural properties.

Buddhist Buildings in the *Horyu-ji* Area

For the Buddhist buildings of the *Horyu-ji* area, the arrangement or composition of buildings in itself has significant historical meaning, and each of the individual buildings displays outstanding architectural style.

In Japan there are twenty-eight historic wooden buildings which were constructed before or during the eighth century. Eleven of these are found in the *Horyu-ji* area. Of these eleven, the Kondo (main hall), *Gojunoto* (five-story pagoda), *Chumon* (inner gate) and *Kairo* (roofed, semi-enclosed corridor) of the *Horyu-ji Sai-in* and the *Sanjunoto* (three-story pagoda) of *Hokki-ji*, which were built

from the seventh to the beginning of the eighth centuries, are the world's oldest wooden structures remaining today in their original form.

***Sai-in* (West Temple):**

The *Kondo* was completed by 680, followed by the *Gojunoto*, *Chumon* and the *Kairo*. The entire temple was completed by around 710. The pillars of these buildings are characterized by entasis and the bracketing systems are in the shape of a cloud; these details indicate that these buildings belong to a period older than and different from many of the buildings built after the eighth century in terms of both structure and design. The structure and design found in these buildings were developed under the influence of the Chinese culture of the *Bai-Wei* period (sixth century). Among the principal buildings in this precinct, the *Kohdo* (lecture hall) was destroyed by fire in 925 but was rebuilt in 990.

***Toh-in* (East Temple):**

The *Toh-in* was built in the first half of the eighth century. Its main hall, the *Yumedono*, is an octagonal building surrounded by a corridor. Behind the *Yumedono* is the *Denpodo*, a lecture hall, and the priests' living quarters. Buildings other than the *Yumedono* and the *Denpodo* were rebuilt in the thirteenth century during a time when belief in Prince *Shotoku* was at its height.

At this time the *Raido* (worship hall) was built where the original inner gate stood, and a building to hold the Buddha's ashes (originally in the possession of Prince *Shotoku*) was built behind the *Yumedono*. This revised arrangement remains today.

The Buddhist buildings in the *Horyu-ji* area were witness to the close cultural interchange between China and Japan and in East Asia at the time. Moreover, there is no other example in which outstanding wooden structures of different ages dating from the seventh century and extending to the nineteenth century are concentrated in one area and preserved. It may be said that cultural properties that express the long and rich history of the wooden Buddhist temples of East Asia, as well as the history of the Buddhist religion itself, are gathered here.

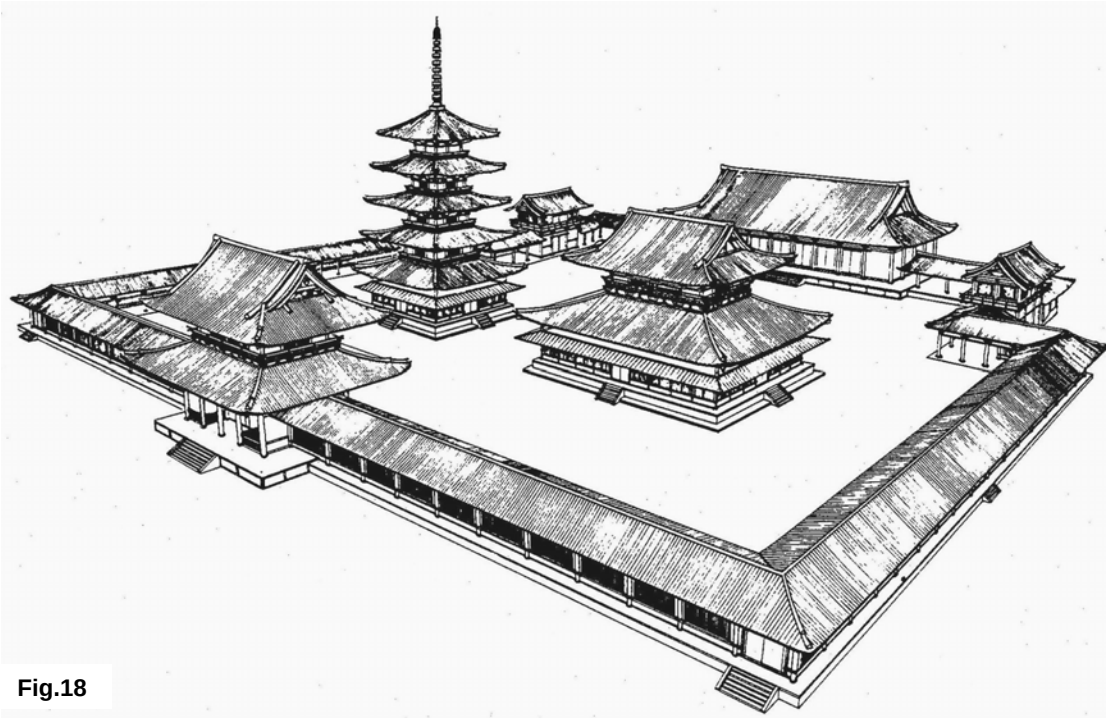


Fig.18

Prince Regent *Shotoku*, who founded the original *Horyu-ji*, was highly instrumental in the introduction and spread of Buddhism in Japan at that time. *Horyu-ji*, with its collection of temple buildings which date back to the age when Buddhism was just beginning to flourish in Japan, holds a very important position in the history of Buddhism in Japan.

As examples of the oldest Buddhist structures in Japan, the groups of Buddhist structures in the *Horyu-ji* area have influenced the development of temples at different ages throughout 1300 years of tradition. They are very important cultural properties in promoting the understanding of the culture of Japan.

The Protection of the Environment

Not only the buildings but also the temple site has been designated by the national government; a total of 48 buildings have been designated as National Treasures or Important Cultural Properties, and the temple site has been designated as a Special Historic Site (14.6 ha) by the national government in accordance with the Law for the Protection of Cultural Properties. Any action which may alter the existing state of the designated place is to be controlled and the permission of the government must be obtained.

The buffer zone surrounding the temple site was designated as a "Conservation District of Historic Natural Features of *Ikaruga* town" in accordance with the Law Concerning Special Measures for the Preservation of Historic Natural Features in Ancient Cities. It was also designated as an "*Ikaruga* Scenic Landscape District" by Nara Prefecture in the same year, in accordance with the Ordinance of Nara Prefecture Scenic Landscape Preservation, thereby providing for the conservation of the historic natural features and the natural environment of the entire district.

History and Results of Conservation Work on Architectural Monuments in Japan: the *Horyu-ji Kondo*

The Process of Repair Work on the *Kondo*

The conservation work on the buildings in the *Horyu-ji* temple precinct, which begun in 1934, was an epoch-making experience in the field of architectural conservation in Japan. The initial focus of the work was the conservation of the mural paintings in the interior of the first story. As a result of this project, in part due to the types of repairs involved, especially repair with dismantling, a major undertaking which could have significant effects on the conservation of the buildings, a comprehensive program of systems and methods of conservation work was established for Japan.

However, in 1945, during World War II, with the work on the first story still under way, the upper storey and the ceiling of the first storey were dismantled as a precaution against possible air attacks on conspicuously tall buildings in this vicinity. After the war, in 1949, the interior, including the mural paintings, suffered damage in an accidental fire; it was decided then to carry out a program of repair which included complete dismantlement, and this repair was completed in 1954. Thus the repair work on the *Kondo*, which had started out as interior work on the mural paintings, in the end

turned out to be a major project including repair with complete dismantlement due to the special circumstances of the war and the accidental fire.

Kaitai Shuri : Repair with Dismantlement

Repair with dismantlement is one of the common methods for repairing architectural monuments in Japan. This method has been used since the beginning of modern scientific conservation work in Japan, which started near the end of the 19th century after the enactment of the first national law. Other types of repair include partial repair in situ, re-roofing, re-painting, etc. Repair with dismantlement may be undertaken in cases in which there is serious deterioration or distortion of the main structural frame, where the consolidation of joints or replacement of main structural members is required on a large scale.

Because of the principal structural characteristics of Japanese architecture, namely (1) the post-and-beam structure without structural walls or bracing, (2) the joint system of mortise and tenon connections without metal fasteners, and (3) the exposed structural frame which is expressed on both the exterior and the interior as the main element of the finished wall composition, dismantlement is made possible by the nature of the structure itself and is a practical and logical solution to the problem of repair, allowing disassembly and reassembly without any damage to the members. Where the structural frame is seriously distorted, this method is required in order to release the internal torsion forces in the joints and to re-align the structure.

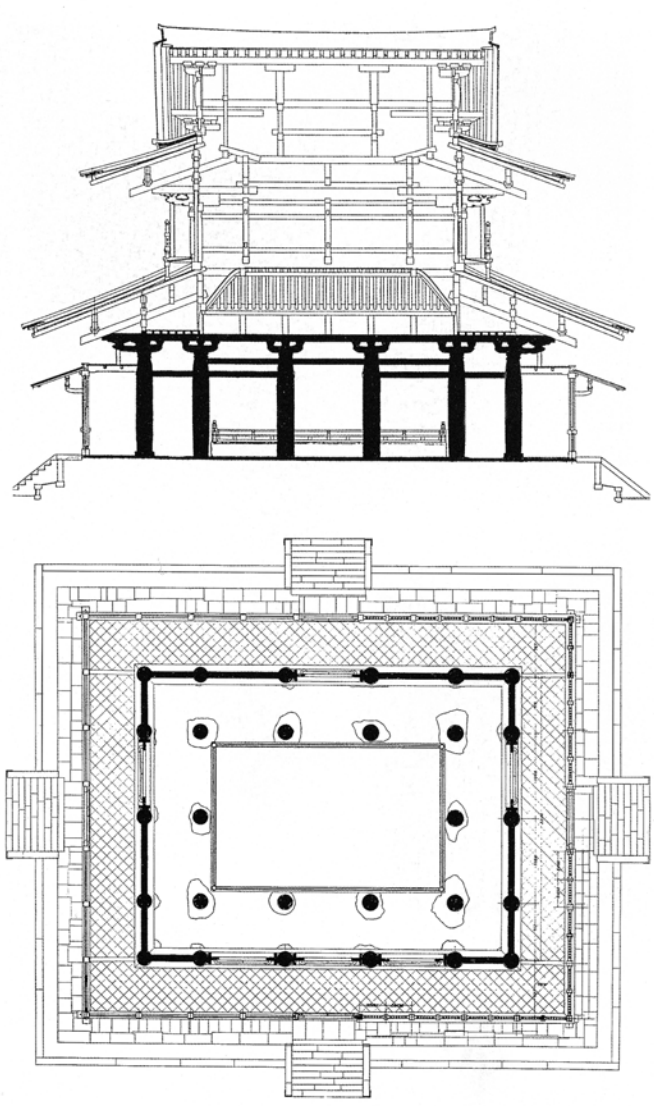


Fig.19

The process of repair with dismantlement is as follows; (1) number plates are attached to identify the location and orientation of each individual member, and detailed record drawings are made; (2) the sequence of dismantlement is determined and the structural frame is disassembled; (3) the damaged or deteriorated parts are repaired or replaced as required; and (4) the structure is reassembled in reverse sequence. This approach to a historic building could be regarded as one application of the method of *anastylosis*.

Partial Restoration

The *Horyu-ji Kondo* was originally constructed at the end of the 7th century and underwent repairs in the 10th, 12th, 13th, 14th and 17th centuries. This was proven through detailed research on traces left on members and archives kept during the conservation work. There were no major alterations done during these periods of repair, but a number of minor changes had been made. As part of the conservation work it was decided to restore those altered portions to their original condition, i.e. those alterations which had damaged the historic value of the building as a 7th century building. These alterations to the then-existing state were made with the approval of the Council.

The restored portions of the *Kondo* include the following; (1) the styles of the roof tiles and ridge tiles; (2) the roof framing sub-structure; (3) the perimeter of the eave framing; (4) the gable ornament; (5) the eave bracketing system at the corners; (6) the removal of eave-reinforcement supports (with the exception of the decorated corner struts); (7) the design of the balustrade on the upper story; (8) the design of the ornamental metal covers on the rafter ends; (9) the removal of the reinforcement tie beams and braces and the installation of new steel reinforcement members concealed in the roof structure; and (10) the design of the roofing material on the projected shed roofs surrounding the lower portion of the building.

In general, the portions of the building that were restored to their original state were those that had been altered during the 17th century repairs. The restoration design was done after careful research which was dependent on the results of investigations of the remaining traces on all of the wooden members. In the case of the *Horyu-ji Kondo*, the policy of the restoration, to return it to its original state, was decided under the following conditions; (1) the later alterations were limited to minor ornamental design features and had not changed the basic fabric of the building; (2) overall, the original design and materials were in a good state of preservation; (3) there was adequate evidence of most features of the original design to enable accurate restoration without conjecture; and (4) *Horyu-ji* has outstanding value as a unique example of *Asuka* Period architecture.

On the other hand, there are portions which were not restored because of a lack of sufficient evidence of the original condition. For example, it is known that the buildings of the *Asuka* Period in general had bird-tail-shaped ornaments on top of the gable ridge ends, and through archaeological excavations parts of such an ornament were found under the ground. However there was no clear proof that particular ornament had come from the roof of the *Kondo*, and not enough fragments remained to reconstruct the entire design of the ornament. The restoration of those parts was therefore not carried out, pending future investigations.

Preservation of Material

The original materials were preserved as much as possible, but materials which were the cause of structural problems because of serious deterioration or other damages were replaced. Also, any materials which had been added in previous repairs or alterations were not re-used in the portions of the building which were restored to the original condition.

In the case of the *Horyu-ji Kondo*, the percentage of original members remaining after the conservation work was 50 to 55% on the first storey, with approximately 70% on the upper storey. Counting the fire-damaged members which were replaced and then put into storage, the percentage

of first-story members remaining is approximately 70%. Most of the replaced parts were portions of the eave structure system, particularly bracketing members or rafters which had been damaged by the overload stresses resulting from an inadequate structural capacity to support the deep roof overhang - a structural deficiency inherent in the original building design which had to be corrected later by the addition of corner reinforcement struts. In *Horyu-ji*, almost all of the members which were not re-used are preserved in a permanent storage facility on site, including the fire-damaged mural paintings and wooden-framing members which are on display.

In general, in conservation work on Japanese architectural monuments involving the replacement of the original members, most of the replaced parts are those around the exposed perimeter of the roof or near the ground surface where moisture damage is most common. It is not common to replace the structural framework members or other fundamental parts of the building, with the result that most of the important building parts remain as original materials.

Fig.20

The Preservation of Traditional Tools and Techniques

Through the conservation work on the *Horyu-ji* buildings, historic investigations were done not only on the traces remaining on the materials but also on construction and carpentry techniques. For example, one of the principal tools used by the traditional carpenters, the *yari-ganna* (a kind of planer-knife shaped in the form of a spear), which produces a finish that cannot be matched by contemporary tools, was reproduced based on investigations of the surface of the original material and archives. For newly-introduced materials for the replacement of deteriorated or fire-damaged members, the greatest effort has made to maintain the authenticity of production techniques by employing such tools.


Fig.21


Fig.22

Captions

Fig.1 Pit-dwelling and Raised floor structure (Reconstructed, Saga pref.)
Fig.2 Main Gate (Nandai-mon) of Todai-ji(Nara pref., 12c)
Fig.3 Shari-den of Engaku-ji (Kanagawa pref., 15-16c)
Fig.4 'Jo-an' tea ceremony room (Aichi pref., 17c)
Fig.5 Main Hall (Kon-do) of Todai-ji(Nara pref., 18c)
Fig.6 Himeji-jo Castle (Hyogo pref., 17c)
Fig.7 Farm house (the Tokitas' house, Chiba pref., 18c)
Fig.8 Town house of the Inoues' (Okayama pref., 18c)
Fig.9 Traditional style residence in modern age (Yuho-en, Kyoto pref., 20c)
Fig.10 Examples of joints
Fig.11 Cross sections of post and beam structures
Fig.12 Thatched roofing in cooperation with villagers
Fig.13 Single board roofing
Fig.14 Cypress bark roofing
Fig.15 Preparation of cypress barking
Fig.16 Traditional carpentry work with traditional tools
Fig.17 Demonstration of cypress bark roofing at an exhibition
Fig.18 Buildings in the Horyu-ji Sai-in
Fig.19 Section and plan of the Horyu-ji Kondo (Main Hall)
Fig.20 Afforestation (Japanese cedar)
Fig.21 Traditional carpentry tools
Fig.22 Carpenters at work drawn in a medieval picture scroll

2. Cultural Heritage Preservation and Restoration

Shin'ichi SHIMIZU

National Research Institute for Cultural Properties, Nara

1. Routine Conservation

The importance of architectural cultural properties lies not only in their beauty; they must be preserved for future generations with their structures intact. Each structural member represents the building technology of its time as well as the spirit of the builder. The proper preservation of cultural properties requires that consideration be given to even the smallest details. It is important to conduct regular inspections to prevent damages from occurring, and to keep up with routine repair work that prevents damages from spreading.

Common sense should be practiced in order to preserve the condition of an ordinary house. For example, highly flammable objects and objects susceptible to rotting should not be stored beneath the floor. The interior and exterior should be kept clean, and windows should be opened regularly to ventilate the house. In reality, however, the work of maintaining and conserving cultural properties is much more complex and varies in scale.

Various circumstances might arise which affect the success of conservation work. Change of ownership may diminish the sense of attachment to and responsibility for the property; a change of function may result in misuse, or the ageing of the residents could mean that maintenance and repairs become neglected. In consideration of such possibilities, routine maintenance work should be conscientiously enforced.

In our modern lifestyles, there is less time available and less motivation to perform routine household maintenance work. In Japan, for example, there used to be an annual custom to thoroughly clean the house. This involves airing the *tatami* floor mats outdoors, and replacing the paper on the latticed sliding doors. Unfortunately, nowadays few people continue this custom. The traditional skills required for such routine maintenance and repairs is no longer passed on, so that even those who are keen to upkeep their houses are likely to hire someone else to do the work, thus this task is becoming impersonalized.

Under the Cultural Properties Law of Japan, while the repair and maintenance of a classified cultural property is the responsibility of the owner just as it is for an ordinary property, the government must supervise and in some cases provide financial or technical assistance. Thus the officials concerned with the preservation of cultural properties must provide the owner with the knowledge for routine maintenance and repairs, and to instill in the owner a readiness to undertake that work.

The staff of local government offices that are in charge of cultural assets regularly inspect the properties under their jurisdiction. Independent craftsmen are also commission to make inspections so that each property is checked several times each year. Furthermore, government agencies hold regular training programs for the craftsmen to develop their skills as

well as their knowledge of history and culture.

The skills required for ongoing maintenance or for the operation of specialized equipments, such as disaster prevention devices, should be passed onto the owners of the property when work is completed by the technicians. In this way, the responsibility for building management is returned to the owners. However, such transmission of knowledge has often been neglected, especially when often, there is the assumption that the owner already knows how to maintain their own house. This is an area where improvement is needed.

To further the education of cultural property owners, there are private organizations that they may voluntarily join. These organizations conduct training programs and site visits relating to the preservation of cultural properties, and contribute in other ways to improve the capabilities of the owners. The merits of improving the awareness of a property owner is demonstrated in the following anecdote: the tenant operating a coffee shop in Building 15 of the historic foreign settlement district in Kobe was asked by the owner to accept detailed contract conditions, which prescribed even the cleaning methods that would facilitate the maintenance of this historic building.

2. Prompt Damage Control through Maintenance and Repair

When damage to a cultural property occurs, the most important thing is to take prompt measures to prevent the damage from worsening or spreading. For this purpose, in Japan the owner of a building that has been designated as a cultural asset by the national government is obligated to file a damage report, within ten days of the occurrence of damage, to the Agency for Cultural Affairs via the responsible local government agency. For small-scale damages, local officials would make an inspection and offer any necessary advice. It is then the owner's responsibility to perform the restoration work. Prompt damage control is a means of not only preserving the value of the cultural property, but also of conserving the building in an economical manner. If large-scale repairs are necessitated, a construction plan is prepared in consultation with the national or local authorities, and the repair work is usually performed as a government-subsidized project.

A building is constructed from a variety of materials; the lifespan of the materials define the needs for maintenance and repair. In the case of a roof that is thatched or shingled with organic materials, if a decayed section is ignored it will quickly lead to rain leakage that can cause corrosion of other parts of the structure. Normally a thatched roof must be replaced every 20 years and a roof of cypress bark shingles every 30 years. However, depending on environmental circumstances such as exposure to sunlight, accumulation of fallen leaves, or the growth of grass or moss, the regular replacement of certain sections and cleaning of the roof can make a large difference to its service life. Roofs of organic materials were conceived to be replaced at regular intervals, hence it is difficult to preserve the original material, but it is essential to retain the traditional procedures and style when replacing it. In special cases, a thatched or bark-shingled roof may be completely covered or replaced with metal sheeting. This may be applicable in a densely built-up neighborhood with a high risk of fire, or where

there is not an inheritor who is capable of handling maintenance and repair work (more common in today's aging society). Such drastic alteration requires a permit based on an investigation by an officer of the Agency for Cultural Affairs.

In Japan, larger temples and shrines that contain many old buildings were traditionally maintained by generations of contracted carpenters who constantly inspected the grounds and made repairs as necessary. For example, at the huge temple complex of Horyuji (Nara Prefecture), groups of carpenters resided in the western and eastern precincts adjoining the temple. At the huge mountain temple of Enkyoji (Hyogo) carpenters lived in a village at the foot of the mountain. Today's commercial society has so weakened the tradition of handing down skills within a family or the local community that such hereditarily established carpenters are no longer common. Thus everyday maintenance of buildings by the owners themselves takes on greater importance in our time.

Traditional wooden structures in Japan are often partly or entirely finished with colorings, lacquer or other materials, while modern buildings are usually finished with paint. The finishing is an important design element while it also has a protective function, hence periodic reapplication is required. Where several coats have been applied, the undercoat may be quite old, and careful inspection is necessary. The finishing has a major effect on the appearance of a building; for example, in the historic foreign settlement district in Kobe, the Kobayashi residence, formerly called the White House, has been known as Moegi (light green) House since its restoration.

The decorative coatings of traditional wooden buildings are often extensively peeled, so analysis of pigment samples is necessary and special care must be taken to preserve any sections where valuable ancient pigment remains. This may require expert advice on the application of finishes and on further maintenance and repair work. However, the exteriors of the oldest wooden buildings in Japan (from about the 13th century or earlier) tend to have been peeled clean, making it impossible to determine the nature of the original finishing. Moreover, the wood is so rough from weathering that it would be difficult to reapply finishes. The austere appearance of such timber buildings has become an accepted image of historic buildings, hence coatings are not applied during recent restoration work.

Recently a growing number of bridges and other steel structures have been designated as cultural assets. To preserve these structures and minimize the need for drastic repair, it is vital that they are repainted at regular intervals.

The basic principle of maintenance and repair work is that it should be carried out regularly in accordance to a building management program in order to prevent the spread of damages. However, even simple and straightforward repairs should be done with expert advice. This would ensure that the integrity and value of the cultural asset would not be undermined in the process. In Japan, the owner of a nationally designated structure is obligated to file a repair report with the Agency for Cultural Affairs at least 30 days prior to the performance of any repair. This requirement allows the government to issue any necessary instructions regarding the repair work, and ensures that the protected cultural property is not altered without permission.

3. Precautions for Natural Disasters

Fortunately, due to their protected locations, many cultural properties have been spared from damages due to calamity and natural disasters over the years. However, due to a traditional reverence for the mountains or for scenic considerations, important buildings have often been sited on difficult terrain or on mountainsides where the forest had been deliberately cleared. Consequently they are especially vulnerable to rotting induced by humidity, and to damages caused by flooding, landslide or fallen trees that resulted from typhoons or downpours. Thus the need arose for the installation of retaining walls, guardrails and drainage works, and the reinforcement or removal of precarious trees. In many cases the risks to the property can be identified and the most urgent disaster prevention measures are taken first. There are a number of inherent difficulties; in addition to the need to harmonize with the cultural property and the surrounding natural environment, the construction work often posed difficult engineering problems, for example when a retaining wall has to be constructed along a cliff behind the structure.

When a small-scale building such as a shrine sanctuary was being built, a temporary sheltering structure may be erected at the start of the construction work to protect it from the elements. This temporary sheltering structure has often been re-used during the restoration of other old buildings in the precinct. In this tradition, concrete sheltering structures have recently been erected to protect cultural properties in areas with heavy snowfall.

Providing adequate measures to safeguard cultural properties during an earthquake is a major problem. In Japan where earthquakes are so common, the very fact that a historical structure has survived up to now implies that it has strong earthquake resistance. Earthquake damages to large historical structures are therefore not anticipated except in special circumstances. However, the fact that many architectural cultural assets were damaged during the Kobe Earthquake of 1995 served as a stimulus for scientific investigation of the anti-seismic capacities of cultural properties. In contrast to buildings of concrete or steel-reinforced concrete, there were no established methods for assessing the earthquake resistance of wooden structures, and studies using actual buildings as specimens were carried out to gather scientific data. From this study, a simple, checklist-type manual was produced. This has allowed owners to easily diagnose the earthquake resistance of their structures without having to bear the high cost of a formal earthquake resistance analysis. As a result, the awareness of disaster prevention has been increased.

Buildings that have been designated at the national level as cultural assets are exempt from certain provisions of the Building Standards Law, including those concerning structural requirements for earthquakes, strong winds and heavy snowfall. In some cases, providing additional structural reinforcements is the only means of ensuring that safety standards are comparable to those of contemporary buildings. Yet this idea has met strong resistance from many persons involved with cultural conservation, as they tend to value the authenticity of structures above all. Rather than enforcing a uniform requirement for the reinforcement of all buildings, efforts are under way to establish standards which correspond to the cultural value and current use of a structure, and to initiate methods for compliance that will not degrade the

cultural value of the structures. At the same time, for buildings where the addition of structural reinforcements has been deemed inappropriate, steps are being taken to post danger warnings, limit access, and improve escape routes.

Preventive measures are continuously being developed to deter the various foreseeable risks and disasters that may occur. While complete prevention is impossible, it is vital to identify all the potential threat to a cultural property, taking into account their context and surroundings. Preventive measures must be provided to cater for all risks identified despite their relative likelihood of occurrence.

4. Fire Prevention and Initial Firefighting

Since about 90 percent of the architectural cultural assets in Japan were built of wood, fire preparedness is essential. Measures are taken for each stage of preparatory actions, including prevention (fire control), early detection, initial firefighting and full-scale firefighting. Controlling the use of fire is the most important. In Japan, fires caused by fireworks igniting roofs made of natural materials have become a problem in recent years.

To cater for early detection, the Japan Fire Service Law requires automatic fire detectors to be installed within structures classified as cultural assets. The devices are selected and placed in ways that would not damage the interior space. To provide for initial firefighting, the Agency for Cultural Affairs promotes the installation of firefighting equipments. Aboveground sprinkler devices for water discharge are frequently used, as it is essential that the equipment can be easily operated by elderly owners and neighbors. For full-scale firefighting, automatic alarms that promptly alert fire departments are installed, and routes for firefighting access are being cleared on large areas of land in cases where cultural properties are set far back from the road.

In addition, lightning arrestors are installed in areas where lightning strikes are common and in districts without high buildings, and fire breaks are created around cultural properties in densely populated areas. For example, the Daizenji temple (in Yamanashi) would be at high risk in the case of a forest fire. Firefighting equipments have thus been installed and a fire prevention zone has been established on the hillside behind the building. Careful consideration of the type of equipment and fire prevention measures appropriate to the circumstances is required for each cultural property.

January 26 has been designated as the Cultural Asset Fire Prevention Day in commemoration of the fire in the main hall at Horyuji in 1950. On this day, annual firefighting drills are held throughout the country at designated cultural sites with the cooperation of local fire departments and residents.

5. Responses to Natural Disaster

When a disaster strikes, naturally lifesaving takes on first priority. It is also vital to prepare and maintain communication systems to enable prompt assessment of damage to

cultural properties. During the confusion at the time of a disaster, cultural properties are at high risk since for example, even an important building could be recklessly destroyed in order to clear a blocked road. Hence authorities and the local residents must be informed about the value of cultural properties in the area, and emergency measures should be in place for their preservation if they are damaged due to natural disasters. Such measures include the erection of temporary structural props for support and the use of sheets to keep out the rain.

It is also important to organize a relief system of personnel to help save cultural properties in case there are insufficient resources on hand. The implementation of such a system was demonstrated in Kobe after the disastrous earthquake of 1995. About one week after the earthquake, inspection teams from the Agency for Cultural Affairs were able to enter the affected areas to assess the extent of damage to cultural properties, prepare preliminary restoration plans, and estimate restoration costs. Local branches of Architectural Associations assessed significant buildings that were not designated as cultural assets. Specialists attached to local government agencies were dispatched to set up long-term procedures for coordinating the restoration of each designated cultural property. As a response to this disaster, measures for earthquake proofing were also reviewed.

Typhoons are another common cause of damage to cultural assets in Japan. In areas that regularly experience typhoons, existing buildings have proved their resilience, and communities are prepared to cope with the storms. But in areas that are not accustomed to typhoons, a major storm may cause heavy damage. Typhoon no. 7 in 1998 is remembered for the extensive damage that resulted by trees that were felled by the strong wind. At the Muroji temple (in Nara Prefecture), along with repairs to the five-storied pagoda, preventive measures such as the wiring of potentially dangerous trees were carried out. Nationwide, measures to reinforce trees that present potential risks were added to the program of cultural asset protection; subsequently, the trees around all cultural asset structures were surveyed to identify risks. This is an example of learning from a disaster.

6. Opening to the Public and Regulating Use

Besides implementing programs to preserve cultural properties, it is desirable that they become accessible to the public, who could benefit from and learn to appreciate our common heritage. Buildings that have fallen into disuse and become public property are frequently converted into museums. Some of them are managed simply as spaces for exhibits that highlight the value and attraction of the building as a cultural asset. In some cases, the exhibits may be irrelevant to the history of the cultural property, and may obstruct views of the building ' s interior. Consideration is needed to develop a complementary relationship between the structure and the exhibits. Attention should be drawn to the relevance of the exhibits; at least one section of the exhibits should be related to the structure.

Public buildings are subjected to societal demands for comfort and convenience, including such aspects as barrier-free access. This may result in numerous requests for all sorts of renovation or equipment to be installed into a cultural property, and these need to be

carefully evaluated in terms of requirements and the methods of achieving them. For example, at the Yokohama Port Opening Memorial Hall, a permit had to be obtained for the installation of an outdoor elevator facing the courtyard.

In the case of a private home, continued utilization as a residence is best for preservation and management, although flexibility is required to improve amenities. Culturally significant dwellings often come under public ownership due to the lack of an heir. There is a wide variation in the ways that these dwellings are subsequently used, and in the merits and extent of their opening to the public. This is usually determined according to the site conditions and the policies of the responsible authorities.

The principle for preserving residential cultural properties in Japan is to promote their utilization as homes, and to take public ownership only as a last resort. With public monuments the opposite is true, as public ownership is the norm and site utilization is regulated by the local authorities.

Continual use of a cultural property tends to help maintain the inherent significance of the structure and reinforce the owner's will to preserve it. Through use, the attractiveness of the building is brought forward and good management is promoted. While an exclusive focus on functional requirements may raise problems due to the conflicting demands of use and preservation, in general the two goals are complementary.

Compared to brick or stone buildings, which retain some physical value even when they have been allowed to fall into ruin, wooden buildings are far more difficult to preserve. It is thus essential to manage them in the context of continued use.

7. Conclusion

The management of cultural properties entails a broad range of issues, from heritage preservation and the conservation of the surrounding historical and natural environments, to topics not mentioned in this paper such as crime prevention and the regulation of institutional and individual users. Accordingly, the ideal manager of a cultural property will have a broad perspective and comprehensive judgment. In Japan, training to develop managers with these qualities has been initiated by some local governments, such as the initiation of a training course for heritage managers in Hyogo Prefecture. However, such training and awareness is still lacking at the national level. This is a key issue for the future.

3. Preservation of Waterlogged Wooden Relics

Yohsei KOHDZUMA

National Research Institute for Cultural Properties, Nara

1. Emergency Measures at the Excavation Site

1.1 Temporary Storage at the Site

A relic of organic material with high moisture content that decayed very slowly in the ground can in many cases become so fragile soon after excavation that it could crumble at the touch of a finger. Because shrinkage and deformation will result if such a relic is allowed to dry out, it must constantly be kept wet during the archaeological survey work. The relic should be regularly watered with a sprinkler, vaporizer or watering can, and it is effective to keep it covered with a black vinyl sheet. A solution of water containing PEG-600 or PEG-1500 (polyethylene glycol with low molecular weight, which is highly water absorptive) may also be applied, either directly or by wrapping the relic with a soaked cloth. But since either of these methods of PEG application will work for only a short time, wooden relics must be constantly monitored to confirm that they stay wet at all times. Wooden relics must also be protected from prolonged exposure to direct sunlight, as the surfaces of a relic left exposed to the sun at the site have been known to deteriorate visibly in comparison to the unexposed surfaces.

A relic discovered in the course of excavation is ordinarily cleaned for the preparation of photographs and measured drawings, and this cleaning must be done carefully. Buried wood may have decayed to the point that even the touch of a finger will cause surface damage, so it is best to perform the cleaning work with gently running water and, if available, a soft brush. Special care must be taken with wood containing India-ink writing (such as the narrow wooden tablets with official records from ancient Japan), because scrubbing off dirt may also scrape away the remaining traces of written characters. Furthermore, dirt adhering to the surface of a relic may contain traces of material that was previously part of the relic itself, so careless or unnecessary cleaning is to be avoided, and the relic should be carried indoors together with any adhering soil for thorough examination.

Relics consisting of both wood and metal, and wooden relics coated with lacquer must also be prevented from drying out if they are wet. Likewise, if a dry organic relic is mistakenly rinsed with water, it must then be kept wet. In addition to items containing organic material, fragile earthenware which contains moisture may crack if rapidly dried, and so must be treated with care.

1.2 Methods for Removing Fragile Organic Relics

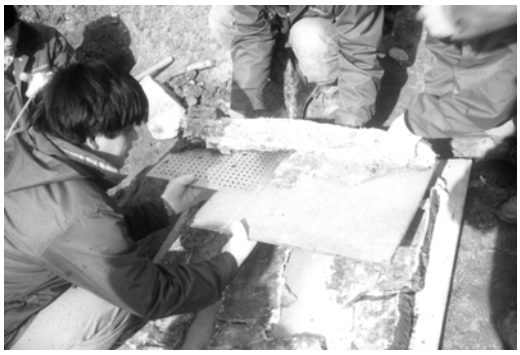
It may be difficult or impossible to simply pick up a fragile organic relic and keep it intact. The method that will best preserve the shape and positioning of the relic should be used, taking into account the condition of the relic and the nature of the surrounding environment. Special techniques

for removing fragile relics include temporary reinforcement, wrapping with hard urethane foam, fixing with urethane foam tape, and freezing with liquid nitrogen.

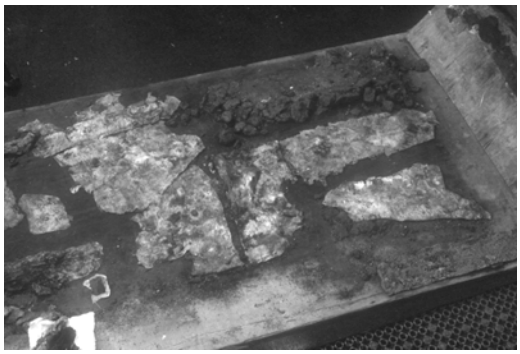
1.2.1 Temporary Reinforcement

A relic in a relatively good state of preservation can be reinforced to facilitate its removal. For example, when a lacquered object is buried, the main object may decay completely leaving only the lacquer membrane to be discovered and unearthed (Figure 1). As consolidation alone is usually not sufficient to facilitate the removal of a lacquer membrane, it may be necessary to reinforce one side or the other of the membrane with handmade paper or nonwoven fabric. The reinforcing material should be attached using either acrylic resin or ultra-macromolecular polyethylene oxide (Polyox). These can be easily removed afterward, using hot steam to dissolve Polyox, or an organic solvent such as acetone to dissolve the resin. In all cases, selection of the reinforcing material and method should be preceded by careful consideration of the type of preservative treatment to be used after the object has been removed. As it is usually difficult to consolidate a wet relic, especially if it is wood or cloth, as a rule it is best not to do the work at the excavation site. Instead, to facilitate the subsequent preservative treatment, it is probably better either to wrap it with hard urethane foam or freeze it with liquid nitrogen, as described below.

a. Consolidation and reinforcement



b. Removal



c. After removal

Figure 1 **Removal of a Lacquer Membrane**

1.2.2 Wrapping with Hard Urethane Foam

As with human bones, reinforcement may not be sufficient to allow the removal of a relic. To fully preserve the positioning and composition of the relics, which may be critically important for large remains and for three-dimensional structures like kilns, the entire set of remains can be wrapped in hard urethane foam (Figure 2). Note that remains which are heavily deteriorated or contain fragile material such as sandy soil must be reinforced prior to being wrapped with foam.

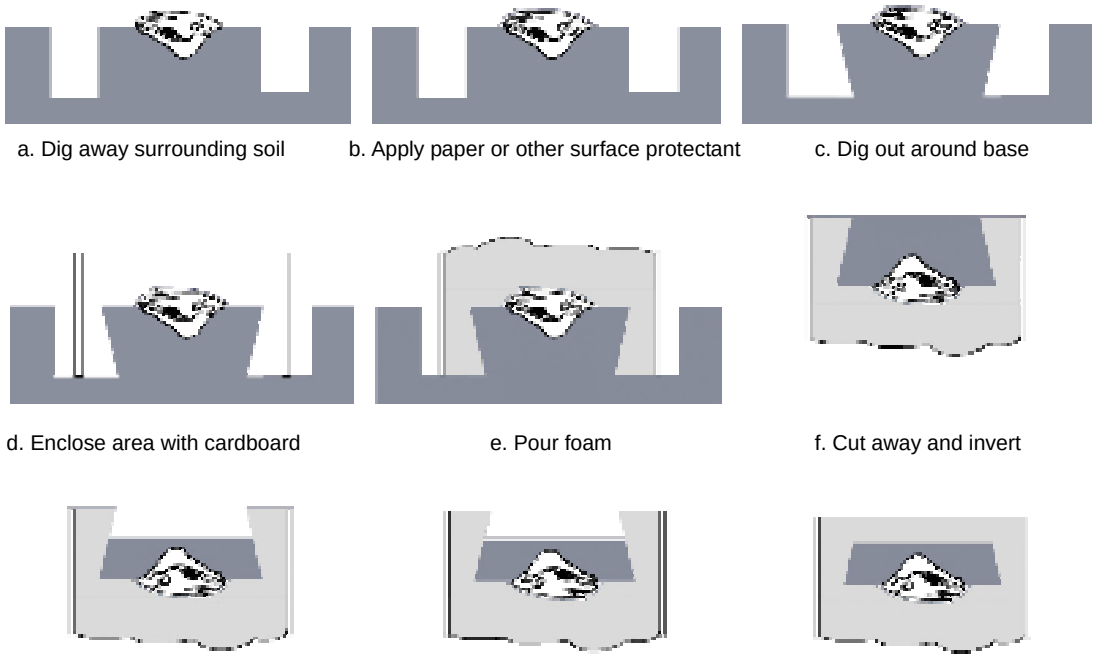


Figure 2 **Using Hard Urethane Foam to Remove a Fragile Relic**

After determining the scope of the material to be removed, dig away and remove the surrounding soil so the relic is protruding into space. Then, to prevent the foam from adhering to the surface of the relic, spread moistened handmade paper over the entire surface as if preparing to take a rubbing. It is recommended that three layers of paper in pieces about 5 cm square be applied without gaps. For a relic with a very uneven surface, clay may be applied over the paper to fill in the gaps and produce an overall smooth surface. An overhang or other vulnerable section may be partially reinforced with clumps of epoxy resin. Then dig away a little around the base of the relic, to make it easier to remove it from the soil. For a large relic, it may be convenient to build a reinforcing structure from square timbers. Finally, enclose the area around the relic with a material such as cardboard, so the foam will not overflow.

When the above preparations are complete, the foam will be poured around the entire relic. Before working with the foam, it is essential to assemble all necessary utensils and gear including a bowl and stick for stirring, a scale for weighing out the urethane components, vinyl bags, garbage bags, protective gloves and masks, and emergency remedies (to rinse the hands or eyes if the foam splashes). Hard urethane foam is usually sold as separate packets of its two components, isocyanate and polyol. These materials must be handled with care, because any amount of moisture will initiate a chemical reaction in either component. Alternatively, but at higher cost, the foam is available in canisters for spray application, which is more efficient because it eliminates the stirring and weighing work and facilitates uniform application. Just before applying the mixed foam, mix the two components in the prescribed proportions and stir quickly. As soon as a substantial quantity of the chemicals are mixed together, they will become dangerously hot. When the mixture changes from yellow to black it will start to foam, at which point it is poured around the relic from the bottom up. It is best to pour the

foam in several stages, because the foaming proceeds very rapidly and a single comprehensive application might damage the relic or lead to a dangerous buildup of heat. When the remains are fully wrapped with foam, let them stand for some time to ensure that the secondary foaming has stopped.

After the relic is fully encased in foam and the secondary foaming has stopped, disengage the bottom of the relic from the soil and turn it over. Remove excess soil from the bottom, and if necessary strengthen the base with FRP or another stabilizing material. Steel reinforcing rods or other structural reinforcements may be needed in some cases.

The relic should now be transportable. If further stabilization is deemed necessary, or if the relic will need to stay wrapped for a long time, an additional layer of foam may be added over the FRP reinforcement to ensure an airtight seal.

1.2.3 Fixing with Urethane Foam Tape

A relatively small relic can be removed by pressing moistened paper along its surfaces and then fixing it with urethane-impregnated tape, of the sort sold for repairing water pipes or making medical casts. The urethane in this tape reacts with water and hardens, providing a neat and comparatively easy method for removing a small relic.

First, protect the surfaces of the relic by applying moistened paper. It may be necessary to dig out some of the surrounding soil. Then apply moistened tape so it adheres as closely as possible to the surface of the relic. If surrounding soil has been dug away, the paper and tape can be extended around the exposed sides. If the soil has not been dug away, use wooden skewers to carefully separate the bottom of the relic from the soil. Thin metal plates or other utensils may be used to neatly remove each bit of soil.。

a. Freezing with liquid nitrogen　　b. Removal

Figure 3 **Using Liquid Nitrogen to Remove a Fragile Relic**

1.2.4 Freezing with Liquid Nitrogen

Some waterlogged organic relics are so deteriorated that they cannot be simply removed from the ground as they are. The urethane foam technique described above is one way to remove them. Another is to freeze them with liquid nitrogen (Figure 3). Nitrogen in liquid form is colder than its boiling point of 195.82°C, cold enough to instantly freeze a small relic. Since no resin is used, the

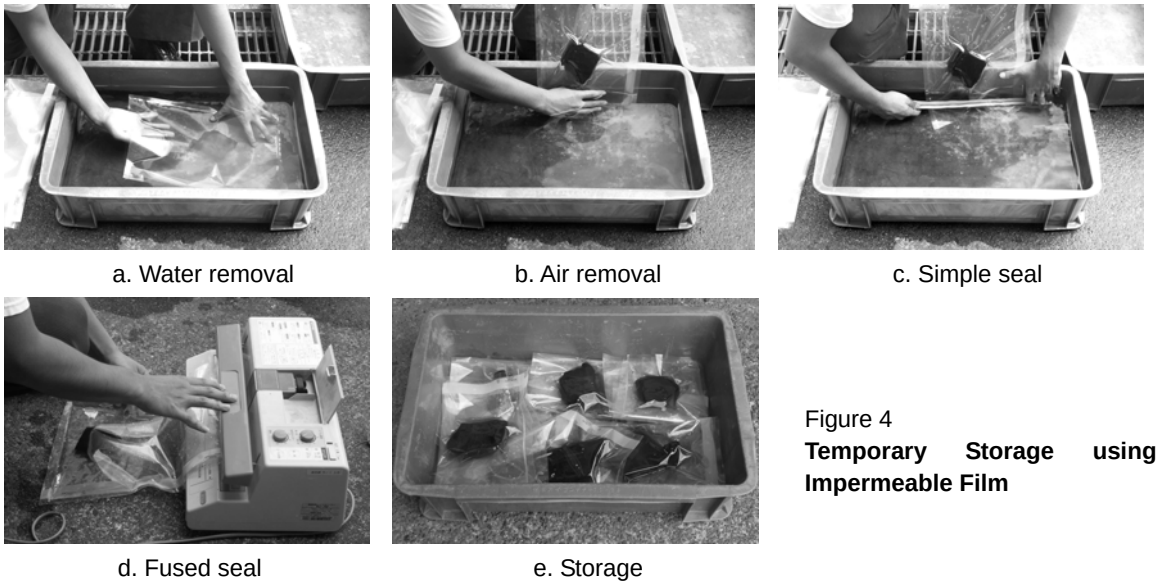
stabilizing process requires only a short time, and there is no need to remove a temporary reinforcement later when the preservative treatment is performed. Caution is required however, because depending on the condition of the relic, there is a risk that sudden freezing may cause cracking or other damage. If left at normal temperature after it is taken from the ground, the relic will thaw and may lose its shape, so protective measures should immediately be taken, such as placing it in sand inside a plastic container.

2. Temporary Storage

Until the preservative treatment can be performed, a relic that has been brought back from the excavation site must be stored temporarily in a fashion that will maintain its condition as stably as possible. Fundamentally, as was done at the site, every effort must be made to prevent it from drying out. Further, since the buried environment included very little oxygen, the generous presence of oxygen aboveground is likely to trigger a dramatic process of decay. In other words, it is necessary simultaneously to avoid drying and prevent decay. The techniques currently in use include placement in a tank of water or in a plastic container, and sealing the relic in impermeable film.

Immersion in water is never more than a temporary storage measure. Evaporation will occur in the tank or plastic container, bringing the risks of drying the relic and elevating the concentration of the anti-mold agent. Nor can storage in sealed film ever be considered a long-term solution. Cold storage is also problematic: in some cases only parts of the relic will actually be below the freezing point, and when a fragile relic is slowly frozen the swelling of ice in its interior may break it. Leaving the relic immersed in water, adding an anti-mold agent, and storing it at low temperature may all be wise steps, but they may also lead to irreversible changes. The most important thing during temporary storage is to periodically check the condition of the relic. Furthermore, there must always be a plan to carry out permanent preservative treatment as soon as possible so the relic will be converted from a waterlogged state to a stable state.

The easiest way to temporarily prevent both drying and decay is to immerse the relic in water with an anti-mold agent added. A water tank or plastic container can be used as long as the relic is not



a. Water removal b. Air removal c. Simple seal

d. Fused seal e. Storage

Figure 4
Temporary Storage using Impermeable Film

too large. For the anti-mold agent, a liquid mixture of boric acid and borax (aqueous solution of 5% or less) is often used. If another agent is used, consideration should be given to its environmental impact.

A large wooden relic such as a building member can be temporarily stored in a water tank. But if it is outdoors, it may be exposed to rain and sun, and leaves or other debris may fall in the tank. In that situation no amount of anti-mold agent will guarantee against decay. When storage in an outdoor water tank is inevitable, the minimum condition is that it be shaded from sunlight and protected from rain and debris. The tank must therefore be fitted with a cover.

Indoors, a good temporary storage environment can be created by installing a water tank, so long as an anti-mold agent is added and the water is regularly changed. Periodically causing the water to overflow will keep the water quality at an acceptable level for preventing damage to the relic.

A storage technique that has recently come into use is sealing the relic in a bag made of laminated layers, which provides extremely low oxygen permeability (Figure 4). This method has the advantage not only of using less water, but also of controlling the oxygen supply. Cold storage of the bagged relic enhances the rot-proofing effect.

Sometimes when the soil adhering to a relic is removed, its shape is altered. Since storage in water will inevitably wash away adhering soil, there is a possibility that the relic will disintegrate. The relic should be sealed in a vinyl bag, placed in cold storage, and periodically sprayed or otherwise supplied with water to prevent drying.

3. Preliminary Examination

3.1 Observational Techniques

Many excavated wooden relics are made solely from wood, while many others are combinations of wood and other material such as metal or stone, or are excavated with adhesions. The consideration of preservative treatment methods starts with gathering data to determine what materials the relic contains, what condition it is in, and what sort of structure it has. Formal details must be observed, and the fine structure must be examined with a microscope.

The first step toward understanding the state of decay of a wooden cultural property is identification of the wood species. The identification will also provide important scholarly data.

Trees are categorized as coniferous or broadleaved. While there are various differences between these two broad types, the most important is that broadleaved trees have vessels while conifers do not. The distinction can usually be made by viewing an end section with a magnifying glass or stereomicroscope to determine whether or not there are vessels. Yet in fact there are some broadleaved species that do not have vessels (an example from Japan is the *yamaguruma* [botanical name: *Trochodendron aralioides*]), so other simple observations of tissue characteristics may be needed to confirm a conifer identification.

It is difficult to make a species identification through nondestructive methods. There are some professionals who can make visual identifications, but they are fairly rare, and more reliably accurate data is desirable. The normal method of identification is to observe thin slices of the three

types of sections under a light microscope to determine the anatomical characteristics. Making the identification from slides with a microscope requires a collection of standard samples as well as proper training, but the first thing required is the preparation and storage of slides from each relic.

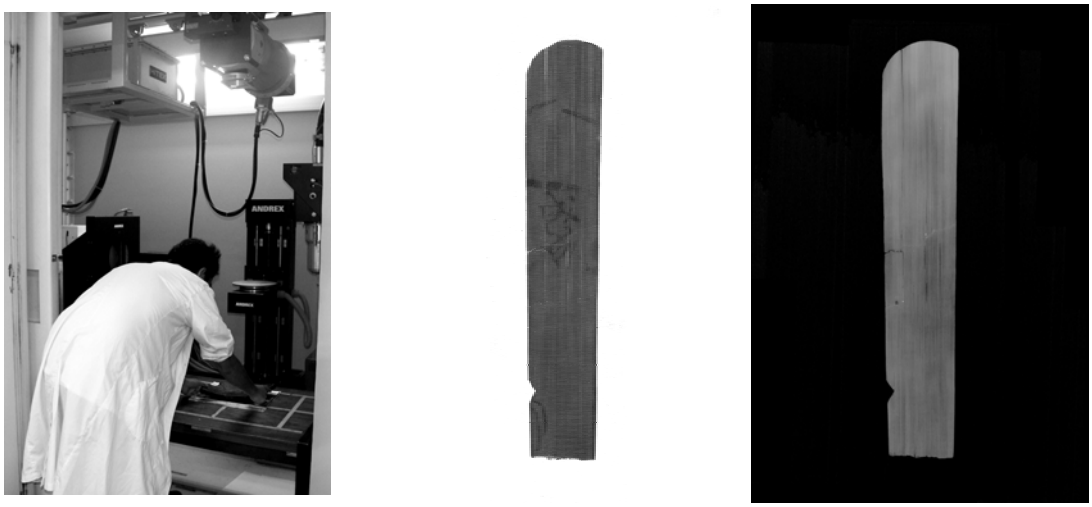
Assuming that minor sampling of the cultural asset is permissible, the thin slices are prepared as follows. A cube measuring 1 cm on each side is removed to provide the three cross-sections. The sample is placed in a 100 ml aqueous solution of glycerine inside a triangular flask, and if softening is needed, a reflux condenser is attached to boil the sample. Boiling is rarely necessary for excavated wood. A razor is used to slice three cross sections, 10 to 30 microns thick, from the softened sample. Each section is mounted on a slide with gum chloral. It takes about a week for the gum chloral to harden, but observation is also possible before it has hardened. Because gum chloral is strongly hygroscopic, the slides should be stored in a dry place.

An effective technique for determining internal structure and form that is imperceptible from the exterior is radioparent photography (Figure 5). If there is India-ink writing on the wood, observation through an infrared camera may allow the deciphering of indistinct or blurred characters (Figure 6).

3.2 Investigation of Physical Properties

3.2.1 Determining the Maximum Moisture Absorption

There are two ways to determine the maximum moisture content of excavated wood. One is by measuring the amount of moisture in a dried sample taken from the relic with an increment borer. The other, employed when sampling is not permitted, uses buoyancy to estimate the average maximum moisture content of the entire relic. Following are explanations of these two techniques.



a. Radioparent photography b. Wooden object c. Radioparency

Figure 5 **Preliminary Examination by Radioparent Photography**

1) Calculating with a Sample

The sample is placed in a beaker standing in water, and put in a vacuum dessicator. The air is removed from the dessicator with a water-jet pump. The dessicator is left de-aerated for a specified interval, and then returned to normal pressure. The process is repeated until no air bubbles form during the interval of decompression. The time at which air bubbles cease to form is the end of the saturation process.

The saturated specimen is removed from the water, and the surrounding excess water is wiped away with wet gauze. The saturated weight m_w is measured with an electronic force balance.

The sample is allowed to dry naturally, and then is further dried in a dessicator for four hours at 105°C. Next the sample is placed in a dessicator containing silica gel and cooled to room temperature by a nitrogen current. (If cooling with a nitrogen current is not possible, a sealed dessicator may be used, although it cannot handle more than one sample at a time.) The sample is removed and weighed. Then it is put back in the dessicator for a further one hour of drying, cooled in the same way, and again weighed. If the weight has changed, the drying and cooling process is repeated until a constant weight is achieved, and this value is taken as the dry mass.

The maximum moisture content u_{MAX} is derived from the saturated weight m_w and dry mass m_o through this formula:

$$u_{\mathrm{MAX}}(\%) = \left(\frac{m_{\mathrm{w}} - m_0}{m_0} \right) \times 100$$

2) Estimating from Buoyancy

The same saturation process as above is performed. The beaker of water is placed on an electronic force balance, a fishing line and hook are mounted as shown in Figure 7a, and the balance reading is reset. The water temperature is measured. Excess water is wiped off the sample and it is stuck on the hook and suspended at the same depth as in Figure 7a (Figure 7b). While it is in the water the hook is removed, the sample is allowed to fall to the bottom of the beaker, and the saturated weight m_w is measured (Figure 7c). When the sample is placed in the water, it is monitored to confirm that no air bubbles form around it.

The maximum moisture content u_{MAX} is derived from the buoyancy B and saturated weight m_w through this formula:

$$u_{\mathrm{MAX}}(\%) = \left(\frac{R - \delta}{R} \times \frac{m_{\mathrm{w}}}{m_{\mathrm{w}} - B} - 1 \right) \times 100$$

where R is the wood fiber density (ranging from 1.3 to 1.6 g/cm^3 for waterlogged wood relics), and δ is water density.

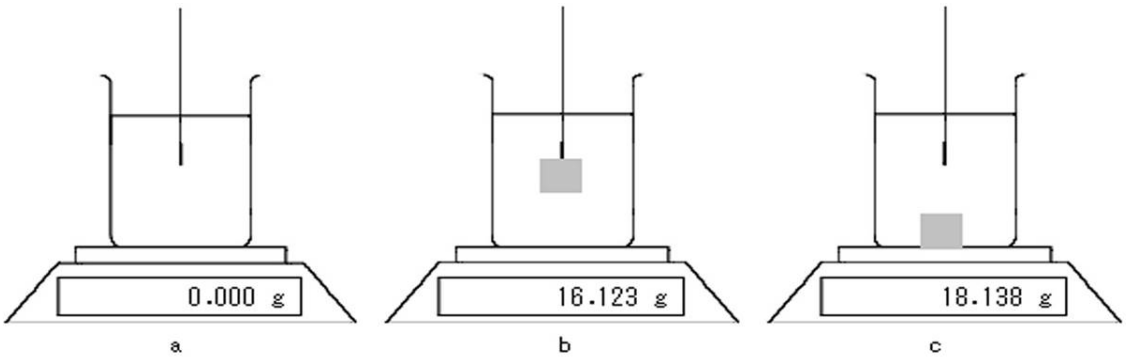


Figure 7 **Measurement of Buoyancy and Saturated Weight**

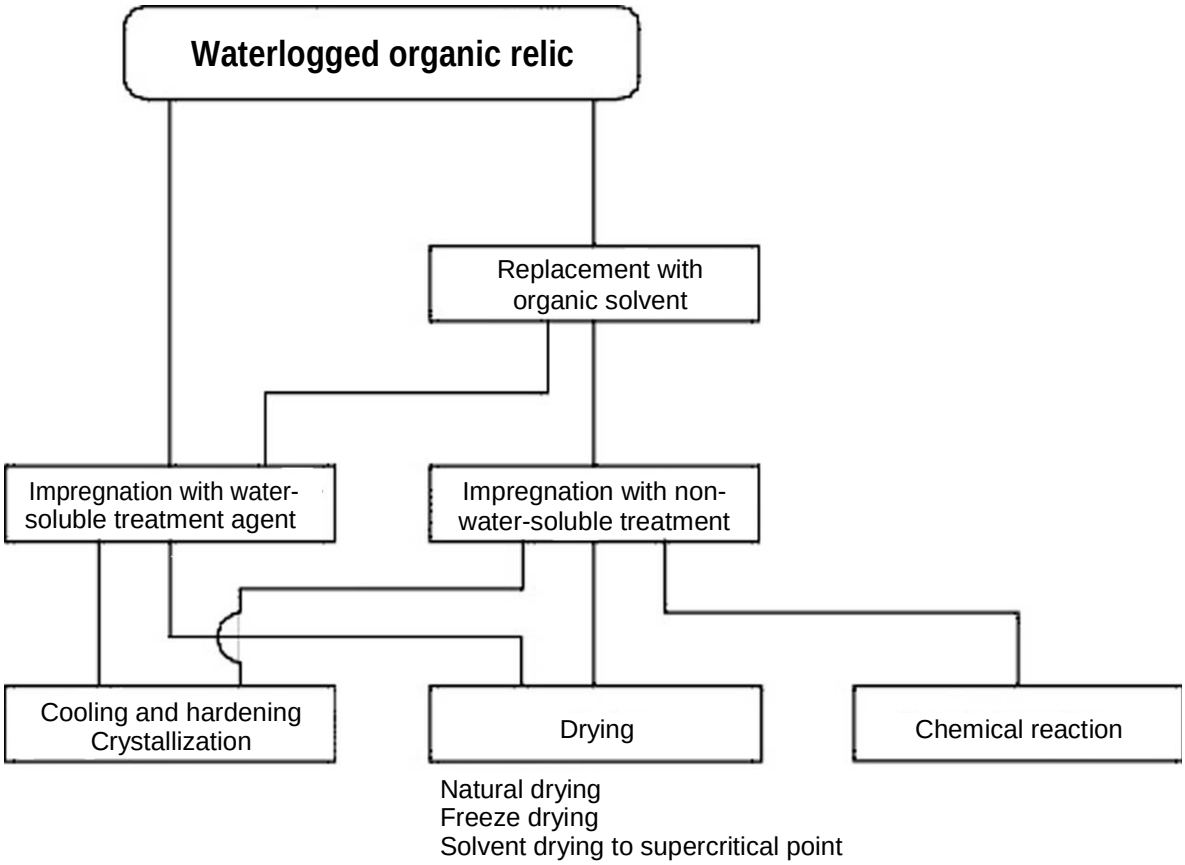


Figure 8 **Sequence of Treatment Processes for Waterlogged Wooden Relic**s

4. Preservative Treatment

4.1 Principles of Preservative Treatment

The essential point of preservative treatment for a waterlogged wooden relic is to dry it sufficiently for display and storage, without shrinkage or deformation. Out of the many techniques for preservative treatment that have been devised, all of those that have been in actual use include the

same two basic processes – impregnation with a treatment agent, and the drying and hardening of the agent. These processes are outlined in Figure 8.

4.2 Impregnation

Impregnation with a water-soluble treatment agent can be done in two different ways. In one process the waterlogged wood is directly impregnated with the treatment agent, while in the other process the moisture in the wood is temporarily replaced with an organic solvent before impregnation with the treatment agent. Impregnation with a non-water-soluble agent requires a pretreatment to replace the moisture in the wood with an organic solvent. Preservative treatment by impregnation with a non-water-soluble agent is sometimes called a solvent-resin method.

Table 1 **Chemicals Used for Impregnation**

Water Soluble:	Polyethylene glycol, Sucrose, Mannitol, Lactitol, Trehalose
Non-Water Soluble:	Dammar, Acrylic resin, Higher alcohol, Resin acid ester

The main goals of impregnation are to strengthen fragile wood and provide dimensional stability. When all the moisture in the wood is replaced by the impregnated agent, the impregnation process itself constitutes the dehydration process. The key to this process is the penetration and diffusion of the agent through the wood. As a rule, when a highly concentrated solution is added to a low-concentration solution, the solute and the solvent will be both displaced until there is the overall concentration is equalized. Using the PEG impregnation method as an example, PEG is the solute and water is the solvent. In order to equalize the concentration of the solution inside and outside the relic, the water inside the relic gradually flows out, while the PEG or other impregnating agent penetrates into and diffuses through the relic, and chemical substitution proceeds (Figure 9). The difficulty with the impregnation process is that the penetration and diffusion of the treatment agent depends not only on its chemical characteristics, but is also strongly influenced by the attributes of the relic, including the types of material, the wood species, and the level of decay. Among excavated wooden relics, wood from camphor, chestnut and red oak trees present the strongest difficulties in the impregnation process. And ironically, the healthier the condition of the core of the wood, the lower the penetrability of the treatment agent.

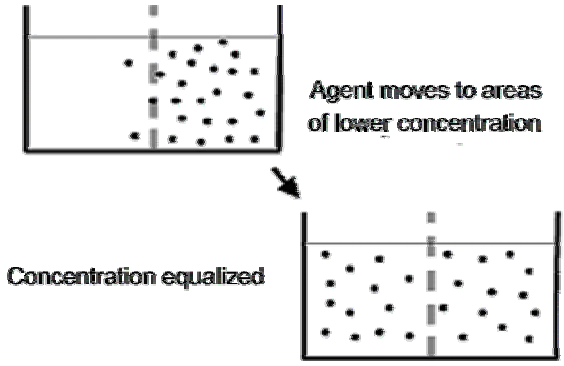


Figure 9 **Impregnation with a Treatment Agent**

Table 1 shows the treatment agents that have been used to date for impregnation of organic relics.

4.3 Drying and Hardening

After impregnation, the relic undergoes the process of drying and hardening. If all moisture in the relic is replaced with a water-soluble agent, the final step is application of heat to melt the agent to liquid form. A non-water-soluble agent, after it is liquefied through heat, will eventually replace all the organic solvent in the wood. With the impregnated agent replacing all the water or organic solvents, the relic is lifted out of the treatment tank and cooled to solidify the agent, leaving the wood dry and strengthened. In some cases the impregnation is stopped short of 100% concentration, and the relic is lifted out of the tank at 70 to 80% concentration. Then, with 20 or 30% of the liquid composition remaining, the remaining water and organic solvent is naturally dried, using chemical crystallization to convert some of the water to water of crystallization by means of humidity control, and evaporating the rest. The remainder is removed, either by cooling to solidify the treatment agent, or by drying away the residual water or organic solvent.

Another method of drying is freeze drying, for which the impregnation process is stopped while there is still a substantial amount of water or organic solvent in the wood.

The strong surface tension of water is a key factor in the severe shrinkage and deformation that occurs when an organic relic is dried. When liquid water is heated, it boils at 100°C. Yet we know that water left in a cup will gradually diminish until there is only air, which shows that even without heating it to 100°, liquid water always has water molecules escaping from it even as it maintains uniform vapor pressure. As the liquid water turns to gaseous water vapor, a strong tensile force is generated.

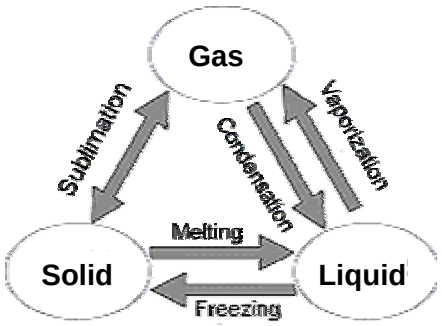


Figure 10 **Material Changes of State**

If a chopped onion is placed in a freezer, it will soon dry out entirely. Since it is a freezer, the moisture cannot have become liquid water before it became water vapor. In fact water molecules also escape from the surface of solid ice. The phenomenon of molecules of solid ice turning directly to water vapor without passing through the liquid state is called sublimation (Figure 10). Surface tension can be considered to be inoperative during sublimation. It is this phenomenon of sublimation that is utilized in freeze drying. There are two method to accelerate the sublimation of water from a frozen relic: one is to send dried air onto the surfaces of the relic to constantly remove the water molecules escaping through sublimation, and the other method is to remove the water molecules escaping from the relic by reducing the pressure to below the vapor pressure of ice (Table 2). The first method is freeze drying at ordinary pressure, and the second method is vacuum freeze drying.

Table 2 **Vapor Pressure of Ice**

Temperature (°C)	Vapor Pressure (Pa)
0	610.6
-5	401.3
-10	259.5
-20	103.0
-30	37.9
-40	12.8

In the final step of polymerization, which is a chemical reaction, a catalyst or heat is used to polymerize the impregnated treatment agent, in order to solidify the relic. When silicon resin is used as the

treatment agent, an extremely fragile relic such as rope can be preserved while maintaining its soft texture. It must be remembered that once polymerization occurs, the treatment is irreversible.

4.4 Detailed Explanations of Preservative Treatment Methods

This section outlines the preservative treatment methods that are in current use, in keeping with the principles of preservative treatment of organic materials presented in section 4.1.

4.4.1 Polyethylene Glycol Impregnation

The highly reliable PEG method is one of the best treatment methods using water-soluble impregnation agents. The PEG method was pioneered in the late 1960s and early 1970s by Broson-Christensen[1)] of the National Museum of Denmark with the Skuldelev Viking ships, and by Barkman[7)] with the Wasa warship in Sweden. For small objects an impregnation tank is used to perform the treatment, while for the huge ships which could not feasibly be placed in tanks, a PEG solution was sprayed onto the wood. In Japan PEG was first used to treat tablets discovered at the Gokuraku quarters of the Gangoji temple in Nara, and the first treatment with the currently used heatable stainless-steel impregnation tanks, in 1972, was for dam parts excavated from the Kodera site in Matsuyama.

PEG is a high-molecular compound with the following formula:

$$HO(CH_2CH_2O)_nH$$

where n is the number of repetitions inside the parentheses, i.e. the degree of polymerization

The properties vary with the molecular weight. PEG 4000S, with a molecular weight of 3300, is used for preservative treatment of organic materials. A solid at ordinary temperature, PEG 4000S is easily soluble in water and an aqueous solution of about 50% can be produced at room temperature. It melts when heated to 60°C and becomes entirely liquid.

The PEG impregnation treatment begins by immersing the artifact in a low-concentration 20% solution. Then the concentration is gradually stepped up along a predetermined gradient. During the treatment, the PEG concentration and the condition of the artifact must be monitored. With some objects and some kinds of wood, dramatic shrinkage and warping may begin as soon as a certain concentration is reached. This results from too high a concentration gradient inside and outside the wood, and is actually due not to PEG diffusion into the wood, but rather to dehydration of the wood occurring on a priority basis, similar to the phenomenon of natural drying. To preserve the shape when this happens, the PEG concentration must be temporarily lowered and then raised very slowly, and in some cases it is better to switch to the freeze-drying method described below. Care must also be taken with respect to acidity, as PEG will break down in acidic conditions even though it is a stable high-molecular compound. Organic objects are penetrated by a variety of elements while they are buried underground, and many of them are acidic when excavated. As heating accelerates PEG decomposition, the pH level of the solution must be monitored during the treatment.

broadleaved wood that is in a good state of preservation, it is sometimes advisable to remove the object from the tank when 80% concentration is reached and allow it to dry naturally.

The ease of performance and the safety and stability of the chemical make PEG impregnation a highly reliable treatment method. Yet there are some problematic aspects: the treated object takes on a darker "wet" coloring, and penetration or diffusion may be difficult due to the high average molecular weight (3300) and large molecular size of PEG. Cleaning away PEG adhering to the surface, using alcohol that has been warmed in a hot-water bath, can substantially brighten the darkened surface. Objects for which penetration is difficult have been successfully treated with a two-stage impregnation method using PEG with different molecular weights, and by adding a surfactant to the aqueous PEG solution. The two-stage treatment consists of impregnation first with a solution of PEG 400, which has a low molecular weight and will penetrate spaces the heavier chemical cannot enter, and then with a solution of PEG 4000S.

There is a risk of PEG elution from the treated artifact if it is placed in an environment where the relative humidity exceeds 85%, because PEG itself has high affinity with water. Hence it is best to store treated artifacts in a stable, low-humidity environment.

4.4.2 Sucrose Impregnation

The PEG method, although it has been used since the late 1960s and is in wide use today, has the disadvantage of requiring a long period of time for diffusion and penetration. In the 1970s the search for a faster-acting impregnation agent, focusing naturally on materials with low molecular weight, led to experiments with saccharides.

Most of the studies of saccharide impregnation have used sucrose. As its molecular weight of 342 is less than one-tenth that of PEG 4000, it penetrates and diffuses in the wood rapidly. Furthermore, it dissolves easily in water (with one part water to three parts sucrose at 15°C), which means the impregnation can be done at room temperature. The procedure for sucrose impregnation is basically the same as that for PEG impregnation.

Sucrose impregnation alone is not sufficient for the strengthening of fragile, highly deteriorated relics, because its very high boiling point of 185°C makes it impractical to achieve a liquid concentration of 100%. There has also been concern over possible damage from the occurrence of microorganisms in sucrose, or from insects that may be attracted after treatment. Progress is being made toward resolving these issues. With regard to fragile relics, good results have been obtained with smaller pieces by performing vacuum freeze drying after sucrose impregnation. With regard to organisms, isothiazoline preservatives have been shown to effectively inhibit microorganisms in low-concentration sucrose solutions, and experiments show that termites cause less damage to sucrose-impregnated wood than to untreated wood.

Sucrose impregnation is regarded as an effective treatment for large wooden relics with limited deterioration, and as an unsuitable treatment for wood that is fragile and severely deteriorated. Efforts to overcome this limitation are what led to the development and utilization of sugar alcohol, discussed next, as a treatment agent.

4.4.3 Sugar Alcohol Impregnation

To overcome problems in the preservative treatment of wooden artifacts using PEG and sucrose, and to identify an alternative material for treatment, Morgos of the Hungarian National Museum and Imazu of the Kashihara Archaeological Institute have conducted experiments with sugar alcohol impregnation since the late 1980s. Imazu's team found that lactitol was an outstanding candidate due to its effectiveness in preserving organic artifacts and its low molecular weight, resistance to rotting, stability under heat, high solubility, low hygroscopicity, limited discoloring effect and reasonable cost. After experimental treatments, lactitol was put into use for preservation.

The impregnation process for lactitol is almost the same as that for PEG. The difference is that whereas PEG melts at 60°C and thus can be added to a solution that is kept at that temperature, powdered lactitol can be added to a vessel heated to 60~80° only up to a concentration of about 70%, after which the concentration can be increased to a maximum of about 90% by means of gradual evaporation of water from the solution.

It is in the drying and hardening phases that lactitol treatment differs significantly from PEG treatment. After removing a PEG-treated artifact from the treatment solution and washing the surface with water, it is cooled in order to harden the PEG inside it, but cooling alone is not sufficient to harden the lactitol solution inside an artifact. To promote crystallization of lactitol, the surface of the object must be sprayed with lactitol powder which will serve as crystal nuclei. Also, because there are four kinds of lactitol crystals which have different coordinate numbers for water of hydration, monohydrates must be produced in sufficient quantity to ensure good crystal formation. For this purpose, after spraying the surface with lactitol monohydrate, the object is dried by keeping it at a temperature of at least 50°C.

The lactitol impregnation method has many advantages as noted above, and the treatment has been applied in a growing number of cases. Yet problems remain: sometimes the impregnation density is low, and cracking may be caused by the formation of trihydrates due to non-uniform crystallization during the drying process. Further development work is needed.

4.4.4 Alcohol-Xylene-Resin Treatment

The surface tension of water is what causes the severe shrinkage that occurs as excavated wood dries. When a solvent with lower surface tension is substituted for the water in the wood, some degree of shrinkage control is possible during drying. But wood that has undergone that substitution naturally loses strength if it is dried, and this is why the further step of resin impregnation is required. The combined process of solvent substitution and resin impregnation is known as a solvent-resin treatment.

One type of solvent-resin treatment is the alcohol-ethyl-resin method, in which the moisture is replaced with ethyl alcohol, then the ethyl alcohol is replaced with ether, followed by impregnation with a resin such as dammar. Dammar is a natural resin that is insoluble in water, but soluble in organic solvents including alcohol and ether. This treatment is rather difficult to perform because of the high flammability of ether. To overcome that limitation, a modified method was developed in which the less-volatile xylene is used instead of ether. This is the alcohol-xylene-resin treatment.

Resins used in this treatment, besides dammar, include acrylic resin.

4.4.5 Higher Alcohol Treatment

The greatest concern in the preservative treatment of excavated wood is the long time period required for chemical impregnation. One way to shorten the time required for penetration of the chemical into the excavated wood is to lower the molecular weight, i.e. the molecular size, of the chemical. Among water-soluble impregnation agents, as noted above, sucrose and sugar alcohol are the leading treatment agents. On the other hand, non-water-soluble solvents and resins may also be used, and a treatment method using higher alcohol, which has a low molecular weight, is under development.

Higher alcohol is the term used for any alcohol with more than six carbon atoms. Higher alcohols that are used for preservative treatment of excavated wooden artifacts include stearyl alcohol (molecular weight of about 242) and cetyl alcohol (molecular weight of about 270). In contrast to methyl alcohol and ethyl alcohol which mix well with water, stearyl alcohol and cetyl alcohol are insoluble in water. They will melt to liquid form when heated to about 60°C.

The procedure for treatment with higher alcohol is to first substitute methyl alcohol for the water in the wooden artifact, then immerse it in a methyl alcohol solution containing 20% higher alcohol, and gradually raise the concentration of higher alcohol.

One advantage of this method is the short amount of time required for dehydration and substitution with methyl alcohol followed by impregnation with higher alcohol. Another is that since the higher alcohol itself is not hygroscopic, there is no need to worry about elution of the chemical after treatment even if the object is placed in a humid environment.

Fatty acid ester is another non-water-soluble agent with which treatments are being performed on an experimental basis.

4.4.6 Freeze Drying

Freeze drying methods are another means of drying and stabilizing the treatment chemical. In the freeze drying treatment, after the sublimated vapor is removed, further sublimation is brought about by one of two techniques, high-vacuum freeze drying (freeze-dry lyophilization) or freeze drying at normal pressure

To enhance the efficiency of the freeze-drying treatment, a pretreatment is performed which temporarily replaces the water contained in the wooden object with tert-butyl alcohol. When the pretreatment is added, there is a definite brightening in the color of the freeze-dried wooden object. For that reason this technique is often used for preservative treatment of the narrow wooden tablets used for official records in ancient Japan.

For conifer wood in a relatively good state of preservation, PEG impregnation is not continued to the normal 100% concentration but is halted at a level between 60 and 80%, after which freeze drying is performed.

Experiments are under way in the application of high-vacuum freeze drying to very large

wooden artifacts. There are three kinds of wood that are especially difficult to treat: camphor, chestnut, and red oak. Large artifacts made from these kinds of wood tend to twist and crack in the course of a normal PEG treatment. As it is impractical to prepare a heatable treatment tank that can accommodate a very large wooden artifact, the impregnation treatment for such an object must be performed at room temperature. It has been found that such large artifacts hold their shapes remarkably well when pretreated at room temperature with a mixture of tert-butyl alcohol, water and PEG, and then dried in a large facility using the high-vacuum freeze-drying method.

4.4.7 Silicon Resin

Besides wood, organic relics found at archaeological sites may be made of such hard-to-handle, extremely fragile materials as rope or woven cloth. For some of these relics, none of the treatment methods described so far is feasible, and for others nothing can be done other than storing them in water. The above methods involve hardening of the treatment agent, which leaves the relics brittle after treatment. Therefore a method was sought that would substantially shorten the treatment time and impart a degree of softness suitable for organic relics that originally had soft textures. The result was the silicon resin treatment.

In the silicon resin treatment, first the moisture in the relic is replaced with methyl alcohol (as in the higher alcohol treatment), then the methyl alcohol is replaced with methylene chloride, and finally the relic is impregnated with a methylene chloride solution containing silicon resin, which is allowed to harden. In order to harden the silicon resin within a few days and shorten the impregnation time, this treatment is performed at low temperature with repeated compression and decompression.

Due to the properties of silicon resin, this treatment leaves the relic pliable, with low hygroscopicity. However, it must be remembered that this treatment makes any further treatment impossible, because the silicon resin goes through the chemical reaction of polymerization as it hardens.

Among the various preservative treatments that have been developed for the drying and hardening of relics, the silicon resin treatment is virtually the only one involving a chemical reaction. Finding a way to make this treatment reversible is a goal for future development.

5. Joining, Filling and Coloring

For relics that cracked or lost parts during burial or removal, joining and filling work may be performed after preservative treatment. But joining and filling should not be regarded as necessary in every case. Rather, it should be done only if a review of the need for extra work has determined that it is really necessary. While a relic is stored or displayed, its own weight may place too much stress on a new joint and cause damage to original sections as well. It must be determined beforehand that there is no chance that joining could cause damage. Consideration must also be given to the potential need for special means of storage or display, such as devising a stand to better distribute the weight. Nor is it appropriate to automatically cover up every defect, as this can sometimes lead to cracking of the surrounding sections brought on by hygroscopically induced dimensional changes.

The many kinds of bonding agents used for joining and filling can be broadly divided into thermoplastic resins, which dissolve with solvents, and thermosetting resins, which do not dissolve with solvents. Always remember that once a thermosetting resin is applied directly onto wood, it can never be removed. That situation can be avoided either by using a thermoplastic resin as the bonding agent, or by protecting the wood surface with a thin thermoplastic layer before applying the thermosetting agent. The impregnated treatment agent is also a factor, as some types will accept bonding and others will not. Advance testing should always be done. For surfaces that cannot be strongly joined, the insertion of stainless steel tenons or bamboo pins may be considered. For filling, a mixture of resin and phenol microballoons is often effective.

Coloring cannot be directly applied to a relic that has undergone preservative treatment, but it can be added to a filling material. Normally when coloring is added it is not exactly the same shade as the relic itself, but is slightly different (not enough to be jarring) to make it clear that the area has been filled in.

6. Conservation after Preservative Treatment

An organic relic that has received preservative treatment is by no means preserved forever. Over the long term, on the order of 50 or 100 years, there is likely to be some deterioration. When a relic that would survive only a few years in a waterlogged state is transferred to a dry and stable state, this will ultimately serve only to slow the pace of decay.

To suppress the decay of a relic for as long as possible, the storage and display environments must be carefully designed. The three critical factors are temperature, humidity, and light. Organic relics absorb and release moisture in response to the ambient humidity, and this is accompanied by dimensional change. In an environment where the humidity varies significantly causing repeated, frequent dimensional change, deterioration is likely to progress more easily. With relics preserved by impregnation with a highly hygroscopic treatment agent such as PEG, there is a risk of elution of the treatment agent if the relative humidity exceeds 85%. For museum materials, it is recommended that relative humidity be kept in the range of 40 to 60%. Humidity is closely connected with temperature, and even though the temperature is usually controlled by an air conditioning system, it is extremely difficult to maintain a constant temperature year round. When there is a large variation in outside temperature of about 25°C, the environment of the repository and display rooms should be designed to respond with gentle adjustments of temperature.

Ultraviolet rays cause deterioration of organic materials, and display areas in particular should be designed to eliminate them. Infrared rays, which are a factor in deterioration due to their heat, should also be eliminated. Even when ultraviolet and infrared rays are eliminated and there is exposure only to light in the visible spectrum, continual long-term exposure should be avoided. For highly sensitive objects, the Illumination Engineering Institute of Japan suggests an intensity of no more than 50 lux for eight hours per day, 300 days per year, or an annual exposure of 120,000 lux-hours.

To further stabilize organic relics that have received preservative treatment, it is necessary to provide storage and display environments with controlled humidity and temperature and minimal light impact.

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V

Participants' Final Reports

(In alphabetical order by country)

Bangladesh

Zakir Hossain CHOWDHURY

The Necessity of Conservation Training

The preservation, Conservation, and Restoration of Cultural Heritage is a highly sensitive, scientific, technical, time-consuming, and special job. It is a vast subject, based on investigations and a technical approach. Proper conservation involves proper documentation, historical records, the assessment of structural stability and the environment, and detail laboratory analysis. It is a multi-disciplinary subject that needs comprehensive study and research in relevant fields as well as internationally recognized conservation principles.

Apart from the above the world is also realizing the importance of the scientific training of Architects, technicians, related staff and others entrusted with the job of conserving and restoring cultural properties. The shortage of such scientifically trained personnel throughout the world had long been a great challenge, which has not fully been met.

Bangladesh is very rich in culture and cultural heritage. So far 355 monuments and sites including three World Heritage sites have been protected. The Department of Archaeology, Government of Bangladesh is doing its best to preserve/conserve relics of the past within limited financial and manpower resources. There is, however, a serious lack of trained conservational personals.

I am working as a conservator in the Department of Archaeology, and have been involved in the Architectural conservation and restoration of various monuments and sites of national and international repute. I am responsible for the:

1. Planning, Execution and Supervision of conservation Works.
2. Preparation of bill of quantities and Estimates of Works.
3. Preparation of contract documents, specification sheets.
4. Preparing and coordinating Architectural and Engineering Drawings, Field Survey and Documentation etc.
5. Preparation of Bills of Contractors for the Execution of Works
6. Writing of conservation notes and report of work completed.

As already stated there is an acute shortage of trained conservation personals in my country. I am involved with a lot of conservation development projects, but I feel that there was an urgent need to improve my knowledge and experience in the field of Conservation and Restoration.

It is important to note that during the conservation of monuments some complicated problems arise. It is necessary to develop the common sense and skills of the conservation staff so that they can meet such challenges.

Bangladesh is a country which has been facing serious problems during the conservation of its glorious monuments, although the Bangladesh Government is trying its best to save them from further destruction and deterioration. But like other third world countries, Bangladesh has also been suffering due to financial constraints and especially the lack of technical staff with sufficient knowledge and training about conservation methods that is necessary for the preservation of historical buildings.

I am lucky enough to have a very good chance to attend this one month Training Course on the Conservation of Wooden Structures from September 24 to October 24, 2003, at Nara Japan, offered and organized by The Cultural Heritage Protection Office - Asia Pacific Cultural Center for UNESCO (ACCU). It was a great training program comprising of lectures delivered by renowned professions from Japan and other parts of the world, on-site demonstrations, site-visits to observe historical monuments and areas. Therefore this practical training course on conservation was very helpful in enhancing my knowledge about the scientific and technical on-site conservation of monuments with special reference to wooden cultural heritage. This training program also gave me a chance share and exchange expertise and technical knowledge with conservation specialist of fifteen different countries in the Asia pacific. I also presented a lecture on the Cultural Heritage and conservation policies of Bangladesh.

Japan is among those countries which are very well equipped with the most modern techniques and knowledge regarding the restoration and conservation of cultural Assets. Japan has the latest modern, computerized techniques and tools, and is utilizing huge budgets and is also implementing strong legislative measures to regulate and control the conservation of cultural properties. By using the latest techniques, tools, and good conservation policies/strategies, Japan has enhanced the life of its innumerable Architectural monuments, but is still thriving to preserve the remaining ones. To date in my country, only traditional methods and materials are used for the conservation of monuments, but in some cases these traditional methods are insufficient, and we need modern methods to conserve the monuments well, but no such equipments or techniques are available.

This training program was really a totally different and absolutely interesting experience for me. It had been a source of inspiration. It has not only improved my knowledge but also broadened my mind in the field of Architectural conservation.

All the lectures and on-site practical training work were very fruitful and were a new experience for me. Japan has a long history with its cultural traditions and many architectural monuments. We were introduced to the cultural heritage protection system of Japan and the different responsible authorities from the Federal to Municipal levels. The system is very detailed and effective for the protection of Japanese cultural heritage. On the other hand, in my country the designation and legislation of cultural heritage is very simple, unsystematic, and ineffective compared to Japan. We also have various types of cultural properties i.e., “Tangible cultural properties” “intangible cultural properties”, “Folk-cultural properties”, “Monuments (*Kinen Butsu*)”, and groups of Historical Buildings, but we could not protect them due to economic and manpower constraints. The only cultural heritage being protected are Archaeological Monument with highest value with historical and architectural interests.

Some folk-cultural properties are exhibited in various Museums in Bangladesh. They are controlled by the Department of Archaeology, but are not protected as well as those in Japan. There is a great need to create an organizational system like that in Japan for the effective preservation of monuments and others cultural properties of mankind.

During the training program, I had a great opportunity to learn about conservation procedures and the ethics of preservation from Japanese specialists like Mr. Yamato, Mr. Shimizu, Mr. Kimura, Mr. Kohdzuma, Prof. Itoh, and guest specialists Dr. G. Wijesuriya and Mr. Myklebust. This great source of knowledge will be helpful for my future career in the practice of conservation in my country. Dr. G. Wijesuriya's lecture about wooden structural heritage for the Asia pacific region was very clear and enabled me to understand about the wooden structure and variety of wooden members used in different buildings, as well as the challenges of conservation.

In Bangladesh, timber buildings are limited but wooden parts are present in almost every monument. Different varieties of timber have been used in different buildings for different purposes, such as in beams, rafters, in the roof and ceiling, ornamental doors / windows, partitions and screen walls etc. Some of colorful wooden pagodas, temples and Khyanges (Buddhist monasteries) erected in the eastern part (hill-rang) of Bangladesh which are damaged, being destroyed or partly modernized in bad repairs by owners. It is necessary to take immediate actions for their protection and proper conservation. But our limitation in manpower, expertise on wooden conservation and also lack financial ability means we could not take action. I think this training will be helpful towards an initiative to prepare a project plan for the protection and architectural conservation of those wooden buildings.

During the lectures by conservation experts, I learned about:

- The system of project planning for the restoration of important cultural properties; the methodology of investigation for rough budget estimate and planning for execution; how to apply latest technology; careful documentation; efficient execution.
- How to start and execute the project.
- The system of dismantling and partial replacement of wooden structure.
- Design of details for the reconstruction of ancient buildings.
- Three-dimensional scanning method for structural analysis to determine the strength of a wooden building.
- Dendro-chronological method for determining the age of a wooden building.
- Opportunities from this training program:

During the participant's presentations and discussion with others experts we could exchange our knowledge and learn about different concept, and about the cultural heritage of other countries, what they are doing in the conservation field. Here I found some common problems;(i) Insufficient funding, ii) Natural disasters (iii) Salinity/acidity (iv) Humidity /dampness, (v) Pressure of tourism. Problems especially common in Bangladesh include: (i) Fragility of terracotta plaques, and (ii) Absence of local treatment facilities for surviving antiquities.

The most impressive points:

- The wooden architecture in Japan has rich ancient values, I was very happy to see the best specimen of wooden Architecture. Besides participating in the site visits and class lectures during the course, I personally visited many monuments of national and international significance in Nara, Kyoto and Osaka Prefectures. This gave me a good knowledge about the monuments, their problems and conservation.
- The Toshodai-ji was a unique example of conservation work and started with detailed survey and recording etc. The construction of scaffolding and a shelter for the whole monument (Main hall) was unbelievable for me. Moreover, during the Bentensha shrine workshop, I expanded my knowledge on how to define the degree of damages and previous restorations, and how to prepare a project plan and estimates from such practical exercises on sites. Rubbing methods are used in Bangladesh to copy inscriptions, but not to record details on other ornamental elements. In our world heritage site Paharpur vihara, a huge number of highly ornamental terracotta reflects the history of Buddhism. They are partly damaged due to dampness, water logging and other natural disasters. They should therefore be recorded for preservation for the future generation.
- I observed in details the complicated system of the bracket structure, which is the most impressive feature of Japanese wooden buildings.

My limitations:

- Lack of documentation and other records related to conservation.
- Shortage of Finance, technical Staff and skilled craftsmen
- Lack of a monitoring system during the execution of work.
- Working with only traditional conservation methods and a lack of necessary modern equipments and techniques.
- Ineffective implementation of legislation.

I had been looking for such a training program for a long time, in order to improve and enhance my knowledge about conservation ethics, procedures, and up-to-date conservation practices in developed countries like Japan. The training I received included theory, on-site practice, site visits and study tours. It was no doubt a reflection of systematic and efficient coordination. It was also a great chance for exchange between experts of the 15 countries dealing with cultural heritage protection. Due to such a well-organized course, I am now in better position to execute the conservation of cultural heritage, especially the neglected wooden heritage of my country. I congratulate the staff of ACCU Nara office for organizing such a valuable training program.

Bhutan

Nagtsho DORJI

Bhutan has a very rich architectural heritage with over two thousand temples (*lhakhangs*) and monasteries and over ten thousand stupas (*chortens*) scattered in every corner of the kingdom. Besides these religious structures, seventy percent of the houses found in Bhutan are of the traditional vernacular style. The materials employed for construction of such religious structures and houses are rammed mud, stone and timber. Out of all these materials, timber has been extensively used (mainly due to its availability) for construction of both religious structures and the traditional houses.

The main organization that is responsible for the protection and promotion of the entire cultural heritage in Bhutan is the Ministry for Home and Cultural Affairs. But as per the Government's policy of decentralization, the protection and preservation of cultural heritage in the country is also considered to be a shared responsibility between all bodies, institutions, districts (*Dzongkhags*), villages (*Geogs*), the local communities and every individual in the country.

The Division for the Conservation of Architectural Heritage under the Ministry of Home and Cultural Affairs is the central division functioning towards the inventory, appraisal, and approval along with the monitoring of all the historical and cultural monuments and sites in the country. (Note - The detail function of my Division is mentioned in the country report presented earlier during this training course).

But, to date the conservation, renovation or reconstruction of a monument or site in a district (Bhutan has twenty districts) is usually carried out when the property owner or the local community with the assistance of the local government concerned forwards a proposal to restore or preserve the structure to the Ministry for Home and Cultural Affairs for approval. The Ministry appraises and approves the project proposal as per the condition of the structure and the necessary needs of the end users. But prior to the implementation of the project, the Division also looks into having the structure / site documented by the technical authorities of the local government. In most cases, the Division provides technical assistance for assessing the conditions of the original structure, as well as for carrying out the documentation and drawing up of plans for the protection and preservation of the structure.

For almost all of the Ministry approved conservation or renovation projects, the Government provides the entire budget required to implement the project. But in cases where only minor renovation or additions to the complex is required, the Government usually provides the property owner / local community with roofing materials and timber at subsidized rate.

But lately, it has been of great concern to the Government that many of the proposals put forward by the local communities are either to reconstruct the entire monument or to renovate the structure extensively. There have been cases where an important historical or cultural religious structure has been dismantled for reconstruction without any documentation, resulting in the loss of the authentic values of the structure. The individual or owner concerned might have undertaken such actions of reconstruction with the intention of making the structure stronger and aesthetically better from their perspective. Therefore such lack of awareness and understanding of the values of the original structure in terms of history, architecture, materials, etc prevails widely among the people in my country.

Even though the Government gives utmost importance to the preservation and protection of the entire range of architectural heritage, at present no appropriate legislations or guidelines have been formulated towards the protection of such cultural heritages. Existing structures under various classifications of important cultural properties has not been identified; this, to some extent, has contributed towards the common people's lack of understanding of the importance of preservation and the protection of cultural heritage.

Furthermore, the lack of manpower in the field of conservation and limited knowledge to carry out detailed documentations has resulted in a situation where a major number of the country's cultural properties are left without any detail documentations or inventory. Therefore when unfortunate incidents of natural as well as man made disasters occur and damage these structures, we are left with no evidence of the existence of such important cultural and historical properties.

Therefore, the current scenario of the conservation of structures that are of cultural importance in Bhutan is at a very preliminary stage. As per my experience, I feel that at this stage, priority should be given in educating the public in understanding the value, need and importance of conservation activities, especially in relation to the historical / cultural monuments and sites located near them. Without such education, we have and will continue to face enormous hurdles in implementing any conservation procedures in Bhutan.

For the last few years, we have been trying to educate the public including monks (as they have a major say in many of the conservation or renovation projects concerning religious structures) on the importance of preservation and protection of the all the cultural properties in the country.

To tackle these kinds of problems, I feel, to a large extent (especially after attending this training), that to understand and learn from the solutions adopted by the Japanese in the field of conservation is necessary and very useful for any Bhutanese in this field. This is particularly due to the similarities in the kinds of construction materials and techniques between Japan and Bhutan. For example, the traditional houses of Bhutan are mainly constructed in the wattle and daub (bamboo matt with mud / clay plaster walls) style, which are very similar to the traditional houses found in Japan. The religious structures in Bhutan are also built in a similar style adopted in Japan, where in both cases we find huge timber columns along with the extensive use of timber as structural and decorative elements. The traditional tools and ways in which they are used (as observed at the Nara Palace and the Toshodai-ji Main Hall reconstruction site) are also very similar to ones that we employ in Bhutan. The variety of conifer timber used in Japan is very similar to the ones that have been and are still being used in almost all the restoration and reconstruction sites in Bhutan. Due to the similarities between Bhutan and Japan when it comes to architectural structures, construction materials and techniques employed, this particular training on wood conservation was very important to me as well as to any conservationist from my country.

The whole concept or the process of conservation in Bhutan, as mentioned earlier, is in its preliminary stage. But the fact that Japan has well established methods, techniques and knowledge of timber conservation as well as the protection of cultural property makes it very important for a Bhutanese involved in conservation activities to learn, understand and make use of such valuable knowledge in Bhutan.

Thus during this one month in Japan, each and every day has been a new learning experience for me. This training course has provided me with invaluable information and experiences that will be very useful in my day-to-day work of trying to achieve the best techniques and methods of conserving the cultural heritage structures of my country. Hopefully, I should be able to initiate and implement the numerous techniques and methods that will be suitable to Bhutan's situation in the conservation scenario.

The following is a summary of the information and practices that I have had the opportunity to learn, understand and experience in this training and which are applicable to the current situation of conservation of structures in my country:

1. The Japanese's techniques and methods of conservation, restoration and preservation of wooden structures of historical and cultural importance.
2. Policies and laws in relation to the protection of cultural properties.
3. Various methods of conserving, renovating and reconstructing a structure or an archeological site of historical and cultural importance.
4. The process in which the conservation as well as the reconstruction of a heritage structure is undertaken with the maximum reuse of original materials (mainly timber) and the technique to carry out the use of new materials with the old one, with minimum alterations.
5. Ways of assessing the degree of deterioration of a structure and to look out for details that would reflect the stages of renovation undertaken over the years.
6. Ways of achieving a precise method of documenting the minute details of structures.
7. Ways of keeping alive the traditional techniques of construction.
8. The extent to which the vernacular houses could still be used as living architecture with minimum alteration to the interior which are required to meet the current needs and situation of the users.
9. Ways of involving the local communities to take active part in keeping the structure in its original form as much as possible.
10. Researching the history and culture associated with an archeological site and the ways of presenting it for the understanding of the public.

From such ideal policies and techniques of conservation found in Japan, the one that we (Division for the Conservation of Architectural Heritage) would like to learn more about and try to adopt are the ways in which the concerned authorities in Japan educate and bringing about full awareness of the importance of the preservation and protection of cultural properties among the people. The extent to which local involvement has been achieved is very commendable. In Japan the media plays an important role in educating the public; we would like to educate the Bhutanese public in a similar manner, except at a smaller scale as per the extent of media coverage. I feel that one of the best ways would be to show the Bhutanese, through photos and videos, the effort hat the people of Japan are making to preserve their structures in their original condition, even though they are a modern nation and can choose to use modern materials and construction techniques.

As mentioned earlier, at present Bhutan has no appropriate legislations or guidelines for the protection of cultural heritage properties. But as we progress with our conservation activities, we definitely need to formulate such to avoid the misunderstandings, confusion and disorganization that we have been facing. Therefore, the Japanese laws and policies, which were shared with us during this training, would be one of the ideal references for us in drawing up legislations for conservation as well as for the protection of cultural properties in Bhutan.

The Division for the Conservation of Architectural Heritage will be organizing its annual conservation workshop, tentatively scheduled in April 2004, for all technical staffs concerned in the field of conservation in Bhutan. I would like to share all the information and techniques related to the conservation of cultural heritage in general and particularly in terms of wooden structures that I acquired from this training, to all the participants of the workshop. If possible, with the help of a few Japanese experts, we would like to introduce the Japanese method of detail documentations and the various measures required to assess the conditions of timber structures.

There are many other ideas and techniques learnt from this training course that could possibly be applied to solve the numerous conservation problems currently being faced in Bhutan. There is no doubt that all the knowledge and experience that I have learnt from this training course will help me tackle difficult situations and problems more confidently during the process of the planning and implementing any conservation projects in my country.

This training course has also given me extra zeal to work harder towards the preservation and protection of cultural heritage of Bhutan, which I believe has given every Bhutanese a rich cultural identity that they can be proud of.

Lastly, I would like to express my appreciation to the Cultural Heritage Protection Cooperation Office, Asia/Pacific Culture Centre for UNESCO (ACCU) for organizing this training course, which is a brilliant platform to receive valuable information and experiences that will be of tremendous help for our work towards the preservation and protection of global cultural heritage.

Cambodia

Sophorn KIM

One People, one Culture, one Power
Humankind has developed a variety of cultures and here also.
There are many nations in our planet, the Earth.
The earth has fostered magnificent nature.
Cultural and natural heritage raises questions about human existence and universal values
common to all humanities can be found out within.

I. Introduction

In the first instance, I would like to express my profound thanks to the government of Japan and the Cultural Heritage Protection Cooperation Office, Asia / Pacific Cultural Center for UNESCO (ACCU at Nara) which organized this training program. I thank ACCU for inviting me to participate in the training course. Without this training, all of us could not gather in Japan, which is abound with cultural heritage.

I am very glad to have the opportunity to attend this training course. It is my great honor and pleasure to be here. I highly appreciated this important training course because it allows me to gain new knowledge and good experiences and visit the various Cultural Heritage Sites in Japan.

II. Difficulties

The kingdom of Cambodia is one of the oldest Southeast Asian countries and one of the richest countries in terms of cultural heritage. Due to the age of the monuments, traditional houses and colonial houses are under natural deterioration so restoration and conservation works are necessary, especially in the Battambang Province where I have been working. We do not have particular laws and regulations for the protection of cultural property yet. Other challenges in my work include the lack of human resources, specialist staff, and financial resources to support cultural heritage protection activities. It is also difficult for us to convince the higher authorities and the public with words that will make them understand the value of the cultural heritage of our nation. There is also a lack of monitoring and supervision of cultural heritage protection activities in isolated and distant areas. Besides this, recently, religious groups have demanded and constructed a new building on an archaeological site. I think there are complicated problems in my work, we have to find solutions for the development and processing of cultural heritage protection activities.

III. Attractive things of this Training Course

There were many interesting points in this training course, such as the methods and modern techniques for the conservation of wooden structures, protection from natural disasters, fire prevention, the study of living trees in order to understand tree growth, particularly ring growth. Field studies, observation tours to cultural sites and open air Museums allowed me to see things that I have learned in the lectures. I have also learned about the water distribution system installed at the districts of traditional houses or at

temples automatically start in the case of an unexpected fire, and about communication skills needed for discussions with related people such as owners and so on. The cultural heritage protection laws in Japan are clear, detailed, respected and practiced. On the other hand, if an owner demolishes his old traditional house, from the local community might object - this is a way to discourage the other owners.

IV. Benefits from this Training Course

In this brief report I would like to inform you of what I have learned during the training course.

This training program not only gave me an opportunity to exchange views with the participants from different countries, but also to exchange information from local citizens' groups who are involved in the protection of cultural and natural properties. The lectures were very important because during that time, we can gain understanding from pictures, examples, and so on besides documents. During this training course I have learnt many things about the Japanese culture, history and traditions. The lectures had been given by Japanese specialists and teachers from different organizations and were held at the ACCU Nara office, Nara Palace Site, Toshodai-ji temple site, etc…

Theory is a key that allows us to carry out our aim; it allows us to understand the starting point of our work. So before we start practical work we have to learn the theory about the subject, listen to the lectures of teachers, and then try to put them into practice on site. I have learned the theories about the conservation and restoration of wooden structures, and also, I have learned from the Japanese specialists about their very good experiences on the conservation and restoration of wooden structures of traditional buildings in Japan. Throughout the lectures we also have learned from the other participants. I have gained good information about the conservation and restoration of traditional buildings and monuments in many countries from the participants' presentations. I think that the different kinds of restoration methods for wooden structures in Japan such as using traditional methods and traditional techniques are very good practices.

V. Results of this Training Course

When I saw the old wooden structures in Japan, which date back to many hundreds years ago but are well preserved until the present, I was very surprised. I observed the structures of traditional buildings, wooden statues, and so on. At first, I couldn't really understand how these old structures could survive from ancient times until now, but the onsite lectures made everything clear. Traditional tools, techniques, materials, and Japanese daily life with their traditional houses, are all very similar to those in Cambodia. I will bring back the methods, laws, techniques, etc…that I've learned here and try to use them in Cambodia, particularly in Battambang province where I work.

VI. Conclusion

I would like to inform you here that this training program is very important for me and other participants from different countries. I could gain a lot of understanding from lectures by experts from different fields, trips to the Cultural Heritage sites of Japan, and from the country report presentations of participants from different countries.

China

ZHU Yu-Hua　朱宇華

Some Impressions and Thoughts

As the Training Course on the Conservation of Wooden Structures in Asia and the Pacific 2003 is nearing its completion, I feel that I have gained a lot from it over the past four weeks. I've learnt many things that I will share with my colleagues on my return to China. Here I would like to talk a about my thoughts of this training course.

Part 1:　Impressions

Impressions on the wooden structural buildings of Japan

Before I came to Japan, I have known that many magnificent ancient buildings of Japan are kept in good condition, some of which are also famous in China, such as the Toshodaiji Temple, Horyuji Temple etc. Compared with the wooden structures that still exist in China, these temples have a relatively longer history and display very traditional techniques of construction. I shall never forget my surprise when I first visited the Todai-ji Temple in Nara Park. I noticed that this huge building was supported only by a simple structure – it represented a structural technique that have disappeared or had been abandoned in China a long time ago. I could hardly believe that this type of building with such simple structures has been saved to the present without much changes, even in a nation with many earthquakes. During this training course, I discovered the reasons as I learnt about the methods of conservation in Japan.

As a matter of fact, wooden structures are too fragile to be preserved for a long time, which is due to the nature of wood. Historically, the structures of Japanese building have evolved in a different way to those of China. It is clear that while the Japanese had focused on the preservation of original methods of construction, the Chinese tended to constantly develop and change the status quo. As a result of such trends, most of the ancient buildings existing in Japan at present have many added reinforcements hidden in the roof area, while the appearance of the building and visible parts of the structure is kept to the original. Those later structural additions have now become an important part of the history of building and can be viewed as reflecting an integral part of Japan's traditional culture. Such development without giving up tradition is a remarkable feature of the Japanese culture, which can be seen in the evolution of the Japanese wooden structures.

It is commonly believed that China, Japan and Korea have similar cultures, especially in regards to the architectural styles of palaces and Buddhist temples. But we should not ignore that the indigenous building types in Japan are very unique and fascinating, such as the thatched houses in the villages of Shirakawa-go which we visited during the training course. Those Gassho-Style farm houses have a special appearance, and reflect the unique traditions and lifestyles of the local people. I was extremely impressed when I was walking in the village. This kind of building is considered one of the Japanese wooden structure types, which should be studied and protected together with the famous temples and palaces. This reflects that much investigations and studies have been done for the conservation of wooden structures in Japan.

Impressions on the system of conservation in Japan

The system of conservation of historic monument in Japan integrates national laws, research institutes, related policies, and staff on conservation and so on, such a type of system has not yet been established in most counties in Asia. After reading the lecture note 'History of the protection and the concept on Cultural Properties in Japan'1, I have come to a clear understanding that the Japanese has undergone a long history to develop such an integrated system. The corporation of the public on the conservation of cultural properties is based on the enactment of related laws and the popularization of the importance of cultural properties that is a result of the continual effort of the Government. In fact, public cooperation is essential for the establishment of a successful system of conservation. But there is still a long way to go for most of the developing counties in Asia in this direction.

Some of basic ideas about the Japanese system of conservation that I would like to share are as follows:

1. The enactment of related laws is the key to protect historic monuments efficiently, which is only possible with an appreciation of the values of historic buildings and sites.
2. A good classification system for various historic remains is the basis for their protection. An important feature in the Japanese conservational system is that they often emphasize the concept of 'culture' in their documents, rather than the international common concept of 'monument'. They give equal consideration to both tangible and intangible cultural heritage.
3. As mentioned above, the development of the Japanese system of protecting historic heritages is based on the cultural and spiritual needs of the people, but it is a little difficult for the west or other nations to understand this concept totally. Maybe in a sense the Japanese themselves can't definite what exactly is culture, which is a difficulty faced when introducing their heritage to the World.

Impressions on the methods of conservation in Japan

Everyone believes that the Japanese like to pursue perfection in their conservation work after visiting their factories or work-sites. The methods for conservation taken by the Japanese involve many different sectors of society and various traditional and modern techniques. It is too expensive for most other countries to adopt. For example, when we visited the Heijo Palace Site (Nara), the reconstruction of the Imperial Audience Hall gave us a strong impression. They built a large shed to cover the entire site, and the Hall is then reconstructed inside for several years. It was explained that the reconstruction can be seen as an equal-scale model. Even though it has no historic value, they can gain experience in the process of the project and get lot of knowledge about the past. These justifications sound reasonable to most people, but they are still being debated by experts who are engaged in the conservation field.

[1] Dr. Saito Hidetoshi, History of the protection and the concept on Cultural Properties in Japan,

One thing to be mentioned is that the Japanese experts have a good grasp of the international guidelines for conservation. They also apply the important knowledge accumulated by the Europeans to their own practice of conservation. The methods of conservation applied in Japan embody a respect for original materials and traditional crafts. They differentiate strictly the original and repair works without regard to financial expenses; such a methodology would be admired and respected by any person who has visited these Japanese buildings. There is in fact a combination of traditional crafts and modern industrial techniques in the Japanese's conservation methodologies. For example, they built a large modern workshop to shelter the whole ancient temple during a restoration project, and investigated all parts of the temple with many kinds of advanced modern equipments to determine the treatments to apply. However, craftsmen repair the wooden members with traditional tools … sometimes I wonder how they will reassemble the repaired structure, with the old chain wheel system or with a crane? Is this kind of mixed method on conservation ideal? In the end, I was aware that I have learned a lot in Japan during this training course, while at the same time many new questions have been generated in my mind.

Part 2: Thoughts

This was my first experience in traveling abroad; it has also been my first opportunity to meet many friends from various countries. It was an amazing experience for me to learn about various cultures, which caused me to think a lot about my own country China, the world, and cultural diversity.

Thoughts on the wooden structures in China

Having talked with the participants from different countries, I recognized for the first time that China is a very special nation. It has a long history yet is still so young and full of energy. It has a great deal of historical documents, stories, legends but a lack of the real historic monuments. The oldest existing structure in China dates back to the Tang Dynasty, while most of the existing ancient buildings belong to the period of Ming Dynasty and Qing Dynasty. When I studied about the history of Chinese Architecture at university, there was an evident focus on the evolution of the Chinese wooden structure. We have defined all kinds of architectural styles according to their historic periods, starting from the Han Dynasty up to the Qing Dynasty. As a matter of fact, Chinese people tend to pay more attention to the historic events associated with a building rather than the historic value of the building itself. In history, many temples were rebuilt repeatedly because of war, fire, and so on. To rebuild a temple was considered a way of promoting one's virtues. Preserving the name of the temple was prioritized, while traditional methods of construction have never been viewed as important. The evolution of Chinese wooden structures was thus influenced. This tradition of repairing temples implies the gradual loss of original crafts, therefore, even Chinese experts who want to see examples of buildings of the Tang Dynasty would come to Japan nowadays.

China has many kinds of wooden structures that include not only the famous temples and palaces but also the folk architecture. There are many different forms of indigenous architecture in China because of her regional and climatic diversity. Some of these indigenous buildings probably have not yet been discovered or researched. The range of wooden structures in China is therefore huge, and has not been surveyed completely. In other words, studies on the history of Chinese ancient architecture are ongoing. The wooden structural system has passed a long history of changes and is therefore a complicated and dynamic area for us to research.

Thoughts on conservation practices in China

As far as Chinese conservation is concerned, it is a little difficult for me to compare the situation in China to that in Japan. China is the biggest developing country in the world while Japan has developed into a modern country for a long time. Even though there are many similarities between the two nations, especially in history, culture and traditional buildings, it is evident that the current situation in China is very different to that in Japan.

The enterprise of Japanese conservation is depended on the enactment of the national laws and the promotion of public consciousness for preservation along with economic development, which has already gone a long way since the Meiji period in 1868. However, in the past 100 years from 1840~1949, parts of China has been under the control of various western colonial powers and been engaged in numerous wars, including the revolution to overthrow the Qing Dynasty, the Opium War , the second World War, and the following civil war. After a century of conflicts, today's China still maintains an independent cultural body, which is still developing along with the forces and influences of the modern times. Nobody can predict what China will be like in the future. When I visited Japan on this course, I really admired the achievements of the Japanese and thought a lot about China. I think that some parts of the Japanese conservational system can be applied in the development of Chinese conservation work.

On the other hand, from this training course I also felt the dilemma faced by Japanese conservationists at present about authenticity. As a matter of fact, the cultural traditions are very similar in many aspects between China and Japan. It is not difficult for me to understand the Japanese mentality in regards to heritage protection. The Japanese care about the spiritual content of a building as well as the physical part. They respect the authenticity of the human activities around the building as well as the originality of those materials in the building, but sometimes these two parts are in conflict. Let's take the Japanese shrine as an example, if you accept the religious tradition of rebuilding a new shrine every 20 years, it must mean you have to give up part of the authentic value of the original construction. There are also many similar puzzles in China. I noticed that the Nara Document in 1994 explained about cultural diversity and accepted spiritual values in traditions as one kind of authentic value. This is a successful beginning for advocating the continuation of the traditional spirit of Asian countries. I believe that there could be a good cooperation between China and Japan on the effort of introducing the Oriental cultural spirit to the west in the future.

Conclusion:

I am grateful to have this opportunity to learn about Japanese culture and wooden structure. I feel fortunate to have met many friends from different countries. They have been very kind and friendly to me.

Lastly, many thanks to the ACCU staff for organizing this course. We could image their hard work in the background during this busy month.

Indonesia

Fitra ARDA

Introduction:

Indonesia is very rich in cultural heritage because she has a long history of several thousand years. In addition, Indonesia consists of many kinds of tribes. Each tribe has its unique customs that are different from others. One of those differences can be seen in how they built their custom houses (public buildings) and dwellings. Each tribe has its own building style, which is unique in shape, size, or interior design.

Since the early 1900's, a lot of research and investigation into cultural heritage in Indonesia have been conducted. Generally, cultural heritage came from various periods, such as the prehistory, classic, colonial, and postcolonial periods. The government of Indonesia has continued to support the protection of the cultural heritage. Since 1992, the government has been protecting all cultural heritage under The Republic of Indonesia Law No.5 / 1992 regarding cultural heritage.

As we know, the cultural heritage of Indonesia consists of various forms and materials such as megalithic buildings, temples, shrines, palaces, traditional houses, mosque, churches, historic buildings, and so on. These buildings use materials like stone, brick, wood, bamboo, and others.

My office, the Office of Protection on Heritage of Banten, West Java, DKI Jakarta, and the Lampung providences, manages various cultural heritage, including timber building such as mosques, churches, historic buildings, custom houses, and traditional houses. This year, one of our projects is the restoration of some traditional houses of Pesagi such as those that I have described in my country report.

Receiving an invitation to this training course on the conservation of wooden structure in Asia Pacific by ACCU is very important to my country, especially to my office. Besides learning about the cultural heritage protection system in Japan, the knowledge and science developed here can be used and applied in our project for the protection and restoration of cultural heritage, especially in Bantan, Lampung and Pesagi Provinces.

Problems on the protection of cultural heritage:

Generally, the protection of cultural heritage in our country is confronted with the choice between the protection of cultural heritage and modern development. The lack of experts has caused many cultural heritages to degrade in their physical conditions. Other than that, destruction has also been caused by developments and modernization. The development of areas for economic purposes has led to changes to many cultural heritage sites due to new constructions. Supervision and protection under certain governmental legislation are not sufficient enough to ensure the protection of cultural from destruction and degradation.

The conservation and protection of cultural heritage such as archaeological and historical buildings, especially buildings made of wood involve several problems in the approach and technique. Besides that, there is the lack of experts and the person who is involved in conservation and restoration of cultural

heritage often lack sufficient knowledge. My office lacks technical workers, surveyors, and architects with experience and clear ideas about the conservation and restoration of wooden structures.

In my country, we have difficulties in finding wood material that is the same as the original one, especially in its species and size. Because trees are being felled at random in forests for the sake of certain community's business and trade, there is a scarcity of palm fiber for roofs. It is hard to find because it is not sold in West Lampung anymore. Moreover, the plants that produce palm fiber don't grow in the forests there. It is very difficult to maintain the four values of authenticity, namely material, form and size, design, and workmanship.

The most serious problem in my country now is the scarcity of traditional carpenters who have skills in making and restoring traditional buildings. That condition has also been caused by the government not giving enough attention to the protection of intangible culture, especially traditional techniques or workmanship. Also people no longer build their houses from wood because it costs a lot of money. Besides, traditional houses are considered out of trend.

Relevance of this training to Indonesia:

The training program was very important and relevant to me because it provided me wide knowledge particularly about conservation and the restoration of wooden structures. I have learned about philosophy of conservation of cultural heritage, and had valuable experiences in practical training as well as visited many important cultural heritage sites in Japan. Experiences during the training program gave me a lot of knowledge that I can apply to the many problems in conserving cultural heritage and important cultural properties in my country.

From this training, I understood the procedures of conserving and restoring wooden structures, such as survey and research, structural analysis, identifying the species of wooden members, dendro-chronological investigation, excavation, preparation of working drawings, rubbings, management of conservation work, and so on.

In this training program, I learned about the relationship between conservation experts and traditional workers such as carpenters. Also, I understand the importance of using documents from earlier conservation projects for the protection of cultural properties. Beside that, I was very impressed with the conservation efforts by the Japanese Government. Good management and relationship between the national government, local government, and the owners in conservation is important in cultural heritage protection. I observed that this relationship is more developed here and can be applied in my country also. The awareness of the Japanese people in cultural heritage protection is very impressive. I was also impressed when I visited the Nara Prefectural Museum of Folklore with Prof. Ueno, because vernacular houses in Japan have many similarities in construction with traditional houses in my country. This similarity has helped me to find the solutions for some of the problems in the conservation and restoration of traditional houses in my country. As we know, Indonesia is located in a tropical region which has high rainfall, causing buildings made of wood to quickly decay and be destroyed.

Most of the knowledge I have gained here during the training will be applied in my country, especially to my duty areas. Next year, my office is conducting a restoration project in the Lampung Province. The building is made of wood and has many similarities with the vernacular houses in Japan. I

will apply the knowledge in practice to that project. In addition, I will transfer the knowledge to co-workers in my office.

In my office I have duties in research, planning, investigation, and compiling inventories on cultural heritage such as archaeological buildings, historical buildings, traditional houses, and others. All the knowledge that I gained during the training course will be used in this work.

Although our country currently lacks funds for the conservation and restoration of cultural heritage, preservation effort must be continued. The philosophy of conservation of cultural heritage that I learned from the lectures of Dr. Myklebust and Dr. Wijesuriya will guide me in the future.

Conclusion:

The training course on the conservation of wooden structures in Asia and the Pacific 2003 has been very productive for learning about the principles and practices of conservation and protection of cultural heritage, especially wooden structures. The programme was significant and relevant to the current practices in my country, especially in my office. During this training, I have learned about the management of cultural heritage in Japan, the concept of cultural properties and the designation system for their protection, how the preservation and protection of cultural heritage is done in Japan, the conservation and restoration of cultural and historical buildings in Japan, and the traditional techniques of carpentry work in Japan. All participants not only gained theoritical knowledge on cultural heritage, but have also gained practical experiences and visited sites under guidance of many experts in the conservation field.

If I compare the conservation situation in Japan with my country, I think Japan is in a better position. Due to this, we must learn about the conservation of cultural heritage, especially wooden structures from Japan. I was very interested about the close relationship between the National Government, local government, and the owner. That condition can also be developed in Indonesia.

Lastly, I wish that in next year’s program, Indonesia will also have a chance to send a participant on this training course.

Kazakhstan

Yelena YATSENKO

I work in the State Institute for the Scientific Research and Planning on Monuments of Material Culture (NIPI PMK). The main kinds of activity of our Institute include the following:

- Revelation and registration of architectural and historical monuments, drawing up of registration documents (Passports of monuments),
- Compilation of the Full List (Cadastre) of immovable monuments for Kazakhstan,
- Scientific research and elaboration of techniques for various kinds of structure and materials,
- Preparing recommendations for the modern utilization of architectural and historical monuments and archaeological sites,
- Determination of buffer zones for monuments and zones for historic buildings, where new construction must be limited (Zones of limited construction),
- Conduct projects for the regeneration of districts of historic buildings,
- Plan projects for the restoration, conservation and utilization of architectural monuments and historical buildings, and supervise their progress,
- Determine management-plans and actions for the protection of the monuments and archaeological sites,
- Prepare projects for the planning and provision of facilities for monumental complexes and archaeological sites.

Experts of our Institute take part in the process of elaborating and correcting the laws in the domain of the protection of cultural properties. They also take part in the commissions for appreciation of importance degree of monuments.

The main part of my work in the Institute includes surveying the physical conditions of monuments and preparing recommendations for urgent works. I also do research on the history of monuments, record their present conditions and damages and estimate their authentic values. Since 2002 I've been working in the Division for Scientific Research and Conservation of Archaeological Sites in our Institute and have taken part in the UNESCO/Norwegian Trust Fund project on the Management and Preservation of the Tamgaly Petroglyph site. Nowadays my role is to elaborate on the database for the petroglyphs of Central Asia.

There was an economic crisis between 1992-1996 and an economic depression followed in 1996-2000 in my country, so there are many problems in our work. The main difficulty is the catastrophic deficiency of qualified specialists and personnel turnover. The lack of specialists in the field of conservation, restoration and protection of cultural properties is due to 2 main reasons:

1. Absence of a special base for training in the educational system of our country,
2. Low salary. Many young architects would like to work in the Institute, but after working during some year they are resigning because the level of salary is 2-3 times less than in a modern architectural office. It is a great pity although they could obtain valuable experience in our work.

Participation in this training course was very important for me for many reasons:

1. There are a good number of wooden monuments of different types in Kazakhstan. Traditional buildings feature wooden parts in the South of the country, wooden houses and churches have been constructed as a result of Russian architectural influence, and there are excavated wooden artifacts as well. At the same time there is a complete lack of experience for the restoration of wooden structures and the conservation of wood. It is extremely important for us to receive knowledge in this field.
2. It's very interesting for me to know about the experience of other countries in the field of cultural properties protection, especially legislative issues, the structures of organizations that are responsible for preservation activities and ways of financing such activities.
3. Such kind of training enables common discussion and the sharing of experience in our restoration practice. It stimulates participants to carry out further work at the completion of the training.
4. I have developed an admiration for the Japanese culture and traditions of Japanese architecture during my studies at the various institutes. The possibility to see all things by my own eyes was a special experience for me.

My expectations were fully met. Many things gave me deep impressions. I was especially impressed by Japan's policies on the protection of cultural properties. The fact that the development of legislations for the protection of cultural properties has a history of more than 100 years is an important fact by itself. Methodological procedures and a thorough inclusion of all kinds of cultural properties in Japan's Law for the Protection of Cultural Properties caused me to have a new, critical look at the legislation of my country. In my opinion, the most important thing is of the definition of cultural properties, which include not only monuments of material culture but also traditions and natural features. For me the presence of such terms as "intangible cultural properties", "Places of Scenic Beauty" in the law is evidence that this Law has profound humanitarian characteristics.

I knew a little about the Japanese traditional system of restoring wooden buildings, but being able to see it with my own eyes left me with sharp impressions, especially the very careful treatment of original materials during the whole process of restoration. We gained an experience of some of this process during the practical training at Toshodai-ji Temple. In one of the activities, we made proposals for the restoration of the Bentensha Shrine. All of our restorations were more radical than that of our lecturer, Mr. Kimura. One more thing that left me with sharp impressions was the thorough and methodological recording of the restoration process in the "Final Report of Restoration Work". Unfortunately this very important study of a

restoration / conservation project is often absent or not well made in my country. The methods of recording are not well developed and often there is no finance allocation for this kind of recording. Meanwhile any restoration or conservation works cannot be considered as finished without such proper documentation.

Surely I will try to apply the knowledge that I received from this training course in my own work. Firstly, I will promote the making of obligatory restoration records for all restoration, conservation and utilization projects. I will also share the knowledge and impressions that I gained during the program with my colleagues, especially in the area of the conservation of excavated wood. Specialists from the Scientific Research and Experimental Laboratory of our Institute will be very interested in learning the techniques, which were given in the lecture of Mr. Kohdzuma. The principles of the preservation, restoration and utilization of historic building districts are extremely interesting for us. The general approach to the restoration and various stages of the work may also be good examples for specialists in my country. Experience of reconstructing monuments (Nara Palace) and historic buildings (Ichijodani) at archaeological sites will be a key topic for discussion among our architects and archaeologists. Besides during on-site lectures I attentively studied the planning within the territory of monuments and complexes, such as the organization of tourist's routes, provision of information and the planning of facilities for tourists. This was done at a high level and very tactfully. In my Institute we are planning a project for the preservation of an archaeological site Tamgaly near Almaty. About 10,000 petroglyphs dating from the Bronze Age are concentrated at this site, so it's very important for me to acquaint with the experience of planning for preserving historic territories.

As for restoration projects, I don't think works of such huge scale as that in Japan are possible now in my country. But there are many aspects which I will try to propagate, especially the careful attitude for original materials.

The training-course as a whole covered a wide area and all aspects in the conservation of wooden structures and related problems in cultural properties protection. The practical course and on-site lectures illustrate the theoretical lectures excellently. There is only one thing I would like to know in addition, and that is in relation to the monitoring of monuments and archaeological artifacts to which restoration have been completed some years ago (10 and more), especially where modern artificial and chemical materials have been used. Also, I would like to know what do Hinoki cypress, Umbrella pine, and Japanese cedar etc. look like? Unfortunately I couldn't understand this by photos only.

The organization of the training course in a whole was splendid. The materials and equipments provided to the participants were more than sufficient. This training course itself can be a model for the organization of such kind of programs. I highly appreciate the work of the ACCU staff during this training course, and I am sure that it will have a real impact on the activities of its participants.

Kyrgyzstan

Arabidin KALANDAROV

Cultural Properties of the Kyrgyz Republic

Knowledge gained from the training program

During this training course, I had an opportunity to view historical wooden structures of Japan and to study modern methods of restoration and conservation activities. I was very much impressed with the Historic Villages of Shirakawa-go and Gokayama. There, the protected cultural property is composed of a set of three historic villages, Ogimachi, Ainokura and Suganuma, which are located in scattered sites in the Shirakawa-go and Gokayama areas, and are surrounded by steep mountains of the Chubu Region in central Japan.

I am also very much impressed by activities in the preservation districts, such as the organization of associations of local residents that regularly conduct lectures to help promote an understanding of the history and culture of the area as well as workshops to study traditional techniques or crafts. I had also a good opportunity to discuss with my other colleagues in the Asia-Pacific region the common problems involved in cultural heritage conservation.

Application of the gained knowledge in Kyrgyzstan

- The protection of selected conservation techniques; recording these techniques and training people to inherit these skills.
- Research on new restoration methods using synthetic materials
- Disaster prevention measures such as fire prevention, reinforcement of structures against earthquake, periodical disaster prevention trainings
- Dendro-chronological dating method in the field of cultural property protection
- Organization of an administrative structure that involves the active participation of the national and local governments, independent institutions and professionals, and residents and owners.
- Project development and implementation that combines both traditional techniques and high technology

I will share my deepened knowledge with my colleagues, cultural property owners, cultural property authorities of my country and students of the faculty of Restoration and Conservation of Cultural Heritage, Kyrgyz State University of Contraction, Transportation and Architecture (KSUCTA).

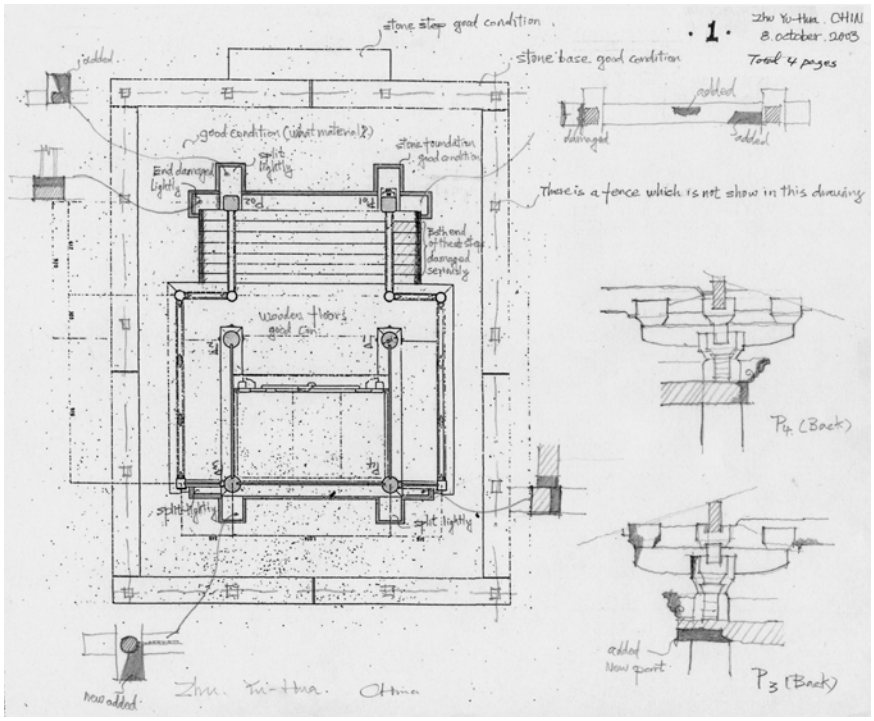
Conclusion

In conclusion I can say that this training program was very useful for me and also I believe that for all participants as well. The experience that I have gained during this training program is in most cases applicable in my country.

Acknowledgment

The Government of Japan is making a great contribution to the promotion of cultural heritage protection in the Asia-Pacific region by conducting such kind of training programs for officials in charge of cultural heritage. In such programs, they may enhance their knowledge on the conservation and restoration of cultural properties.

I am sincerely grateful to the Government of Japan and ACCU Nara Office for inviting me to Japan and providing me with this training course. I believe that in the future all participants of this training course will continue to communicate with each other and share their experience for the benefit of promoting cultural heritage protection in their respective countries.



Conservation plans prepared during the Bentensha Workshop at Toshodaiji Temple, Nara. By Yuhua ZHU, China.

Mongolia

Luvsanjalbuu MUNKHZUL

All participants might have come here because they would like to learn about the Japanese conservation and preservation techniques for wooden architecture and to become aware of the application of high technology in current practices.

We found the training course helpful in allowing us to share information about other countries' traditional and modern conservation systems, and how they use a variety of technologies for the conservation of all types of buildings or constructions wholly and partially in wood.

The training course included classroom and onsite lectures, and onsite practices as well which acquainted the participants with facts about the conservation of Japanese wooden architecture. It also gave us a chance to discuss our ideas about the diversity of regional wooden structures as well as the customs, believes, spiritual development and aesthetic thinking of different people and different nationalities. Even though the origins of wooden architecture go back to very ancient times in countries in the Asia Pacific region, their survival and current conservation practices are influenced by different circumstances. In this case, we can identify the necessity of establishing conservation standards for cultural properties including building structures as a top challenge in all countries. The last two training courses on the conservation of wooden structures in Asia and the Pacific were pioneering instruments, which enabled the participants to understand about the current practices of wooden structures in the region. It has been shaping the discussion of all regional studies into the problems involved in the conservation of wooden structures.

Conservation work attempts to involve all related practices or sciences as seen in the practices of Japanese and other countries. This encourages multilateral co-operation and sharing of information.

In my country, there is a set of laws on the protection of cultural properties and some of them were passed under the ratification of international legislations including the 1954 Hague Convention, the 1970 UNESCO convention on the Means of Prohibiting and Preventing the Illicit Importation, Exportation and transfer of Ownership of Cultural Properties and the 1972 convention concerning the Protection of World Cultural and natural Heritage. But we have no sufficient managerial coordination system to ensure the good protection of wooden architecture.

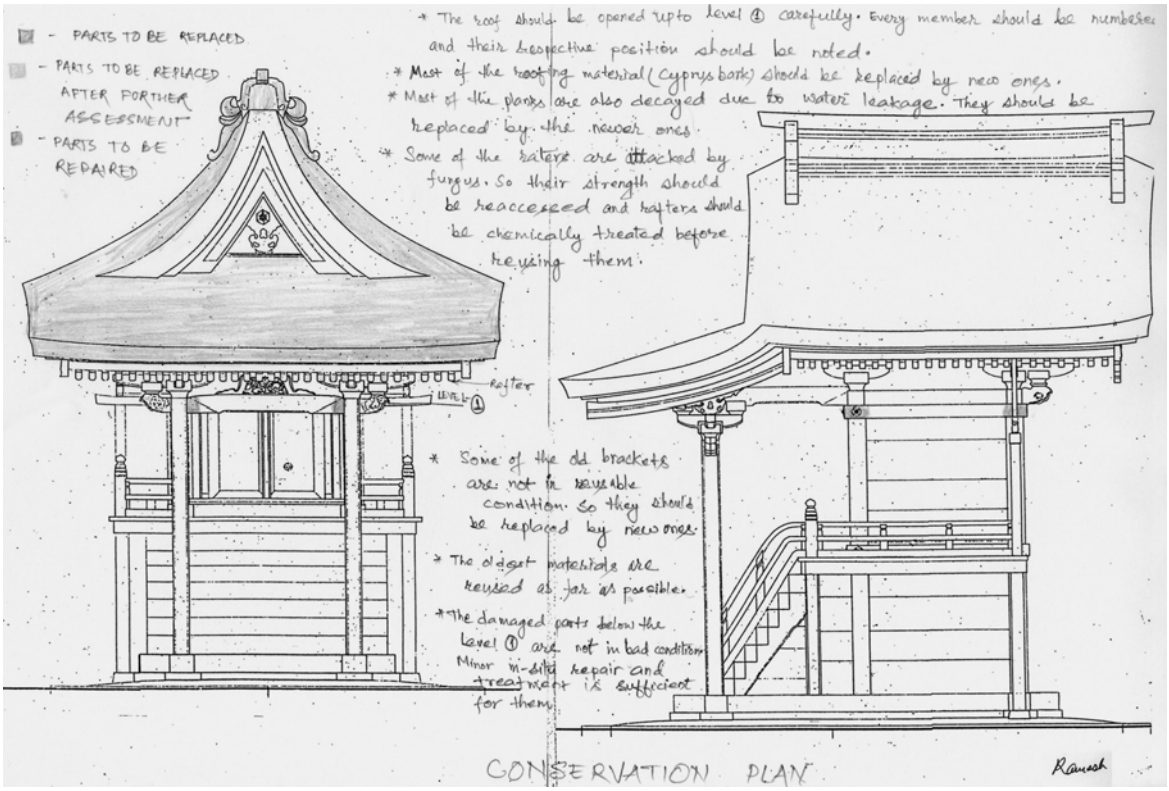
For a long time there has been a gap between what is stated in policy papers regarding the protection and conservation of cultural properties, and their implementation. Many of the papers seem to be too abstract to be put into actual practice. The two training courses have shown that an effective system was needed and if it is thoughtfully and conscientiously implemented, there will be good results.

For the effective protection of wooden heritage, we should set up a network of services which consists of a central administrative unit and national institutions to ensure the effective preservation and presentation of wooden heritage.

The network should carry out the following functions:

- Contribute to the formation of draft laws and regulations designed to secure particularly the protection of wooden heritage, studying international legislations, recommendations, principles to develop standards for local situations
- Establish and keep up to date a national inventory of designated cultural properties
- Promote the development of related institutions (museums, libraries, archives, laboratories, workshop)
- Increase both national and international training for professionals in different fields of wood studies

It is a good time to make a critical assessment of current practices and encourage those countries that are now reassessing their work in the conservation of wooden structures to make the effort to adjust their domestic practices to include international collaboration in a combined effort to hinder the damage and destruction of cultural properties by man made or natural deterioration.



Conservation plans prepared during the Bentensha Workshop at Toshodaiji Temple, Nara.
By Ramesh THAPALIYA, Nepal.

Nepal

Ramesh THAPALIYA

The use of timber in Nepal ranges from structural, architectural to decorative purposes. Structural use of timber is seen in its use as posts (*Tham* in circumambulatory of temples, '*dalan*' of bahal houses, shop fronts, as the replacement of the middle wall in the upper floor of houses, particularly the second floor and attics, etc), as beams over posts (*ninah*), joists in floors and rafters in roof, ties and wall plates (*nas*) in temples, as inner frames of doors and windows (post and lintel) and struts. It is important to note that the structural use of timber is really abundant.

The architectural and decorative use of timber is likewise extensive too. Such use is seen in the posts, metha (capital), torana over door, doors and windows, as well as struts. Exposed structural members are usually carved elaborately. Doors and windows shutters are also of Timber. The doors are either a 'single-leaf door' or a 'triple-leaf door' (used in some temples). There are many specialized designs and they are used in particular contexts and positions. Window designs are yet more extensive than doors, e.g. Tiki-Jhya, Sun-Jhya, Biman-Jhya, Pasuka-Jhya, etc. The doors and windows are built with multiple posts and lintels and carry elaborate motifs.

Common problems in the conservation and preservation of woodwork include rotting, beetle attack, attack of white ants or dry rot. Careless repainting also poses problems of another kind in restoration works.

Such a wide range of wood application in Nepalese architecture makes it the principal concern in our conservation works. The traditional techniques of selecting wood species, its cutting period, method of seasoning and different kinds of joinery used in the construction are passed down through generations. As the wood is becoming dearer than ever and is gradually being replaced by new materials like steel and concrete, the tradition of wood working as an inherited skill is drastically reduced. Wood is the most vulnerable construction material in our traditional construction. So the study of this field is always important for us.

My area of work is primarily concerned with the Kathmandu Valley World Heritage Site. The capital city of Kathmandu is famous for its wooden temples. Wood is the medium of artistic expression and is the backbone of structural support in our heritages. So I sincerely express my gratefulness to the organizers of this training course - Conservation of Wooden Structures in Asia and the Pacific 2003 for giving me this opportunity in increases my knowledge in this field.

The monuments located in the Nepalese World Heritage sites can be categorized mainly into two groups in terms of ownership; they are either Public monuments or Private houses. The challenges identified in conserving the private houses are more complicated in comparison to public monuments. As I have categorized the challenges of conservation in terms of public and private monuments, I will list the usefulness of this training course in this context.

Approach to the conservation of public monuments –

The Nepalese world Heritage sites usually consist of a main Monument surrounded by other monuments or a group of monuments. Such groups of monuments including the main monument fall in the category of public monument. The major challenges identified in the conservation of these public monuments can be thus discussed under the following sub headings.

Lack of sufficient fund:

The conservation of cultural heritage is highly expensive. This is more obvious in case of Japan. From the lavish construction of protective sheds to the most detailed study of materials and techniques, the expense of restoration projects in Japan is much higher than that of my country Nepal. As I learned here, the fund made available by the government is always sufficient to carry out conservation work to the highest standard but in my country's case, it is different as the budget allocated to conservation works has always proved to be insufficient in comparison to the number of monuments and the expensive conservation materials and craftsmanship. The proportioning of some amount in the government's annual budget and few donations from different sources have enabled us to keep the public monuments of world Heritage sites in normal condition. But a much bigger amount of money is needed for us to conserve properly and improve the condition of such sites. I cannot imagine carrying out the conservation/preservation works with such fine detail documentation and minute research in every aspect from the monument's material to the technique of construction etc. in my country right now. Thus the insufficient investment in conserving cultural heritages has remained always a major challenge.

Lack of proper documentation:

Advanced architectural conservation is based on experience, architectural heritage recording and information management. The basic thing required in conservation is knowledge. Knowledge entails documentation as a fundamental aspect for preserving cultural heritage. Architectural records and information generated from them plays a vital role in the conservation process.

Seeing that the records of construction, maintenance, renovation and reconstruction processes from the middle of the nineteenth centaury are still kept here in Japan amazed me. I can easily imagine their value in present conservation works. Though the method of construction in Japan is different to the South Asian context, the depth of tested knowledge especially in the field of wooden monument conservation is priceless and other countries can benefit from this.

A detailed inventory of the monuments of the World Heritage Sites, including private houses, is yet to be completed in my country. Until and unless such documentation is completed properly it is impossible to categorize the monuments and treat them in accordance with their category, value and importance, which is highly necessary in order to formulate plan and programs for conserving the world heritage of any place. By seeing the Japanese way of collecting information and storing, interpretating and disseminating them, I am confident that my performance would be better than before and I can help my colleagues also.

Heritage is not only the big and beautiful monuments. It includes all those things that provide us a tangible access to our past. In the name of world heritage site and artistically valuable monument I feel that we are not giving due attention to those various heritages which are scattered throughout the country and are

related to the different ethnic groups and their ways of life. So my thinking and works in the future will certainly be directed towards paying due attention to them also.

Lack of public awareness:

Awareness of the people is the single most important factor in the conservation of any form of cultural heritage. The love and passion for one's own identity and a pride in one's history always provided people the motive to conserve their heritage. As we think that it is our responsibility to transfer our cultural inheritance to the future generation, the purity of the inheritance should be maintained as far as possible. Heritage is always for the people rather than the people for heritage. So the management of change and maintaining a balance between the conservation needs and development needs has always been the principle challenge for the conservation professionals. This difficult task would be so much easier if the society is educated. Unless effort is made to make the people more aware about the importance, value and direct and indirect benefits of their cultural heritage, they cannot appreciate the efforts made by somebody else in conserving the Cultural Heritage or even if they participate themselves. If the support and appreciation of the local is not gained, the conservation of cultural property remains incomplete. Among the challenges I have to face while working in the conservation field is the ignorance of the values of cultural properties in the people. Sometimes educated people who are in the position to teach others about the needs of conservation turns a deaf ear when they have to compromise something for the sake of conservation. They are the most difficult clients to handle.

By learning from the Japanese professors and professionals in this month, I see that even Japan is not free from this problem. Persistent effort of the conservationists to get people to agree to conservation plans is the only way to solve the problem and there are no easier ways to achieve this goal. By communicating with the society, building support groups and creating social pressure, we can reach a balance between conservation and modernization. Implementing educating plans such as broadcasting Information about the cultural heritages on Radio, Television and publishing in newspapers, making and distributing posters, pamphlets and brochures and including Heritage conservation topics in high school level curriculum, we can try to create a heritage-loving society. We sincerely hope that the positive result of these activities will be realized slowly in the future and our current difficulties will be changed into positive support from the people.

Living Cultural traditions:

The combined nature of settlement patterns and their execution in secular & religious buildings within a cluster shows the close relationship among the palace, temple, stupa, public rest houses and private houses in heritage sites of Nepal. This case is more pronounced in the case of the Katmandu Valley World Heritage Sites. The conservation of any cultural site means to maintain the regular functioning of traditional activities or intangible cultural practices at the site also. All the Nepalese Cultural monuments enlisted on the World Heritage list, by their nature, are living heritages. Local people living in the cultural heritage zone are among the most important elements in conserving such intangible cultural heritage. Therefore, our job is also to retain people's living patterns and their livelihood within the protected monument Zones. However, traditional values could sometimes create many challenges in conserving the sites. Basic concept in Hindu philosophy is that the eternal core of the soul survives death and transmigrates to a new life or is released

from the bonds of existence. We give importance to the inner spirit rather to the body. Our religious philosophy teaches us to discard worldly things. So Idols representing spirits and the procedures that lead towards the spiritual goal gets priority.

In the case of Japan, I observed a somewhat different situation. Many of the monuments are separately located within a large compound. Their traditional houses are primarily wooden structures without fixed joints, so the complete removal of members and reusing them after examination and maintenance is possible. The size of the wooden member is very large in major structural elements and Japan has developed a joining system that works by the mechanics of interlocking surfaces. It was a pleasing experience to see the filling of damaged timber parts without losing any part of the sound timber.

My country's monuments are full of finely carved decorative wood works. The major deterioration on these members occurs on the neglected part attached to brick walls, but the carved parts are in reusable condition in most cases. So the technique of repair with dismantlement can be extensively used in conservation works in my country's monuments.

Lack of co-ordination between different agencies:

Traditionally as well as legally, different governmental and semi-governmental organizations are responsible for maintaining and conserving the Nepalese cultural heritage. Though many institutions are working in the same field, the current law does not specify their authority and responsibilities clearly. When there is a need to take difficult or unpopular actions for heritage protection, one tries to throw the ball into the other's court. Another challenge caused by the lack of proper coordination is in controlling modern constructions and the encroachment of modern urbanization process. To control such activities active support of the chief district officer (District Administrative Head), the local police force and Municipality authorities is a must but this sort of activities is not their priority. This tendency has created many difficult challenges. During this training course, I learned that Japan has a more precise demarcation of concerned authorities in the field of conservation. We are also planning to propose amendments in the Ancient Monument Preservation Act in near future. This training experience gave me some valuable insight into this aspect, which I will certainly put forward in my departments meeting.

Technical and Logistic Support:

Providing technical and logistic support to the local people is necessary for the preservation of vernacular architecture. The maintenance of and renovation design for vernacular houses is a challenging job. Balancing the cost and reward is never easy. Enabling the people to enjoy modern facilities in a traditional setting in Nepal is even harder. An increased number of Architects graduating from universities these days is a candle in the tunnel for us.

I have seen that conservation architects are selected professionals who have a wide range of responsibilities here in Japan. In the case of my country, the architectural designer pays no attention to their design after obtaining the initial government approval. Contractors and the owner would then try to change the design in the construction process, and these changes are often not in agreement with the traditional values of the building. We should therefore give more authority to architects and they should be made more responsible.

Approach to Problems Related To Private Houses –

A number of private residences exist within the world heritage sites of Nepal. The local inhabitants are maintaining their age-old cultural tradition that is also an important aspect to be conserved in the site. The people who are living inside the protected monument zones are another important element in conserving the cultural values of the sites. Therefore, it is necessary to retain people's accommodations and their livelihood within the world Heritage sites. This interdependent relationship has created several challenges and most of these are related to the construction and reconstruction of private houses. Here I outline the major activities of the inhabitants that are causing serious threats to conservation activities in Nepal.

Nature of construction materials and the tradition of reconstruction:

The main construction materials of Nepalese traditional architecture are bricks, timber, terracotta tiles and stones with mud mortar as a binder in most cases. While old buildings may be damaged, deteriorated or dilapidated due to the nature of construction materials and loads, there has been a traditional practice of reconstruction after complete demolition of the building instead of in-situ conservation. The age-old timber components of traditional buildings are usually rotted and need replacement urgently. If people are permitted to demolish and reconstruct their dilapidated houses then conservation guidelines are not followed. But if the permission for demolition is not granted, there will be negative attitudes towards the conservation policy.

Japanese old structures are primarily made of wood and most of the components are exposed to the open air unlike the load bearing wooden structure within walls in the Nepalese case. They are therefore less affected with moisture and there are fewer chances off the wood rotting. It enables the conservators to use more of the old materials in the process of conservation. The damp proofing system in old Japanese houses is impressive. This method can tremendously improve the conditions of my country’s monument also. Improved damp proofing will certainly prolongs the life of wooden members in the structure.

Problem of balancing Owner demand and governmental codes and regulations:

As the perceived need for traditional structures has changed considerably, design professionals are unable to find a solution within the framework of current governmental codes and regulations. It is a challenge for design professionals to produce a set of construction documents that defines the proposed building exactly and from which the building can be constructed within the framework of current governmental codes and regulations. If design professionals are able to incorporate standard criteria for human comfort such as thermal environment, lighting levels, damp proofing etc., the job to implement the approved design becomes much simpler.

I have seen many examples of improvement of housing condition without altering the traditional façade of the building in the preservation districts of Japan. They directed me to think about improving the interior of the traditional Nepali houses. It would have been a great opportunity if I could have more time to go through the details of this process.

Changes in the usage of houses:

The ground floors of almost all old private Nepali houses have few small windows and it remained always damp and dark. The ceiling height is also around six feet. Nowadays, almost all the World Heritage sites are developing as a tourist center and ground floor of the private houses can be changed into profitable shops. They need bigger sized windows for more light, owners want to increase floor height of their houses and they try to add different modern commodities, most of which can not be fitted due to the size and shape of their traditional houses. Thus the intentions of prescribed conservation methods and people's needs could not go together and it creates confrontations between the house owners and managers of the world heritage sites.

Japan's modern commercial centers are not located in historic areas. Though the houses are smaller in size compared to modern ones, they have no ceiling height problems. I find less variation in the overall height of traditional buildings. The actual owners do not inhabit many of the buildings in preservation area. Though this gives the professionals more freedom to work, it also creates the problem for carrying out regular care, repair and maintenance. The continued search for a better utilization of vernacular houses in the modern context by Japanese professionals provided me a new direction of thinking which I have to analyze within the Nepalese context.

Scarce and expensive materials and craftsmanship:

The bricks and terracotta tiles used in old Nepalese houses are special in type and quality. Another construction material used in the traditional buildings of heritage sites is stone. The stone itself and carvings on it are of high quality. Though the timbers used in old houses are in large quantity and of low quality but carvings and designs on them are very beautiful. The production of such high quality and beautiful construction materials is two to three times more expensive than using modern construction materials, and to get these materials and craftsmen in the market is very expensive. The offer of the government to provide 10 % subsidy to the total cost and exempting the tax levied on wood could not provide much incentive.

I observe that the central and local governments in Japan provide around eighty percent subsidy to the cost of traditional building conservation, yet professionals are still facing a hard time to convince the owner about the conservation of traditional houses in many cases. So anyone can imagine the gravity of opposition we have to face in Nepal from the society to conserve the traditional environment, especially vernacular houses.

In learning about the traditional tile-making techniques and observing the factory site, I was impressed with the level of commitment the Japanese had to their work and to the way they carry out investigations through to the end of the project. It had inspired me to do research in the field of traditional materials.

Socio-economic changes:

The agriculture-based economy of local inhabitant of Katmandu has changed into an industry and commerce based economy. The commercial value of the private houses of world heritage sites are increasing day by day and people want to change the unused ground floor of their houses into shops or for other commercial use. Also, changes in the lifestyle of the people have presented pressures to the families

living in the World Heritage Sites to acquire modern commodities like refrigerators, modern furniture and so on, which can not be moved inside their houses from the small traditional doors. This sort of economic ability and social pressure for modern commodities have encouraged the local people to change the size and design of their original houses. To meet such challenges, a level of compromise is inevitable. The system of value analysis with due consideration of people's perspective may lead us to the delicate balance we want to achieve. I feel that I am more equipped with such philosophical understanding after this training. Cultural heritage are for the people and we cannot ignore the human element in Heritage conservation work.

Conclusion

Most of the work was very rewarding throughout the course and there were many opportunities for interaction with lecturers and with fellow participants. Seeing different approaches that do not conflict with the fundamentals was impressive. The practical sessions were particularly useful in developing skills and testing them in real situations. Presentations gave me brief knowledge about heritages in the region and approaches taken by fellow professionals. Study tours provided the opportunity to see the outcomes first hand and meet other professionals in the field and discuss about their approaches to the range of problems they are faced with.

Overall, I had an exposure to the range and depth of cultural heritage in Japan. It is equally rewarding to compare the different conservation approaches taken in Japan and other countries. The course provided many opportunities to interact with experts and getting some insight into the philosophy and the processes that they take in their work. Gaining an exposure to the many experiences and approaches and enjoying it with experts in the field was a rare opportunity and I enjoyed it very much. I am sure this training course will contribute to the protection of wooden heritages in each country and it was a very satisfactory meeting for all of us. At the end of this program, we have increased our knowledge of our field of work, learned directly applicable techniques in our work, gained contacts with experts and have met wonderful friends working in the same field. And last but not least, I had the opportunity of experiencing first hand amazing cultural and natural heritage. It has been an experience that I will remember for a lifetime.

Philippines

Candido H. CASTRO

I would like to express my sincere gratitude to the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Center for UNESCO (ACCU) for inviting me to participate in this training course on the Conservation of Wooden Structures in Asia and the Asia Pacific 2003. During the training course in Nara, Japan, I had an opportunity to visit many Ancient Cultural Heritages consisting of Wooden Structures. During this training course, I have also fixed in my memory the conservation techniques and methodologies applied by the Japanese People for the restoration and conservation of Cultural heritage. The knowledge I have learned in this training course will be applied to the present work of our office and will be disseminated to other people to educate them about the conservation of cultural heritage. I hope that the ACCU will continue to provide such training course to help other countries do better in the conservation of wooden structures.

The training course was attended by fourteen participants and two observers. The course was run by Mr. Yasushi Nishimura as the course director and several Japanese exerts in the field of conservation as speakers and lecturers. The Japanese Government through the ACCU funded this training course.

At present, I am a Senior Restoration Engineer and presently work at the National Historical Institute NHI, which is the only governmental institution in the Philippines to undertake the promotion of history and other historical activities and also the preservation, conservation, restoration and maintenance of significant historic sites and structures. The NHI supports various activities, including:

- public education on the processes, values and benefits of preserving our historic sites
- dissemination and transfer of technologies to organization and individuals who have interest or are directly involved in historic preservation activities,
- community involvement in conservation,
- provision of technical assistance on the restoration, preservation and conservation of historic structures and objects to other agencies, Local Government Units and Non Government Organization.

The NHI believes that every citizen should be proud of his country and culture, and should be responsible in helping to preserve and protect our cultural heritage with genuine commitment, involvement and cooperation.

At present our office is maintaining and operating 30 history museums, among which are National Shrines, Landmarks, and Monuments including three of the four baroque churches in the Philippines declared by UNESCO as World Heritage Sites. Every year our office had requested budget allocation from the National Government for the maintenance and restoration of these designated structures. The preservation of these historic sites is undertaken by engineers, architects and conservators who also provide technical assistance to the various preservation and development projects involving different historic sites and structures in the country.

Conservation Measures undertaken by NHI:

The NHI implements heritage conservation laws and liaises with the government and non-governmental organization. We issue guidelines on restoration and preservation and implement educational activities. We also make plans and request budget allocation for restoration and conservation projects.

As a Sr. Restoration Engineer my duties and responsibilities are:

1. Plan scope of work, prepare budgetary cost estimates and specifications for all NHI projects.
2. Supervise all on-going restoration works undertaken by the NHI.
3. Check and review all work of lower technical staffs pertaining to the restoration and conservation, particularly in relation to engineering aspects.
4. Conduct investigations on the structural stability of existing structures.
5. Prepare progress reports and photo documentation for on going restoration projects.
6. Prepare structural design and investigation of all NHI projects.
7. Liaise with Local Government before the implementation of the project.
8. Survey and documentation of historic structures.

The common problems of conservation and restoration in the Philippines, especially project located in remote areas, include the following:

- Lack of public awareness and interest on conservation. Some schools have no idea about conservation policies. The resulting trend therefore, is an endless variety of intervention techniques being applied which are contrary to the principle of universality.
- Lack of resources for both traditional and modern technologies of restoration e.g. skilled artisan and work force for traditional works, funding constraints due to expensive or unavailable technologies, lack of scientific conservation equipment and facilities, lack of funds and time for quality technical supervision. Too many cases are in urgent need for attention but there is a limited budget ceiling to work with, and the implementing government agency finds difficulty in gaining support from local communities and other government and non-governmental organizations.
- Conservation is not a major priority of the government. Personal interventions by political or influential figures often conflict with interests of conservationists.
- Lack of police power to properly implement the heritage conservation laws.

The Training Course on Conservation of Wooden Structures in Asia and the Pacific 2003 had an objective of contributing to the promotion of cultural heritage protection of each country in the region. Theoretical knowledge as well as practical skill through lectures and practical training in the areas of wooden structure survey techniques and conservation /restoration philosophies and technologies were included. The course offered an exposure to the conservation challenges and an overview of established conservation approaches. The conservation course provided essential knowledge for diagnosing deterioration in structures and selecting the most appropriate methods of conservation of wooden materials.

It has also promoted efficient collaboration and mutual understanding among the different disciplines working in the field of wood conservation. It has broaden our awareness regarding the conservation of wood.

Leaning experiences during the course on wooden conservation are the following:

- The Japanese Policies on Protection of Cultural Properties, Administrative system, budget and tax system, the law for the cultural properties e.g. tangible, intangible, folk cultural and group of historic building.
- The protection of National designated cultural properties, the designation and protection of cultural properties in local areas; policies on Museum of art and history.
- The Promotion of International Exchange and Cooperation
- Information Technologies in the administration of Cultural Affairs.
- An introduction to Architecture and historical heritage in Japan regarding legislation, problems, concerns and also the conservation of modern architecture.
- The conservation of Wooden Architectural heritage in Asia-Pacific Region. Dr. Wijesuriya tackled the important value of timber in wooden Architecture, the causes of deterioration of timber and the conservation process, principles and procedures for wooden structures. The concepts and Philosophy of Conservation was also discussed by Mr. Dag Myklebust.
- An Introduction to the Conservation Science of Archaeological Relics was discussed and some important topics was tackled about basic properties of wood, the deterioration of waterlogged wooden relics and the preservation of waterlogged wooden relics.

I have learnt at this training course about the protection of cultural property buildings, the history of conservation and the investigation, designation and registration of all cultural properties. Also, I have learnt about the different wood species used in traditional Japanese wooden architecture. I have learnt about Dendrochronology: procedures for determining the age of wood from its annual rings and the study of living trees in order to understand tree growth. I have learnt about the Japanese restoration and preservation methods for Cultural Heritage such as:

- performing routine household maintenance
- holding regular training program for craftsmen to develop their skills as well as their knowledge of history and culture
- providing the owner with the knowledge for routine maintenance and repair and providing financial support and technical assistance
- prompt damage control through maintenance and repair to take measures to prevent the damage from worsening or spreading.
- precautions for natural disasters
- opening to the public and regulating the use of cultural properties; promoting the continual use of a cultural property tends to help maintain the inherent significance of the structure and help preserve the cultural properties.

I have learned about the policy on the conservation of historic district, the basic concept for preservation, the conservation program and the process of conservation done by the local government in Japan.

On October 15 – 17, the participants visited the Takayama Local History Museum (a former sake brewery that has been converted into a Museum), Takayama-Shi, Sanmachi Preservation District of Group of Historic Buildings and Takayama Shi, Shimonino-machi and Daishin-machi Area, The Historic Village of Shirakawa-go and Gokayama , Historic Village at Kanazawa City and Ichijo-dani site and Museum. On this site lecture I learnt about the identification of cultural property and site, the protection law, the state of conservation in Japan, the World Heritage value and background of the Gassho-style, Samurai, Merchant and Landowner's houses.

The most impressive part of this programme was the individual country presentations. They gave me a global overview of the movable and immovable cultural heritage in various settings and the current conservation problems in field of conservation. I was also impressed with the method of reconstruction done at the Toshodai-ji Temple and Nara Palace, including:

- the provision of a temporary shed over the entire site during reconstruction
- storages for the dismantled materials
- field offices for the technical personnel involved in the reconstruction
- the process of conservation e.g. rubbing and sketching works
- the traditional carpentry techniques used by the skilled artisan.

I was also impressed with the process of conservation and maintenance work done by the Japanese Government at different temples e.g. the Horyu-ji temple, Yakushi-ji Temple, various Historic Districts and the Nara Prefectural Folklore Museum. I have learned about the overall process of wooden structures, policy making, project planning, management, inspection, diagnosis, wooden carpentry and roofing materials.

The most interesting parts of this training program:

1. Site visit at different ancient temples in Japan; I saw the ancient wooden structures from the 8th century still remaining.
2. The material used for roofing e.g. bark and pampas grass;
3. Site visit at the different museums;
4. Site visit at the Archeological site in Ichijodani;
5. The proposal for the renovation of Bentensha shrine, Sketching and measuring the roof structure of the main hall of Toshodai-ji temple and rubbings of tiles; The Central Government was provided financial support for the repair and reconstruction of ancient structures but these structures was privately owned.
6. The laboratory facilities and modern equipment for preservation and diagnosis of relics.
7. Site visit at the roof tile factory.

I will disseminate all the new techniques I have learned at this training course on wooden conservation to other people in my country. I hope that ACCU will continue to provide such training course to help other countries do in better in the conservation of wooden structures. This training programmed on wooden conservation was very well-organized, especially the arrangement of lecturers, lecture room, transportation and accommodation for the participants. The success of this program was highlighted by the good relationship between the participants and the staff of ACCU who organized this training course.

Shirakawa-Go Village, Gifu.

Republic of Korea

Young Hun JUNG

During my training course at the ACCU, I could understand the Japanese conservation system for cultural heritage better than before as well as the Japanese's efforts to preserve their heritage. This training course is a great experience for me because I can compare our conservation system with another nation's system.

In these days, the natural scenery and traditional buildings in Korea are disappearing year by year just as in other developing counties. This is due to rapid industrialization and high demand for land development. Japan has experienced these kinds of problems caused by rapid economical development earlier than Korea. These are very interesting subjects for me; that is, how can the Japanese control the demand for development and what is the Japanese' decision to meet the balance between the demand for development and the need for conservation.

Actually, designated cultural heritages including traditional villages in Korea are preserved well under the cultural properties protection law. But the designation system in Korea is too narrow to cover traditional streets, districts and roads which are important cultural heritage as well. This phenomenon is due to the Korean government's policy, which is more focused on a unit rather than a broad area such as street, district, roads, etc.

Because most traditional streets, districts and roads are not designated in Korea, I was very interested in the eastern district of Kanazawa city and the Takayama-Shi Sanmachi preservation districts as well as Shirakawa village, especially in terms of how to preserve and utilize large historic areas. On the site lectures during my training course, I found that the Japanese are actively utilizing their heritages as stores, museums, inns, restaurants, etc. It seems that they can easily convert their houses into commercial buildings if they follow recommendations from the Board of Education. In addition, I heard that there was conflict between conservation planners and urban planners of the Takayama preservation district, but the cultural properties protection laws superceded the urban planning laws. It shows a good and positive attitude towards the preservation of traditional districts which are now disappearing. Developments in certain areas surrounding traditional districts might bring sever damage to those districts because the values of cultural heritages include their surrounding.

It is true that we cannot ignore the demands for developments, which might benefit the area surrounding designated heritage. But I thought there were other methods to solve these problems and I could find possibilities in the Shirakawa village and Takayama-Shi Sanmachi. The villagers can convert their houses into commercial buildings such as museums and stores, whereby designated cultural properties can be conserved. It can be expected there will be more benefit to the villagers due to the active utilization of their properties.

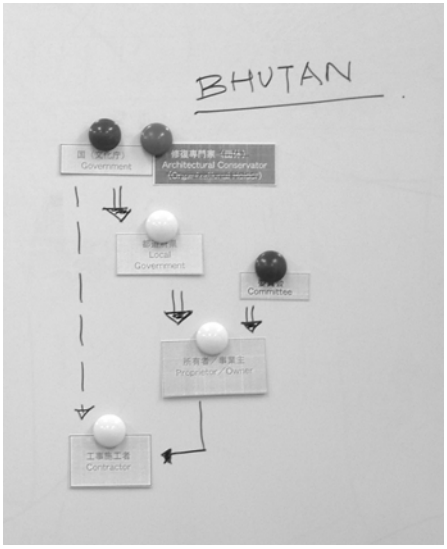
The conversion of a designated residential building into a commercial building is very rare in Korea. Also the transfer of ownership from designated building owners, which is caused by difficulties of dwelling, is very rare case in Korea. Due to this, the Japanese classification of designated historic areas as "*Judenken*" (which means Preservation Districts for Groups of Important Historic Buildings) might be adopted.

Firstly, we may apply the Japanese *Judenken* classification to the traditional villages in Korea, which are already designated. The owners can utilize their houses and buildings as partial inns, stores, small workshops for traditional goods. In this way, the owners can derive profit from their houses and buildings

Secondly, following Japan's model, the registration system in Korea should incorporate a classification for "important district for the protection of traditional houses" that includes traditional districts, streets, and roads. We may encourage owners to preserve their buildings, streets, and districts by giving some incentives such as subsidies and tax reduction for commercial gains derived from the utilization of cultural properties. But this method is insufficient for the preservation of districts and streets because the current registration system does not include such large areas and only deals with individual buildings. For this reason, we may consider applying the classification of "important district for the protection of traditional houses" to Korean traditional districts and streets.

I would also like to comment on the ACCU training course. Most lectures are well organized and lecturers were very eager to teach. ACCU provided information about Japanese conservation system and shared ideas about the basic principles of conservation, which are often ignored. In addition, they gave us on-site lectures. I am sure that this on-site lecture is very helpful to every participant because places such as Takayama and Shirakawa village are good examples that we can refer to in terms of utilization. I think that this ACCU training course is a good example of providing further education to conservation experts. This training program will become a good guide for me in many areas: how we should teach, how we can deliver our knowledge to conservation experts, what are important principals that we have to consider before carrying out preservation activities and repair works. I hope that this training course can be broaden in the future to include stone architectural monuments.

Finally, I have to give special thanks to Mr. Nishimura, Ms Ishii, Ms Amy and to all ACCU staff. - I'll miss you all!



Flow charts produced by the participants during a discussion, explaining the administrative structure of conservation work in their countries.

Sri Lanka

Jeewana Deepal WIJETHILAKE

The protection of archaeological cultural heritage in Sri Lanka is my main responsibility as I have been engaged in the field of architectural conservation as an assistant director of the Architectural Conservation Division, Department of Archaeology of Sri Lanka. The planning of conservation projects, the supervision and management of conservation works, maintenance and exhibition of cultural properties in a proper manner are some of the responsibilities related to my work. The Department of Archaeology is the statutory custodian of cultural properties of Sri Lanka. Architectural conservation projects are being conducted by the Architectural Conservation Division through the regional offices of our department

As I mentioned in my country report, Sri Lanka has a very rich cultural heritage, which includes a large number of ancient monuments and sites including a great number of timber structures. It is a great responsibility to conserve and maintain them in a good condition. Proper management skills, correct decision-making and correct approaches at the right time etc. are essential to fulfill this task. Having experiences in this field is very important for achieving good results. So far I have been engaged in different types of conservation projects in my career to date and that involvement has helped me gain good experiences in architectural conservation in my country. It has also been an invaluable opportunity to get further experience at an international level by participating in this training course. First of all I would like to thank ACCU for giving me this opportunity.

When we arrived, all the necessary arrangements had been made for the participants of the training course, and the staff of ACCU gave us tremendous support so that we can get maximum benefit from the course. The training course also had been well organized from its inception to completion and covered all the necessary parts of the theme. It began with an introduction of the cultural heritage protection system of Japan that gave us a preliminary understanding of how that system is being operated. A step-by-step course followed covering the themes of the course. Theoretical and practical parts were covered through lectures by Japanese and foreign experts and on site practical works, study tours, etc in a well organized manner. Videos and slide shows etc. were also used in the presentations. I appreciated the organization of the course, which is also something that I can use in my future professional tasks.

I had a good opportunity to gain experience and knowledge in a vast area within the field of architectural conservation during the training course. I would like to share them with my colleagues and use them for the benefit of cultural heritage protection after going back to my country. I would like to mention some of the things that I have learnt and their application in my country briefly in the following.

From the training course I had an opportunity to increase my knowledge about the theories of cultural heritage protection in Japan, as well as the modern and traditional techniques which are being used for conservation. This information was given through lectures by experts in relevant fields, site observations, on site practical training etc. I would like to use this knowledge and experience to upgrade our cultural heritage protection activities. As an example, through the practical training at Toshodai-ji Temple, we learned about different techniques used for the documentation of the different elements of a building. I think these techniques can be applied to the documentation involved in our conservation projects. The

organization of these restoration projects also impressed me and I would like to use the knowledge I gained by applying it in our context.

Proper management of the use of both modern and traditional methods in restoration work without harming the traditional quality of a monument is another aspect I was interested in. In this course I was able to learn about the modern techniques being used in restoration work. As an example, techniques for analyzing objects and ancient structures are very useful to me as an officer engaged in the conservation field. I need to understand the availability of such techniques and the applicability of them in conservation work. I also got a sound knowledge about the traditional carpentry techniques in Japan. The tools being used, how they are used and the traditional skills of carpenters etc. could be observed very clearly. It was an interesting thing to study the similarities and differences in the application of such tools and techniques between Japan and my country.

It is very important when we are conserving a monument that we can find out exactly the period of its construction and the later changes that had been done to it. Correct conservation decisions could be made by using such data, particularly if the situation is complicated. Techniques used for dating objects, such as dendrochronology, are very important. The lecture on use of dendrochronology in conservation work gave us good knowledge about the suitability of using it to reveal the history of a building.

Site observations and study tours gave me the opportunity to observe massive wooden structures and their complex, marvelous structural patterns, and to study how the wooden members have been connected to form these impressive structures. We were able to see different kinds of wooden structures such as religious, residential, commercial, etc. and observe how their designs differ according to their location and function. The measures which are being taken to conserve and maintain these buildings were explained to us at the sites. Also, the traditional and modern techniques being used to protect them from natural disasters and fire were observed. It has been a good experience, and it is necessary to identify the similar problems in my country and use suitable techniques to over come them.

On the other hand as an architect it has been an invaluable opportunity to visit and observe Japanese architecture. This knowledge and experience would be very useful in my future professional work. The documents, which were provided to us, will be very useful in this regard.

I was also very interested in the techniques used for maintaining and exhibiting the cultural heritage of Japan. The systematic techniques which are being used at sites and museums are very attractive. As an example, the radio explanation system used at the Ichijo-dani site is very interesting. These experiences are very useful for designing interesting ways of presenting the sites and museums of our country.

In the Sri Lankan context, a main part of our heritage can be called ‘living heritage’ because they are still being used at present. In this training course I was able to get good knowledge about how Japanese conservationists deal with living heritage, especially the measures taken to protect them, their approach etc. This experience can thus be used in our approach to the protection of living cultural heritage in Sri Lanka.

The designation, selection and registration system for cultural properties, and the variety of measures devised by the national government for the preservation and utilization of them are most effective for the protection of cultural heritage. Such measures include regulations that prohibit alterations to an existing historic building, and the grant of subsidies for its maintenance and repair.

I also had a rare opportunity to meet professionals engaged in the same field from different countries, and to share our experiences in cultural heritage protection in different countries. In this way, we could strengthen our knowledge about the global situation in this field. I got the chance to understand about the ways other countries approach the task of protecting cultural properties, and how they solve the relevant problems through the participants' country presentations and by talking with them. I felt as though I have personally visited all those different countries within this period. I would like to use this knowledge and experience for the benefit of conservation works after returning to my country. Meeting these professionals from Japan and other countries was an invaluable and rare opportunity which I gained through my participation in this course. We were also given the chance to discuss various issues after every lecture and thus we were able to understand the different techniques and approaches applied to solve various problems. The explanations of the experts and the experience and knowledge of the participants from different countries had given me comprehensive knowledge about matters related to conservation.

Conclusion

This training course has been an invaluable opportunity given to us to receive knowledge about the cultural heritage of Japan and Asia Pacific region. Although it was mainly concerned with the conservation of wooden structures, it covered a vast area and other related topics. We benefited from not only the lectures, but also from the arranged site visits, practical works etc. For the free weekends, we were provided with all the necessary travel information so that we could to see more things in Japan; this has provided us with a tremendous chance to get various experiences in this beautiful country.

All the knowledge and experience I got from this training program will be very important for carrying out my duties in conservation project planning, in managing and conducting them, and also for my other professional activities as an architect. Information about the way Japanese conservationists approach their work and their cultural heritage protection system were given to us in a very systematic way. By this course, we were able to enhance our knowledge about the conservation, management and maintenance of wooden structures.

The problems related to the protection of cultural heritage were discussed throughout the course. Some of them were similar to those in our country, so the discussions gave me good ideas for strengthening our ways of solving the problems. In this way, this training course has enhanced the knowledge and experiences of the participants who are engaged in the field of conservation, and has created an opportunity for good interaction among them. Therefore it would be appreciated if professionals engaged in the field of conservation are given more opportunities to participate in training courses like this, to share and enhance their knowledge and experiences, and to use them to benefit the field of conservation.

Thailand

Sudchai PHANSUWAN

Most of the historic buildings and ancient monuments in Thailand were built of brick. Wood was also used in the roof structure. The roof beams or roof structures are fixed to the brick wall or fixed-jointed. There are also some wooden monuments. We divide the monument into two-groups. The first group is 'dead monuments' and the second is 'living monument'. These monuments have deteriorated due to the passage of time, adverse environment conditions and human destruction. Some are relatively stable and can be maintained in their present condition. Due to the influence of modernization, many of the living monuments have been repaired and modern functions have been added. Most of the historic buildings are owned by governmental offices, and have been managed to keep their architectural and artistic values.

In Thailand, there are many historic buildings which differ in their details such as roof form, roof tile, building proportion, constructional methods and building decorations. The conservation staff consists of architects, landscape architects, civil engineers, arts historians and other related professions when necessary. In Japan, in the case of living monuments, most wooden structures are similar in style and similar in construction methods so that only restoration architects and carpenters are required to handle the conservation of wooden historic buildings.

There are different methods for conserving dead monuments or ruins between Thailand and Japan. Reconstruction works maybe impossible in Thailand especially for dead monuments or ruins such as the Nara Palace. In general, we only preserve and maintain cultural properties in their present condition and add some part of monuments for presentation where necessary, however in this training course, I have gained knowledge about reconstruction work and the methodology for reconstruction design, including the structural design procedure. I have learned from this course how we can solve problems arising from missing information, the conflict between legal compliance and classical construction, as well as structural reinforcements which can incorporate traditional techniques and modern technology in order to comply with current construction standards and law. These methods will become guidelines for our country in case of reconstruction.

I have learned about the cultural heritage protection system, particularly the system of preserving historic districts and townscape, which is similarly applied in Thailand but in Japan, the system seems to be more effective than that in our country. From this training course, I have gained knowledge about how we can preserve the historic districts and townscape. The most interesting lecture of this training course has been the "Conservation of Wooden Architectural Heritage in the Asia-Pacific Region" by Dr. Wijesuriya Gamini, especially 10 challenges we must meet to conserve our heritage. This applies to not only wooden structures but to all historic buildings and cultural heritage. This is Ten Commandment for the conservator.

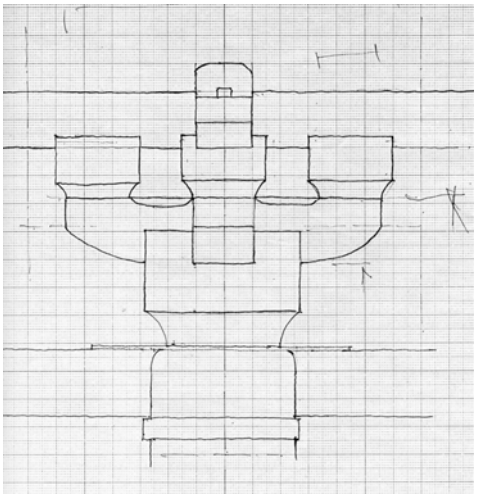
The interesting point about the practical training at Toshodai-ji Temple is the discussion concerning issues on restoration work and a workshop which allowed me to experience procedures in restoration work on a historic wooden structure. I also learned about the restoration techniques of joining new materials to damaged part, and methods of fixing wooden pillars onto based stones. These techniques will be useful for restoration work in our country. The practical training was useful in term of learning about data-collection, especially wet rubbing and dry rubbing methods. These traditional techniques provided data effectively and

can be applied for many purposes and anywhere. These methods are not expensive, without advanced technology, and the conservator can touch every part, record the dimensions of historical remains and see that evidence. The latest equipments are also very important in conservation work as they provide information and correct data which are necessary to do conservation work properly and accurately. Due to the shortage of conservation budget, we cannot provide these equipments and technicians for conservation work in Thailand at present.

The best method for conservation is to protect a historic building from causes of damages, and I had never thought about conservation in this way. I learnt a lot concerning routine conservation, methods to protect cultural heritage from various causes of damage and how we can prevent damages. This function involves not only conservators but the public and community also. From this training course, I have learnt a very clear lesson – that prevention is better than cure.

The study tour and site visits demonstrated the success of conservation work in Japan. The community and cultural properties can existence harmoniously. This is the result of suitable policies, the cultural heritage protection system and effective conservation practices. They are able to preserve these places in good condition and use them in the modern context. Such success will be an interesting example for conservation work in our country.

Overall, the knowledge from this training course is useful for conservation work in our country. I got a lot of knowledge and experiences, and learnt about restoration technique and the success of conservation work as well as procedures of reconstruction and prevention systems. I believe such knowledge will be an important instrument for my conservation work.



Sample sketch: detail of a structural bracket set, Toshodaiji Temple, Nara. By Ms Chigira (workshop instructor)

Vietnam

Anh Dung NGUYEN

First of all, I would like to express my sincere thanks to the organizer, ACCU Nara Office, for giving me the opportunity to attend this very important training course.

During this one month of well-arranged stay in Japan provided by ACCU (although it is not long enough), I have learned a lot from all the interesting and useful lectures given to us by various professors, specialists and experts from ICOMOS, ICROM, ACA, JACAM, NRICPN. We even had the opportunity to discuss and exchange valuable information with colleagues from various countries in the Asia-Pacific region. At the same time, I have had the opportunity to see the valuable cultural relics of Japan and directly participate in the investigation, research, preservation and restoration work at sites (the national and international cultural heritages of Japan). Through these, I have had a chance to understand and learn more about the preservation, restoration, promotion and utilization of the cultural heritage of Japan. This will be summarized in the following:

1. The policy of the preservation and utilization of cultural heritage:

The preservation and protection of cultural heritage in conjunction with economic developments can only have true meanings in the social context of "openness policy", i.e. where there is open exchange of idea between different countries. Japan had implemented this model of cultural heritage preservation for more than 100 years.

Though Japan has undergone major economic developments, the activities of cultural heritage preservation and utilization has always been adjusted to meet the requirements of reality. There had been at least 3 official documents for conducting these activities in Japan: the first one in 1897, the second one in 1950, and recently, the "Cultural Policy of Japan" in 1991.

The measures for cultural heritage preservation and utilization in Japan (the administration system, legal documents, international cooperation) show that in this country, cultural heritage is not viewed merely as a dead relic from the past, but is treated and used as a part of life.

The effectiveness of this system is demonstrated by the fact that at present, Japan still preserves many historic wooden structures which had been built at different times (the earliest was in the 7th century). Some of these cultural heritage have been listed by UNESCO as world cultural heritage, for instance Horyu-ji, Yakushi-ji, Toshodai-ji Temple and Shirakawa-go Village.

2. Experience and techniques in the preservation, restoration and utilization of cultural heritage:

Through the lectures during the Training Course as well as on-site lectures and practical training at heritage sites, I have come to admire what the Japanese have done to protect the cultural heritage in their country. The Japanese restoration experts, with the developed economy of their country, have exploited the

intrinsic traditional potentials of cultural properties in combination with modern technology to protect and promote their cultural heritage.

The preservation, restoration and utilization of cultural heritage in Japan have been implemented very carefully and systematically. For example, in the restoration of the Main Hall of Toshodai-ji Temple (World heritage), during the restoration process, a modern shelter was built to protect the whole structure, and this has created an ideal space for investigation and research work during the restoration of the Hall. With many people working diligently for over 10 years (1998-2009), the condition of every part of the Hall will be assessed and classified (define the date, measure and draw by machine and by hand, take pictures, record designs… I have also practiced these skills during four days of the program). These parts will then be brought to workshops near the main structure for preservation or restoration. This is not only a restoration project, but also a very good chance for training people working in cultural heritage restoration.

In Vietnam, restoration work has been done following similar steps, however, due to constraints in economic conditions, some of them have not been implemented thoroughly, for instance: there is a lack of experienced restoration experts, survey is not done carefully, there is no equipments for assessing the date of wooden structures so this is mainly done by the subjective judgment of experts or carpenters, the wooden structures are not carefully measured, drawn and recorded since the duration of restoration projects often lasts only 6 to 18 months.

For relics buried underground such as those at the Nara Palace Site, in order to restore the site of one of the country's first capitals, Japan has established the National Research Institute for Cultural Properties in Nara (NRICPN) to do the archeological excavations, make investigations and conduct research. The design for the reconstruction was based on the collected artifacts, in combination with historic documents and a study into the architectural styles of Toshodai-ji and Horyu-ji Temple. The restoration experts have selected the most suitable architecture design and built illusive models in order to implement the plan.

Vietnam has also discovered many ancient city structures of former Kings that have been buried underground, and they are very valuable to our history and culture (for example, the Thang Long Fortress of 11th Century, Fortress of the Ho Dynasty – 15th century…). But it is impossible for Vietnam to rebuild these structures at present due to many factors: economy, lack of historical documents etc. At present, we can only protect and preserve them for future generations.

An important part of the cultural heritage of Vietnam is the traditional folk houses at different locations that are valuable from the perspective of history, architecture and art. However, at the moment, there had only been primary survey, investigation and pilot preservation and restoration of some typical houses with financial and technical support from the Japanese government. These houses often have typical folk characteristics; on the other hand, they are also the daily living places of the people, so they hare often been changed following the requirements of changing lifestyles. That is why we need to have a suitable policy and solution for preserving not only a house but also many houses in all traditional handicraft villages, as well as both tangible and intangible cultural heritage.

The preservation and utilization of traditional villages in Japan have been carried out very effectively and at a large scale (58 areas have been preserved) owing to the policies for cultural heritage preservation. Japan does not only preserve the historical and architectural values of the houses, but also

preserve the associated scenery, environment and customs (for example: the Shirakawa-go Village – World Heritage). Besides that, at present Japan also preserve many ancient streets within developed towns (for example: Imai-cho Town, Kashihara, Hida-Takayama). The use of modern fire alarm and fire fighting equipment is carried out very effectively.

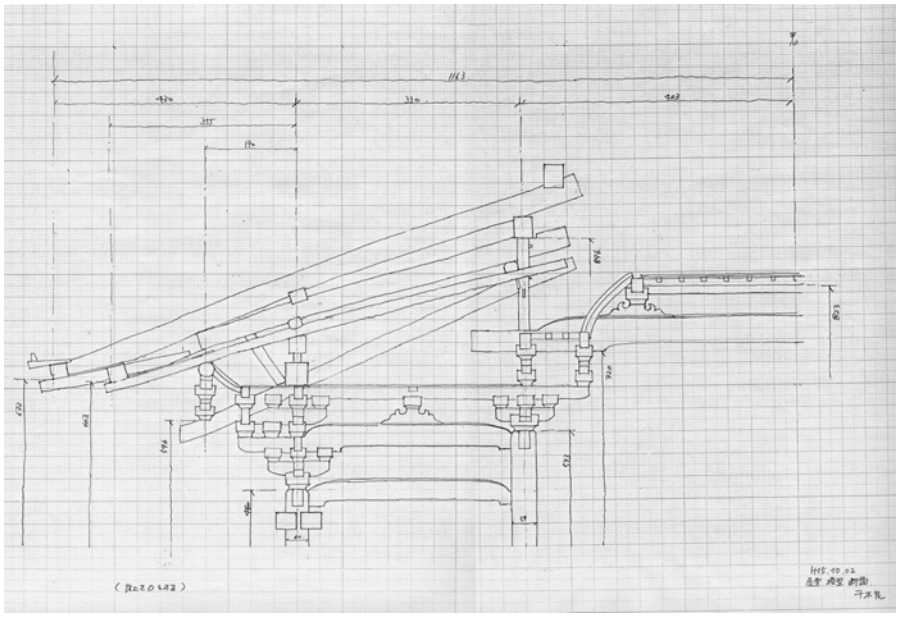
We can say that the preservation methods for this kind of cultural heritage is very suitable for Vietnam. I hope that with the experiences gained from Japan, in the near future Vietnam will achieve success in the preservation and promotion of the cultural heritage values of traditional handicraft villages and ancient streets as well.

3. Conclusion:

This Training Course has created a favorable condition for countries in the Asia-Pacific Region to have an opportunity to understand about each other's cultural heritage, as well as the preservation, restoration and utilization of cultural heritage. Moreover, through this Training Course, we have learned many techniques in management, preservation and restoration from Japan. These can be applied in the preservation, restoration and promotion of our own cultural heritage.

As an architect managing projects that deal with the preservation and promotion of cultural heritage in Vietnam, I find that such training courses are highly necessary and useful for all those who are working on cultural heritage preservation in different countries in the world.

Once again, I would like to express my sincere thanks and best wishes to the ACCU Nara Office, the organizer of this Training Course.



Sample sketch: eave structure,
Toshodaiji Temple, Nara.
By Ms Chigira
(workshop instructor)

VI

Appendix

1. List of Participants
2. List of Lecturers
3. List of Staff Members, ACCU Nara
4. List of Tutors and Interpreters

1. List of Participants

Bangladesh

Mr. CHOWDHURY Zakir
Sub-Assistant Engineer,
Department of Archaeology,
22/1, Block-B, Babar Road, Mohammadpur, Dhaka-1207

Office Phone: (880-2)9113387 / 9114689
Office Fax: (880-2)8112751
E-mail: jtmz@dhaka.net

Bhutan

Ms. DORJI, Nagtsho
Architect,
Division for Conservation of Cultural and Historical Structures,
National Commission for Cultural Affairs
P.O.-233 Thimphu

Office Phone: (975-2)322694
Office Fax: (975-2)321285
E-mail: nagtsho@hotmail.com

Cambodia

Mr. KIM, Sophorn
Chief of Cultural Heritage Office,
Service of Culture and Fine Arts, Battambang Province,
Ministry of Culture and Fine Arts,
St. 1 20Usaphea Village, Svay Po Commune, Battambang District, Battambang Province

Office Phone: (855)53-730007 Office Fax: NIL
E-mail: kimsophorn@yahoo.co.uk

China

Mr. ZHU, Yuhua
Assistant Researcher,
The Institute of Architectural History and Historic Preservation, Tsinghua University,
Beijing, 100084

Office Phone: (86)010-62783665
Office Fax: (86)010-62770314
E-mail: zhuyh01@mails.tsinghua.edu.cn

Indonesia

Mr. ARDA, Fitra
Staff of Documentation and Publication Division,
Office of Protection on Heritage of Banten, West Java, DKI Jakarta, and Lampung Provinces,
The Ministry of Culture and Tourisme
Jalan Letnan, Kp. Kepandaian, Serang, Banten, 42115

Office Phone: (0254)203428
Office Fax: (0254)203428
E-mail: ardha_sambas@yahoo.com

Kazakhstan

Ms. YATSENKO, Yelena Leonidovna
Senior Architect,
Division for Scientific Research and Conservation of Archaeological Sites
State Institute for Scientific Research and Planning on Monuments of Material Culture
21 Tole bi Street, 480100 Almaty

Office Phone: (7-3272)916-111 / 914-386
Office Fax: (7-3272)916-111
E-mail: dlpv@mail.kz

Kyrgyz

Mr. KALANDAROV, Arabidin
Senior Scientist,
Restoration and Rehabilitation of Architectural Heritage,
Institute of Architecture and Design, Kyrgyz State University of Construction, Transportation and Architecture
Maldybaeva Street 34 ‘b’, 720020, Bishkek

Office Phone: (996-312)54-57-84
Office Fax: (996-312)54-51-36
E-mail: arabidin_k@mail.ru

Mongolia

Ms. MUNKHZUL, Luvsanjalbuu
Culture and World Heritage Site conservation management Programme Officer,
Mongolian National Commission for UNESCO
Revolution Avenue, Government Building-XI, Room 1107,
Post Office-38, Ulaanbaatar

Office Phone: (976-11)315652
Office Fax: (976-11)322612
E-mail: jepazulaa@yahoo.com

Nepal

Mr. THAPALIYA, Ramesh
Architect,
Department of Archaeology,
Ministry of Culture Tourism and Civil Aviation
Ramsham Path, Kathmandu

Office Phone: (977)1-4250687
Office Fax: (977)1-4262856
E-mail: rthapaliya_333@hotmail.com

Philippines

Mr. CASTRO, Candido
Senior Restoration Engineer,
Historic Preservation Division, National Historic Division
NHI Bldg., T.M.Kalaw Street, Ermita, Manila

Office Phone: (632)523-1039
Office Fax: (632)536-3181
E-mail: rinovero@edsamail.com.ph

Republic of Korea

Mr. JUNG, Young-Hun
Deputy Director of Division,
Modern Cultural Properties Division,
Cultural Properties Administration
920, Seonsa-ro, Seo-gu, Daejeon, 302-701

Office Phone: (82)42-481-4881
Office Fax: (82)42-481-4899
E-mail: ivyblue@hanmail.net

Sri Lanka

Mr. WIJETHILAKA, Jeewana Deepal
Assistant Director,
Architectural Conservation Division,
Department of Archaeology
Sir Marcus Fernando Mawatha, Colombo 7

Office Phone: (94-1)693216 / 694727
Office Fax: (941)696250
E-mail: arch@diamond.lanka.net

Thailand

Mr. SUDCHAI, Phansuwan
Civil Engineer,
Fine Arts Department, Ministry of Culture
81/1 Sri Ayutthaya Rd. Dusit, Bangkok 10300.

Office Phone: (662)281-7037
Office Fax: (662)281-3947
E-mail: psudchai@hotmail.com

Viet Nam

Mr. NGUYEN, Dung Anh
Architect,
Department of National Cultural Heritage of Viet Nam,
Ministry of Culture and Information
51 Ngo Quyen Str., Hoan Kiem, Ha Noi

Office Phone: (844)9434443 / 9436132
Office Fax: (844)9439929
Office E-mail: nchdvn@hn.vnn.vn

2. List of Lecturers

Lecturers from Abroad:

Mr. MYKLEBUST Dag
Senior Advisor on International Affairs,
Norwegian Directorate of Cultural Heritage
P.O.Box 8196 Dep N-0034, Oslo, Norway
Office Phone: (+47) 22-94-0400 Office Fax:(+47) 22-94-0404
E-mail: dm@ra.no

Dr. WIJESURIYA Gamini
ICOMOS Expert,
Principal Regional Scientist Department of Conservation
P.O. Box 112, 1st Fl., Royal & Sun Alliance Building, 127 Alexandra Street,
Hamilton, New Zealand
Office Phone: (+64) 7-858-0020 Office Fax:(+64) 7-858-0001
E-mail: gamini.mala@xtra.co.nz

Lecturers from Japan:

Prof. UENO Kunikazu
Professor,
Division of Human Life and Environment,
Nara Women's University
Kita-uoyanishi-machi, Nara 630-8506
Office Phone: (+81) 742-20-3478 Office Fax:(+81) 742-20-3478
E-mail:

Prof. ITOH Takao
Professor,
Wood Research Institute,
Kyoto University
Gokasho, Uji-shi, Kyoto 611-0011
Office Phone: (+81) 774-38-3601 Office Fax: (+81) 774-38-3600
E-mail: titoh@kuwri.kyoto-u.ac.jp

Mr. YAMATO Satoshi
Senior Specialist for Cultural Properties,
Department of Cultural Properties Protection,
Agency for Cultural Affairs, Japan
3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8959
Office Phone: (+81) 3-3581-0013 Office Fax: (+81) 3-3591-0278
E-mail: yamato@bunka.go.jp

Mr. MURATA Ken'ichi
Senior Specialist for Cultural Properties,
Department of Cultural Properties Protection,
Agency for Cultural Affairs, Japan
3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8959
Office Phone: (+81) 3-3581-4111 Office Fax: (+81) 3-3591-0278
E-mail: muraken@bunka.go.jp

Dr. SAITO Hidetoshi
Director,
Japan Center for International Cooperation in Conservation,
National Research Institute for Cultural Properties, Tokyo
13-43 Ueno-koen, Taito-ku, Tokyo 110-8713
Office Phone: (+81) 3-3823-2150 Office Fax: (+81) 3-3823-4867
E-mail: hsaito@tobunken.go.jp

Dr. INABA Nobuko
Section Head,
Project Planning and Coordination Section,
Japan Center for International Cooperation in Conservation,
National Research Institute for Cultural Properties, Tokyo
13-43 Ueno-koen, Taito-ku, Tokyo 110-8713
Office Phone: (+81) 3-3823-4085 Office Fax: (+81) 3-3823-4867
E-mail: ninaba@tobunken.go.jp

Dr. SHIMIZU Shin'ichi
Section Head,
Architectural History Research Section,
Cultural Heritage Division,
National Research Institute for Cultural Properties, Nara
2-9-1 Nijo-cho, Nara, 630-8577
Office Phone: (+81) 742-30-6812 Office Fax: (+81) 742-30-6811
E-mail: shimshin@nabunken.go.jp

Dr. MITSUTANI Takumi
Section Head,
Paleo Environments Section,
Center for Archaeological Operations,
National Research Institute for Cultural Properties, Nara
2-9-1 Nijo-cho, Nara, 630-8577
Office Phone: (+81) 742-30-6845 Office Fax: (+81) 742-30-6856
E-mail: takumi@nabunken.go.jp

Mr. KOHDZUMA Yohsei
Senior Researcher,
Conservation Science Section,
Center for Archaeological Operations,
National Research Institute for Cultural Properties, Nara
2-9-1 Nijo-cho, Nara, 630-8577
Office Phone: (+81) 742-30-6847 Office Fax: (+81) 742-30-6846
E-mail: kouzumay@nabunken.go.jp

Mr. SHIMIZU Shigeatsu
Researcher,
Architectural History Research Section,
Cultural Heritage Division,
National Research Institute for Cultural Properties, Nara
2-9-1 Nijo-cho, Nara, 630-8577
Office Phone: (+81) 742-30-6812 Office Fax: (+81) 742-30-6811
E-mail: shimizu@nabunken.go.jp

Mr. KIMURA Tsutomu
Advisor,
Japanese Association for Conservation of Architectural Monuments
1-28-10 Hongo, Bunnkyo-ku, Tokyo 113-0033
Office Phone: (+81) 3-5800-3391 Office Fax: (+81) 3-5800-3390
E-mail: t_kimura@bunkenkyo.or.jp

Mr. UEDA Tetsushi , Deputy Director
Mr. TANAKA Izumi, Chief
Mr. MATSUI Masakazu, Chief Engineer
Ms. CHIGIRA Reiko
Ms. NAKABAYASHI Yuki
Toshodai-ji Office of Cultural Properties Preservation,
Nara Prefectural Board of Education
13-46 Gojo-cho, Nara 630-8032
Office Phone: (+81) 742-34-9275 Office Fax: (+81) 742-34-9276

On-site Lecturers:

Mr. TANAKA Akira
Director, Takayama Museum of Local History
75 Kami-ichinomachi, Takayama-shi, Gifu
Office Phone: (+81) 577-32-1205 Office Fax: NIL

Mr. OSAKI Keisuke
Curator, Takayama-shi Municipal Board of Education
2-18 Hanaoka-cho, Takayama-shi, Gifu 506-8555
Office Phone: (+81) 577-32-3333 Office Fax: (+81) 577-35-3172
E-mail: bunkazai@city.takayama.gifu.jp

Mr. MATSUMOTO Keita
The World Heritage Shirakawa-go Gassho Style Preservation Foundation
2495-3 Ogimachi, Shirakawa-mura, Ohno-gun, Gifu 501-5627
Office Phone: (+81) 5769-6-3111 Office Fax: (+81) 5769-6-3113

Mr. YOSHIOKA Yasuhide
Chief Researcher, Fukui Prefectural Archaeological Research Centre
4-10 Awaga-cho, Fukui 910-2152
Office Phone: (+81) 776-41-3644 Office Fax: (+81) 776-41-2494

Mr. KOBAYASHI Akio
Holder of Selected Conservation Techniques designated by Agency for Cultural Affairs, Japan
Kawara-u (Roof tile Factory)
17 Nishi-shinzaike-machi, Nara 630-8248
Office Phone: (+81) 742-26-2901 Office Fax: (+81) 742-26-2903

3. List of staff members, ACCU Nara

（Staff involved in the Training Course）

Mr. USHIKAWA Yoshiyuki, Director
Mr. YOSHIOKA Toshiyasu, Deputy Director
Mr. NISHIMURA Yasushi, Director of Programme Operation Department
Ms. ISHII Kayoko, Chief
Ms. CHAN Amy, Architectural Consultant

Cultural Heritage Protection Cooperation Office,
Asia/Pacific Cultural Centre for UNESCO (ACCU)
Nara Prefectural Government “Horen” Office, Ground Floor
757 Horen-cho, Nara 630-8113
Office Phone: +81-742-20-5001　Office Fax: +81-742-20-5701
E-mail: nara@accu.or.jp

4. List of Tutors and Interpreters:

Ms. HONDA Satoko

Japanese Association for the Conservation of Architectural Monuments
1-28-10 Hongo, Bunnkyo-ku, Tokyo 113-0033
Office Phone: (+81) 3-5800-3391　Office Fax: (+81) 3-5800-3390
E-mail: kikaku@bunkenkyo.or.jp

Ms. NOJIMA Yuuka

Graduate of Arts History, Kyoto University

Ms. SAWADA Chika

Graduate Researcher, Nara Women’s University

Ms. HATA Chiyako (Interpreter)

Training Coordinator, JICE Osaka

Ms. HIGASHIDA Natsuyo (Interpreter)

Training Coordinator, JICE Osaka