Training Course on Cultural Heritage Protection
in the Asia - Pacific Region 2007

Preservation and Restoration of Wooden Structures

18 September - 19 October, Nara, Japan

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

Agency for Cultural Affairs, Japan (*Bunkacho*)

National Institute for Cultural Heritage,
National Research Institute for Cultural Properties, Tokyo
Nara National Research Institute for Cultural Properties

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

The opening ceremony at ACCU Nara

The reconstruction work site of Toshodai-ji Temple

Drawing a floor plan and an elevation of the old farmhouse; the lecturer made a comment on the drawing.

The closing ceremony at Kasugano-so Hotel

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Preface

The Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU) was established in August 1999 with the purpose of serving as a domestic centre for promoting cooperation in cultural heritage protection in the Asia-Pacific region, and will almost celebrate its 10th anniversary. Since its inception, our office has been implementing a variety of programmes to help promote cultural heritage protection activities, developing broad cooperation with the Agency for Cultural Affairs, Japan (*Bunkacho*), Nara National Research Institute for Cultural Properties, the Nara Prefectural Government, the Nara Municipal Government, universities, and museums.

The ACCU Nara's activities include, training programmes for the human resources development, international conferences and symposia, the training of young leaders in cultural heritage protection supported by the UNESCO/Japan Funds-in-Trust, our website for the dissemination of information relating to cultural heritage protection, and the world heritage lectures in high schools. This year, I have a pleasure to announce that ACCU Nara Office has begun offering "the Local Training Workshop" which dispatches a group of lecturers from Japan and implements the practical training on cultural heritage protection on sites. In addition to that, we have set up the system of "International Correspondents" for the purpose of establishing even closer ties with the countries in the Asia-Pacific region, and appointed the correspondents from each country, who will periodically send reports on cultural heritage protection in their country.

The training courses on cultural heritage protection in the Asia-Pacific region have comprised a significant part of our activities for heritage protection, with two themes on alternate year: "Preservation and Restoration of Wooden Structures" and "Research, Analysis, and Preservation of Archaeological Sites and Remains." This was the eighth training course on wood structures and 14 participants from across the Asia-Pacific region gathered in Nara to join the course with high expectation.

The areas surrounding Nara are blessed with wealth of wooden structures, some of which have been inscribed on the World Heritage List such as Horyu-ji Temple. These old wooden structures have been preserved, repaired time to time, and handed down to us in a thousand years. Therefore much information about techniques and materials for the sustainable preservation of wooden structures has been passed down and accumulated. In addition, the philosophy or principle of the preservation and restoration was also developed.

Thus in the Nara region, there survives a large number of ancient wooden structures which are unique in the world; there are ample human resources working on a daily basis to carry out conservation; and

the philosophy of restoration has been cultivated through year's experience and is widely accepted by the local community. The ACCU Nara has chosen "Nara" as the training venue because we can take full advantage of its environment.

I believe the participants were able to learn not only the techniques and knowledge relating to conservation and restoration of wooden structures but also the importance of local community by visiting the cultural heritage on-site: the way how local people cared for the cultural heritage; their views; their willingness to protect heritage and hand it down to posterity; their daily society-wide efforts. Cultural heritage cannot be protected solely by the efforts of experts or specialist. I am sure the participants understood the need and importance of respecting the views and initiative of the local community as well as joining hands with them in the conservation activities.

Finally, I would like to express my profound appreciation again to ICCROM, the Agency for Cultural Affairs, Japan (*Bunkacho*), Nara National Research Institutes for Cultural Properties, the Nara Prefectural Government, and the Nara Municipal Government for their continuous supports and cooperation for the successful completion of the training course 2007.

NISHIMURA Yasushi
Director
The Cultural Heritage Protection Cooperation Office,
Asia/Pacific Cultural Centre for UNESCO (ACCU)

I Introduction

1. General Information
2. Programme Schedule

1. General Information

Training Course on Cultural Heritage Protection in the Asia - Pacific Region 2007 -Preservation and Restoration of Wooden Structures-

(18 September – 19 October 2007, Nara)

General Information

1. Organizers

Jointly organized by Bunkacho (Agency for Cultural Affairs, Japan); 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 Ministry of Foreign Affairs of Japan; the Japanese National Commission for UNESCO; Nara Prefectural Government; Nara Municipal Government; and the Japanese Association for Conservation of Architectural Monuments (JACAM)

2. Background

The countries in the Asia-Pacific region are blessed with a wealth of cultural properties, and most of them have outstanding value in the world. However, many Asia-Pacific countries urgently need to preserve, restore, and manage those irreplaceable cultural properties through appropriate data analysis as well as thorough investigation and research in order to pass on them to future generations. In response to such a situation, ACCU has been continuously implementing a number of programmes on preservation and restoration of cultural heritage since 2000 under the joint auspices of ICCROM and Agency for Cultural Affairs, Japan, for the purpose of building professional capacity in the Asia-Pacific region. This training programme aims to provide participants with the latest methods and techniques on research, conservation, restoration, and management of historic wooden structures.

3. Dates and Venues

Course dates and duration: 18 September (Tuesday) to 19 October (Friday), 2007

Venue: ACCU Nara -- Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU) (Nara Prefectural Government "Horen" Office, 757 Horen-cho, Nara City)

Additional venues: Facilities of cooperating organizations; sites undergoing preservation and restoration, etc.

4. Objectives of the Training Course

The main objectives of the training course are to:

- provide participants with a knowledge of recording/documentation and analytical methods for wooden architecture;
- provide participants with a knowledge of principles and methodologies for preservation of wooden structures;
- provide participants with a practical knowledge of technology/techniques and hands-on training for preservation and restoration of wooden structures;
- provide participants with a knowledge of maintenance, utilization, and risk management of historical wooden structures;
- provide participants with an opportunity to network with colleagues from the region and share experiences.

5. Training Curriculum

Lectures

- Introduction to Wooden Architecture in Japan
- Introduction to Asian Wooden Architecture
- Conventions and Charters Relating to Cultural Heritage
- Survey Methods on Conservation of Vernacular Houses and Historic Towns
- Approaches to Conservation and Maintenance
- Design and Implementation of Conservation Projects
- Management and Utilization of Wooden Structures
- Risk Preparedness for Cultural Heritage
- Others

Practical Training and On-site Lectures

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

Presentations and Discussion

- Presentations on the present status of preservation in each country and exchange of views
- Recapitulation of the Training Session
- Additional presentation and discussions will also be included in the agenda

6. Participants in the Training Course

(1) The training course is offered to the following 37 signatory countries listed in the UNESCO World Heritage Convention (see below). For application, UNESCO National Commissions or UNESCO liaison offices need to submit the following documents required for those individuals nominated **no**

later than 6 July (Friday): letters of recommendation written by the head of the organization to which a nominee belongs; a profile of the nominee; a report on his/her major achievements.

*A total of 16 people will be selected from the nominees as participants in the training course.

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

(2) Qualification Requirements
Applicants should be:

1) those who are experts or equivalent and 45 years old or younger, who are engaged in the preservation, restoration or management of wooden buildings and who can make effective use of the results of the training session upon returning to his or her home country;

2) those who have a good command of English, the working language for all lectures, so that they can deliver presentations and write reports from the training session (ACCU Nara Office and ICCROM shall be allowed to utilize all contents of presentations and reports, including drawings and photographs, for future publication and cultural heritage protection programmes);

3) those who can attend the entire training programme;

4) those who submit all of the required documents (i.e. a recommendation by NATCOM, and reports) within the deadlines outlined;

5) those who will most likely continue exchanging information and interacting with ACCU after returning to their home countries;

6) those who were not previous participants in training courses organized by ACCU Nara Office (however those who have participated in the International Youth Exchange Programs can apply for this programme).

7. Notification of Screening Results

After consultations with the other organizers, ACCU will select 16 people (one person per nation only) around mid-August from among all applicants. After selection, the UNESCO National

Commissions from each country and successful applicants will be informed of the screening results.

8. Certificate of Completion

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

9. Language of the Training Session

English will be the working language throughout the course.

10. Documents for Application

(1) Application Form (Form 1)

(2) Report Relating to Cultural Heritage Preservation.

The report should be written by the applicant and should mention present and previous work engaged in by the applicant. This report will be weighted during selection of the participants.

(3) Letter of Recommendation by the UNESCO National Commission

(4) Letter of Recommendation by the Attending Chief Official (Annex 1)

(5) Documentation Indicating English Proficiency (if obtained)

11. Expenses

Expenses during the Training Course shall be borne by the ACCU, as follows:

(1) Travelling expenses:

Each of the participants (except those from Australia, Republic of Korea and New Zealand) will be provided with an economy-class return air ticket from the nearest international airport from their residence to Kansai International Airport, and transportation fees between Kansai International Airport and Nara.

(2) Living expenses:

Participants will be provided the basic living expenses incurred during the training course from 18 September (Tuesday) to 19 October (Friday), 2007. Arrangements for accommodations will be made by the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU Nara).

12. Secretariat

Cultural Heritage Protection Cooperation Office,
Asia/Pacific Cultural Centre for UNESCO (ACCU Nara Office)
Nara Prefectural Government "Horen" Office,
757 Horen-cho, Nara City, Nara Prefecture 630-8113
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E-mail: nara@accu.or.jp

2. Programme Schedule

	Date		Morning (09:30-12:30) (Lecturer / Venue)	Afternoon (13:40-16:40) (Lecturer / Venue)
September	18	Tue.	Opening Ceremony Orientation Session (ACCU)	On-site Lecture: Introduction to World Heritage in the Nara City Area (Kofukuji Temple, Kasuga Grand Shrine etc.)
	19	Wed.	Introduction to the Cultural Heritage Protection System in Japan (Mr Nishi / ACCU)	Conventions and Charters Relating to Cultural Heritage (Mr Nishi / ACCU)
	20	Thu.	Introduction to Wooden Architecture in Japan (Mr Yamato / ACCU)	Conservation of Wooden Architectural Heritage (Mr Yamato / ACCU)
	21	Fri.	On-site Lecture: Survey Method on Conservation of Vernacular Houses and Townscape Visit: Imai-cho (Important Preservation District for Group of Historic Buildings) (Mr Shimada / Kasihara City)	
	22	Sat.		
	23	Sun.	Autumnal Equinox Day	
	24	Mon.	Substitute Holiday	
	25	Tue.	Introduction to Wooden Architectural Heritage in the Asia-Pacific Region (Mr Gamini Wijesuriya/ ACCU)	On-site Lecture: Re-construction of Ancient Buildings in the Nara Palace Site (Mr Shimizu / NNRICP)
	26	Wed.	On-site Lecture: Risk Management of Cultural Properties Visit: No.15 Former Foreign Settlement of Kobe, Kobe City Museum, and Sawanotsuru Sake Museum etc. (Mr Murakami / Kobe City)	
	27	Thu.	Participants' Presentation and Discussion I: Problems and Needs for Wooden Architectural Heritage Conservation in Each Country (Ms Inaba and Mr Wijesuriya / ACCU)	
	28	Fri.	Participants' Presentation and Discussion II: Problems and Needs for Wooden Architectural Heritage Conservation in Each Country (Ms Inaba and Mr Wijesuriya / ACCU)	
	29	Sat.		
	30	Sun.		

October	1	Mon.	Prevention of Termite Damage to Wooden Structures (Mr Komine / ACCU)	Introduction to the Conservation Science for Wooden Architecture (Mr Kawanobe / NNRICP)
	2	Tue.	System and Project Planning for Restoration of Wooden Structures (Mr Murakami / ACCU)	Preparation for the Practical Training: Overall Process of Conservation (Mr Hatano / ACCU)
	3	Wed.	Practical Training: The Old Farmhouse of the Tanaka Family (Mr Imanishi, Mr Yamaguchi, and Mr Hatano / Nara City)	
	4	Thu.	Practical Training: The Old Farmhouse of the Tanaka Family (Mr Imanishi, Mr Yamaguchi, and Mr Hatano / Nara City)	
	5	Fri.	Practical Training: The Old Farmhouse of the Tanaka Family (Mr Imanishi, Mr Yamaguchi, and Mr Hatano / Nara City)	
	6	Sat.		
	7	Sun.		
	8	Mon.	National Sports Day	
	9	Tue.	On-site Lecture: Case Study on Conservation and Utilization of the Wooden Heritage Visit: Museum Meijimura, Aichi Prefecture (Mr Iida / Inuyama City))	
	10	Wed.	On-site Lecture: Case Study on Conservation and Utilization of the Wooden Heritage Visit: Hida-Takayama, Gifu Prefecture (Mr Tanaka / Takayama City	
	11	Thu.	On-site Lecture: Case Study on Conservation and Utilization of the Wooden Heritage Visit: Shirakawa-go, Gifu Prefecture (Mr Kondo and Mr Matsumoto / Shirakawa Village)	
	12	Fri.	Management and Disaster Reduction of Wooden Structures (Mr Nagao / ACCU)	Protection of Traditional Techniques and Materials for Sustainable Conservation (Mr Murata / ACCU)
	13	Sat.		
	14	Sun.		
	15	Mon.	On-site Lecture: Survey on Painting and Plan for Painting Restoration Visit: Niukawakami Shrine (Mr Kubodera / Higashiyoshino Village)	
	16	Tue.	Dendrochronology in Japan: Tree Species and Annual Rings (Mr Mitsutani / NNRICP)	Lecture: Future Tasks in the Preservation of Cultural Heritage (theory and practice)□ (Mr Aidan Challis / ACCU)
	17	Wed.	Discussion: Future Tasks in the Preservation of Cultural Heritage (theory and practice)□ (Mr Aidan Challis / ACCU)	
	18	Thu.	Writing the Final Report (ACCU)	
	19	Fri.	Summary and Evaluation of the Training Course (ACCU)	Closing Ceremony (ACCU)

Ⅱ Proceedings

1. Opening Ceremony
2. Summary of Training Course

1.Opening Ceremony

The opening ceremony of the 2007 training course was held on 18 September 2007 at the meeting room of ACCU Nara Office with fourteen course participants and honourable guests from the Agency for Cultural Affairs, Japan (*Bunkacho*), the Nara National Institute for Cultural Properties, the Nara Prefectural Government, and the Nara Municipal Government.

Opening ceremony at ACCU Nara

The opening addresses were delivered by Mr NISHIMURA Yasushi, Director of ACCU Nara Office (Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO); Mr SUZUKI Yoshimori, Director of Programme Department, ACCU (Asia/Pacific Cultural Centre for UNESCO); Mr KATSUHIRA Hiroshi, Deputy Director of Office for International Cooperation on Cultural Properties, Traditional Cultural Division, Agency for Cultural Affairs, Japan; Mr YASUDA Ryutaro, Head of Centre for Archaeological Operations, Nara National Research Institute for Cultural Properties; Mr FUKUTANI Takeo, Director of Science City and Higher Education Coordination Office, Planning Department, Nara Prefectural Government; Mr NITAKI Hisanori, Deputy Director of Lifelong Education Department, Nara Municipal Board of Education. In the above mentioned speeches, organizers and guests extended warm welcome to the participants and hoped the success of the training course 2007. At the end of the ceremony, the

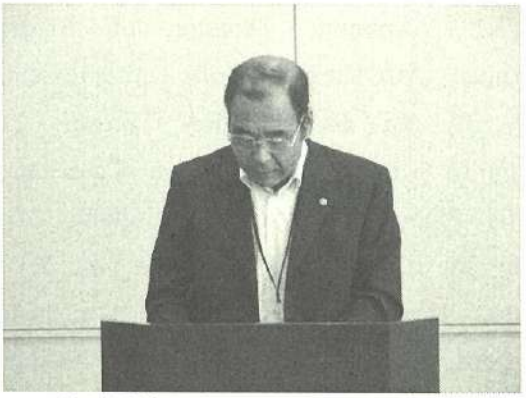
Mr Nishimura, Director of ACCU Nara Office

Mr Suzuki, Director of Programme Department of ACCU

Mr Katsuhira from Bunkacho (Agency for Cultural Affairs, Japan)

Mr Yasuda from the Nara National Research Institute for Cultural Properties

Mr Fukutani from the Nara Prefectural Government



Mr Nitaki from the Nara Municipal Government

participants introduced themselves and expressed their gratitude and expectation for participation in the training.

Finally, the participants proceeded to the Nara Prefectural Office and made a courtesy visit on the Deputy Governor of Nara Prefecture, Mr TAKIGAWA Shinsuke.

In the afternoon, an introduction to the training course was given regarding to the theme, objectives, logistics, and requirements.

2. Summary of Training Course

Various experts delivered a series of lectures in this training course. The following is a list of lectures and workshops with a brief description of their contents.

■ **Introduction to the Cultural Heritage Protection System in Japan** (19 Sep.)

NISHI Kazuhiko

In the morning, participants learned about the types of international guidelines and organizations relating to the protection of cultural heritage. In the afternoon, they learned the history and development of the systems for the protection of cultural property in Japan, in the context of the historical background.

Lecture by Mr Nishi

■ **Introduction to Wooden Architecture in Japan / Conservation of Wooden Architectural Heritage** (20 Sep.)

YAMATO Satoshi

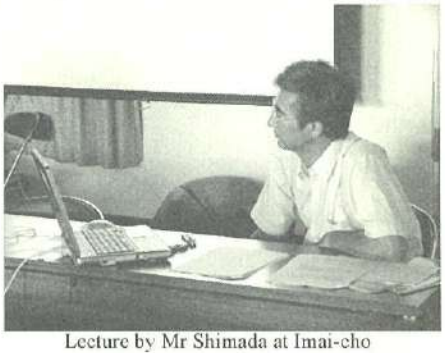
The lecture in the morning was about the history of Japanese architecture. There was instruction on the transformation of buildings through history, focusing on specific, representative examples from the prehistoric age to the modern times. There was also an overview of the Japanese systems for the protection of cultural properties and of institutes dedicated to cultural properties. The lecture covered the differences in the philosophy of restoration between Japanese wooden structures and structures in the United States and Europe. There was also an overview of traditional techniques and traditional materials in Japan. Various methods of restoration were illustrated, referring to actual examples of wooden buildings.

Mr Yamato lectured on Japanese wooden architecture: its history and conservation system

■ **On-site Lecture: Survey Method on Conservation of Vernacular Houses and Townscape** (21 Sep.)

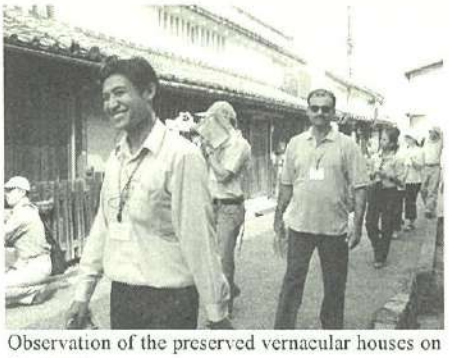
SHIMADA Toshio

Mr Shimada lectured in detail how to investigate private residences and townscapes, using the Duong Lam Village in Vietnam as a specific example. In the afternoon, participants toured the townscape of the Preservation District of Groups of Historic Buildings in Imai-cho, Kashihara City. After having an overview of the history and characteristics of the town, participants toured the facilities (fire prevention park; Imai-cho Townscape Preservation and Improvement Office; The Old Yoneyama Residence; Imai Machiya Museum). They observed fire prevention devices and fire fighting measures in the region.



Lecture by Mr Shimada at Imai-cho

Taking an overview of Imai-cho by miniature models

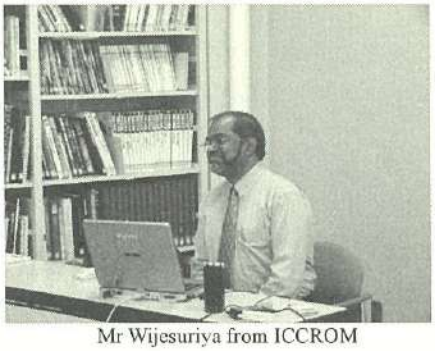


Observation of the preserved vernacular houses on the streets

■ **Introduction to Wooden Architectural Heritage in the Asia-Pacific Region** (25 Sep.)

Gamini WIJESURIYA

Participants learned the architectural heritage of Asia and an overview of the ICCROM organization. The lecturer analyzed the issues inherent in Asian wooden architectural heritage from different angles. While introducing the European Charters and values relating to the protection of cultural properties, Mr Wijesuriya stressed the importance of planning the systems for the protection of cultural properties which are most appropriate to the culture and traditions of each country in question.



Mr Wijesuriya from ICCROM

■ **On-site Lecture: Reconstruction of Ancient Buildings in the Nara Palace Site** (25 Sep.)

SHIMIZU Shigeatsu

In the afternoon participants learned site restoration methods in practice at the Heijo Palace Site. The lecture covered the sequence of events from the excavation survey of the Heijo Palace Site to the preparation of the historical site, the history of the Heijo Palace and the characteristics of the urban structure, the methods for building restoration and their advantages and drawbacks, the presentation methods within the Site, and the challenges inherent in the concept. Participants toured the outdoor exhibits in the Palace Site guided by Mr Shimizu, and visited the *Daigokuden*, the reconstruction site and its underground seismic isolation system.

Lecture by Mr Shimizu at the Nara Palace Site Museum

Visiting the reconstruction site of the First Imperial Audience Hall (*Daigokuden*) due for completion in 2010

■ **On-site Lecture: Risk Management of Cultural Properties** (26 Oct)

MURAKAMI Yasumichi

Participants heard a lecture at Kobe Study Plaza and toured the 15 Bankan and Sawanotsuru Museum. Mr Murakami made a proposal to the risk management plan against natural disasters based on the damage caused by the Great Hanshin Awaji Earthquake and based on the restoration activities that followed. Participants learned the importance of experience-based risk management planning. As a specific example of reconstruction, participants visited 15 Bankan and observed the underground seismic isolation system with detailed explanation by Mr Murakami. They also visited the Sawanotsuru Museum and learned about the importance of earthquake-proof reinforcement of historical buildings.

Mr Murakami emphasized the importance of risk management plans backed up with experiences

Explanation of the seismic isolated structure at the basement of restored building, Jugobankan in Kobe

At the Sawanotsuru Sake Museum

■ **Participants' Presentation and Discussion I** (27 Sep.)

Gamini WIJESURIYA and INABA Nobuko

Each participant made presentation on the present situation in their own country in regard to the protection of cultural properties. Presenters gave an overview of the cultural heritage of their country, as well as actual examples of activities relating to the conservation of cultural properties, and of the problems inherent in conservation activities.

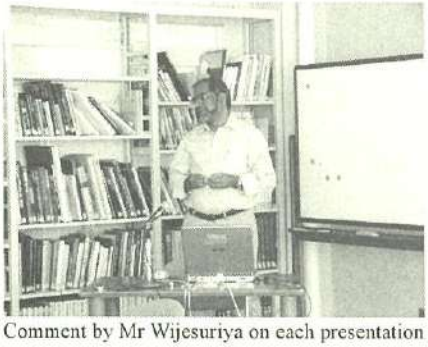
In the classroom

Country report presentation by Ms Kuncoro

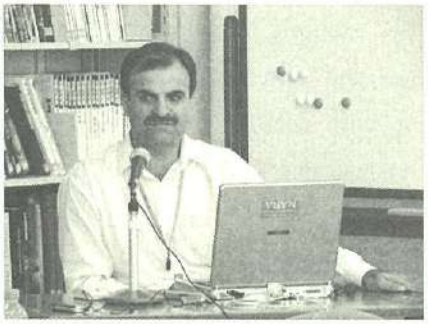
■ **Participants' Presentation and Discussion II** (28 Sep.)

Gamini WIJESURIYA and INABA Nobuko

Presentation of country reports, and discussion (continued).



Comment by Mr Wijesuriya on each presentation



Country report presentation by Mr Khan

■ **Prevention of Insect Damage to Wooden Structures** (1 Oct.)

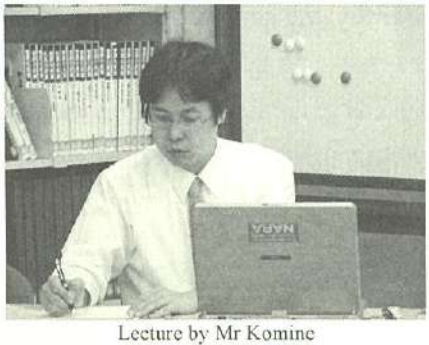
KOMINE Yukio

Lecture of descriptions of the actual situation relating to insect damage to wooden cultural properties in Japan, as well as an overview of species-specific measures for pest control. There was a detailed explanation on various termites, which were causing particularly serious damage to wood.

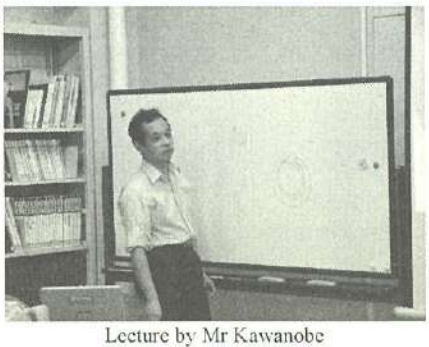
■ **Introduction to the Conservation Science for Wooden Architecture** (1 Oct.)

KAWANOBE Wataru

In the afternoon, a lecture on wood preservation and chemical materials were delivered. The types of resins used in wood preservation were described, and the differences in their structure. Participants learned the characteristics of synthetic resins and adhesives, and their properties. Mr Kawanobe also introduced wood preservative agents and insecticide to prevent deterioration of wooden structures.



Lecture by Mr Komine



Lecture by Mr Kawanobe

■ **System and Project Planning for Restoration of Wooden Structures** (2 Oct.)

MURAKAMI Jin-ich

The lecture went over about 100 years of the Japanese systems and frameworks for the protection of cultural properties, which began in 1897 with the Law for the Protection of Old Shrines and Temples. Participants learned about the qualifications of the senior engineers involved in heritage building restoration projects in Japan, the ideals and realities of handing down traditional skills and crafts through such means as constructing organizations relating to restoration and repair, and that restoration projects span a wide range from repair of parts and components to restoration projects involving complete dismantling operations. There were also descriptions of specific examples relating to the planning of the restoration project, designing the restoration work, and implementing the project.

■ **Preparation for the Practical Training: Overall Process of Conservation** (2 Oct.)

HATANO Tsuneo

Participants received an orientation on the Old Tanaka Family Residence in Nara: themes of the on-site training and its specific procedures.

Lecture by Mr Murakami

Lecture by Mr Hatano

■ **Practical Training: The Old Farmhouse of the Tanaka Family** (3 Oct.)

HATANO Tsuneo, IMANISHI Yoshio and YAMAGUCHI Isamu

General information of the preserved old house by Mr Yamaguchi

Workshop at the Old Tanaka Family Residence, which was located in Gojo-cho, Nara. At first, Mr. Yamaguchi gave an overview of the history and architectural features of the Residence. Subsequently, the participants were divided into five groups of three each, and began surveying the building to create floor plans and enter the dimensions by measuring. Lastly, the lecturers commented on each drawing of the day.

■ **Practical Training: The Old Farmhouse of the Tanaka Family** (4 Oct.)

HATANO Tsuneo, IMANISHI Yoshio and YAMAGUCHI Isamu

Participants diligently continued to draw the Old Tanaka Family Residence. Today, they proceeded to draw cross-sections of the house and entered the dimensions.

■ **Practical Training: The Old Farmhouse of the Tanaka Family** (5 Oct)

HATANO Tsuneo, IMANISHI Yoshio and YAMAGUCHI Isamu

Participants continued working on the cross-sections while also entering notes on the drawings in regard to the structural members, such as wood species, configuration, and material characteristics. In the afternoon they toured the construction site for the dismantling and restoration of the Main Hall at Toshodai-ji Temple. Mr. YAMADA Hiroshi, Toshodai-ji Office of Cultural Property Preservation, gave them an overview of the reconstruction work and described newly-discovered findings revealed through investigations during dismantling repairs.

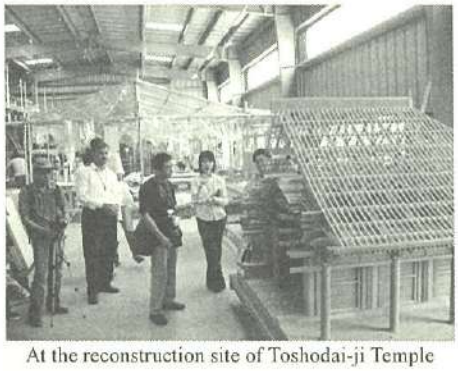
Drawing the floor plan of the house by measuring

Comments by lecturers

Drawing the elevation of the house by measuring

Lecturers appreciated the industrious work of the participants and made overall comments in front of the Old Farmhouse

Investigating the attic of the house

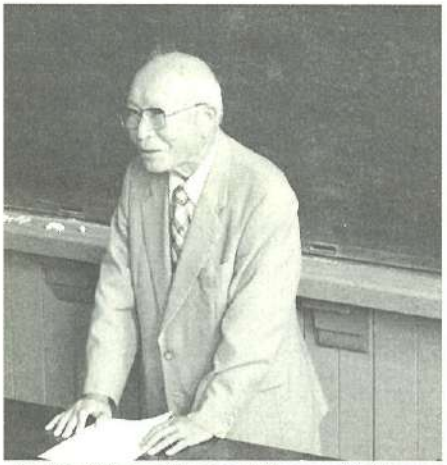


At the reconstruction site of Toshodai-ji Temple

Closely observing the restored roof of the main hall of Toshodai-ji Temple

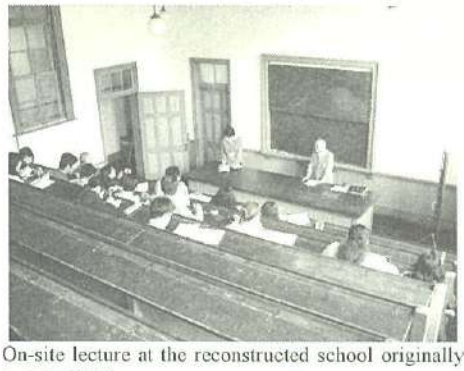
■ **On-site Lecture: Case Study on Conservation and Utilization of the Wooden Heritage** (9 Oct.)

IIDA Kishiro



Mr Iida, Director General of Museum Meiji-mura

On-site lecture at the Museum Meiji-Mura, Inuyama City, Aichi Prefecture. At first, participants heard an overview of the history of the conservation of modern architecture, the sequence of events which led to the establishment of the Meiji-Mura, and about architectural museums as a method of conservation. Then they toured the Museum Meiji-Mura with detailed explanation of the philosophy and methods of conservation: Tomatsu House, the Shibakawa Mataemon Residence, the Kurehaza Theater, and the Old Main Entrance of the Imperial Hotel.



On-site lecture at the reconstructed school originally built in 1890

At the tearoom of Tomatsu House in Museum Meiji-mura

■ **On-site Lecture: Case Study on Conservation and Utilization of the Wooden Heritage** (10 Oct.)

IWATA Takashi

On-site lecture at Takayama City in Gifu Prefecture. Participants studied actual cases of conservation, restoration and utilization of cultural properties. They toured the Preservation District for Groups of Historic Buildings in the city with the commentary on the ideals and realities of the practice of conservation. At the House of Yoshijima, an Important Cultural Property, they closely observed the characteristics of vernacular houses preserved in the Takayama region and the actual utilization methods of the historic buildings. At the Takayama Local History Museum (Kyodokan), they also learned the history and culture of Takayama.

On-site lecture by Mr Iwata

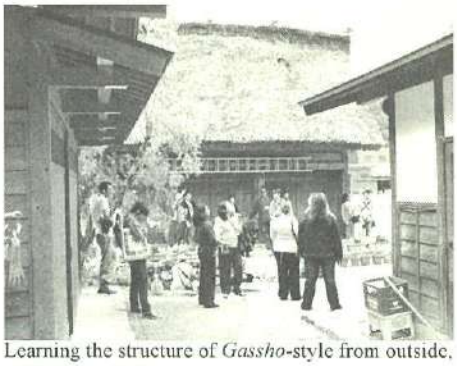
Observing historic townscape of Takayama city

■ **On-site Lecture: Case Study on Conservation and Utilization of the Wooden Heritage** (11 Oct.)

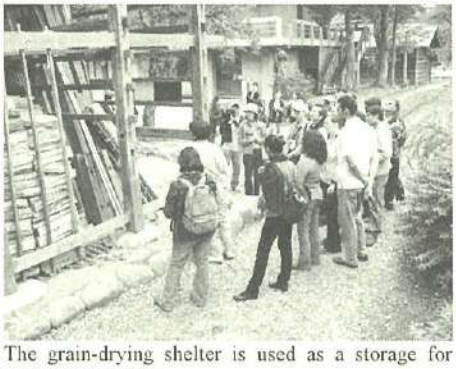
KONDO Hisayoshi and MATSUMOTO Keita

On-site lecture at Shirakawa Village in Gifu Prefecture. Participants learned actual cases of conservation, restoration and utilization of agricultural villages. First, they had a panoramic view of Ogi-machi and learned the history and the conservation management in the district. Mr Kondo also lectured in detail not only conserving the vernacular buildings in the community but about the preservation of the surrounding environment including stone walls, rice paddies, and farmland. Afterward they toured through the village to observe the interior of the Kanda House, the Important Cultural Property, where they learned the traditional construction methods for the *Gassho*-style roof.

Overlooking the whole Shirakawa-mura from the observation platform



Learning the structure of *Gassho*-style from outside, at Wada-family house



The grain-drying shelter is used as a storage for wooden materials.

Learning the structure of *Gassyo*-style from inside, at Kanda-family house

■ **Management and Disaster Reduction of Wooden Structures** (12 Oct.)

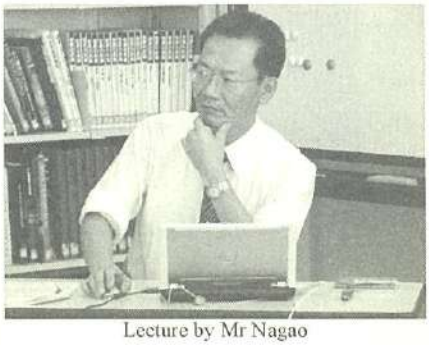
NAGAO Mitsuru

Participants learned how to build management plans for disaster prevention. The lectures were divided on four topics: the maintenance and management necessary for the conservation of cultural properties, environmental protection, risk management, and utilization of cultural properties. At the same time there were presentations of specific examples of fire prevention and fire fighting equipment, lightning protection systems, and earthquake-proofing measures to prepare for natural disasters such as fires, earthquakes, and typhoons.

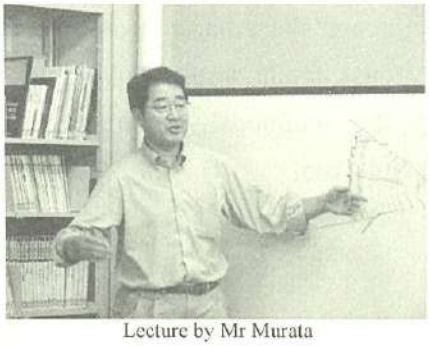
■ **Protection of Traditional Techniques and Materials for Sustainable Conservation** (12 Oct.)

MURATA Ken-ichi

The lecture on the importance of handing down traditional skills and securing materials for repair. Plant-based roofing and coating materials used exterior of the building require to be replaced at 30 to 40 years intervals, and Mr Murata pointed out that this cycle in particularly essential for the handing down of skills to the next generation. There was an explanation on how important it was for the approach and philosophy of repair on an as-needed for conservation, instead of repairing after sever damage. The lecturer also commented on how training programs was set up for architects, cartenters, painters, and rawhide craftsman given the recent changes in the social environment which made it difficult to convey and hand down tradional skills. All the participants seemed to understand the importance of both securing of resources and the handing down of traditional skills.



Lecture by Mr Nagao



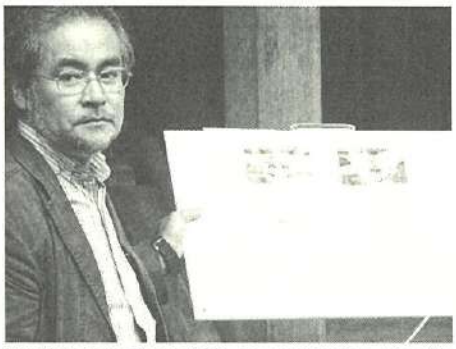
Lecture by Mr Murata

■ **On-site Lecture: Survey on Painting and Plan for Painting Restoration** (15 Oct.)

KUBODERA Shigeru

Recording all the information obtained by investigation and observation

On-site lecture at the Niu-Kawakami-jinja Shrine in Higashi-Yoshino Village, on the topics of colour surveys and planning for repainting. Participants heard a detailed explanation on the differences in repair techniques depending on the extent of damage, and on research results relating to ancient painted decorations revealed through repair projects. Through the analysis of paint remaining on



Mr Kubodera showed his own restoration plan for paintings

the building, participants had practical training on methods of investigating and restoring the colours and patterns on the original building. While observing the building, participants also heard a lecture on different pigments and the differences in their durability, and the different speeds at which they became discoloured. Finally, each participant drew up their own plans for repainting of Niu-Kawakami-jinja Shrine, and the plans were commented by Mr Kubodera.

Discussion on the present state of the colouring and the required painting restoration plan

■ **Dendrochronology in Japan: Tree Species and Annual Rings** (16 Oct.)

MITSUTANI Takumi

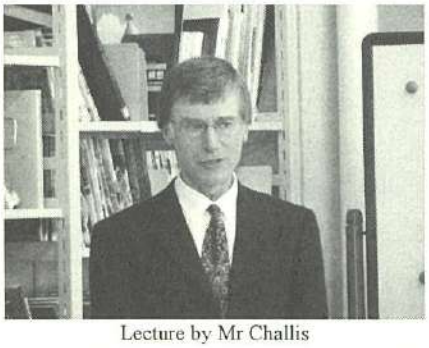
Participants listened to an explanation on the use of master chronologies and their validity in the field. Actual examples of master chronologies being used were enumerated while participants learned the validity and necessity of this method for the investigation of cultural properties.

■ **Lecture: Future Tasks in the Preservation of Cultural Heritage I** (16 Oct.)

Aiden CHALLIS

Participants heard a lecture on the ideals and realities of the conservation of cultural heritage. They also listened to explanations on the principles of cultural heritage conservation, the principles and mechanisms of the convention concerning the protection of the world cultural and natural heritage, and a status report on registration in Asia. In addition, Mr Challis introduced the historical buildings and the Maori historical district in New Zealand and made detailed commentary on the ideals and realities of cultural heritage conservation by using these as examples.

Lecture by Mr Mitsutani



Lecture by Mr Challis

■ **Discussion: Future Tasks in the Preservation of Cultural Heritage II** (17 Oct.)

Aiden CHALLIS

Ms Toa showed her gratitude for Mr Challis

Continuation of the lecture on the ideals and realities of the conservation of cultural heritage. Participants had individual presentations and group discussions on the following subjects.

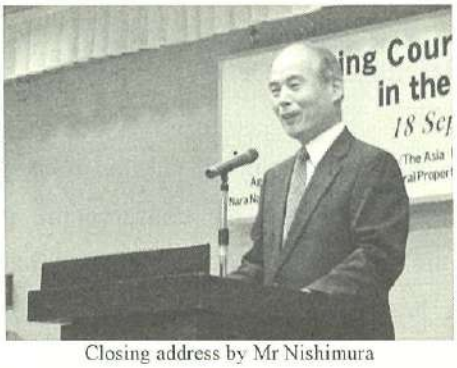
1. On the basis of the principles of the Benchmarks Meeting held in Paris in April 2007, participants had a discussion on what values are held in common throughout the world.
2. Group discussions on the basic principles of the WHC-31 session.
3. Individual presentations on matters which he or she found to be beneficial and matters which will be useful in conservation projects.

Participants also had a group discussion on what kinds of international projects could be engaged in by the home countries of the participants for the preservation of wooden architecture in the Asia / Pacific region.

■ **Writing the Final Reports** (18 Oct.)

Each participant submitted a final report.

■ **Summary and Evaluation of the Training Course / Closing Ceremony** (19 Oct.)



Closing address by Mr Nishimura

Awarding a certificate of completion

Participants and ACCU staff exchanged views on the training course for better implementation in the future. There were many suggestions which would be helpful for ACCU training activities. In the afternoon, closing ceremony was held at Tenpyo-no-Ma in Kasugano-So Hotel. The closing addresses were delivered by Mr NISHIMURA Yasushi, Director of the Cultural Heritage Protection Cooperation Office of the Asia/Pacific Cultural Centre for UNESCO, Mr YASUDA Ryutaro, Head of Nara National Research Institute for Cultural Properties, and Mr Aiden CHALLIS, as a representative from ICCROM. The Certificate of Completion was awarded by Mr Nishimura to each participant with words of appreciation of their efforts. Mr Hooman Sobouti from Iran and Ms Vaveao Vavao Toa from Samoa expressed their acknowledgements and gratitude for the organizers and lectures on behalf of all participants.

III Country Reports by Participants

Cambodia

SY Basith
Civil Engineer
Department of Monument and Archaeology I
Landscaping Unit, APSARA Authority

Problems and Needs for Cultural Heritage Protection and Restoration

INTRODUCTION

Cambodia, with its capital in Phnom Penh, is a country of 12,500,000 inhabitants and covers an area of 181,035 sq kilometers, and is bordered by Laos and Thailand on the North, Vietnam on the south and east, and the gulf of Thailand on the west. This region corresponds to the present area of mainland Southeast Asia.

The Khmer (Cambodian people) were among the first in Southeast Asia to adopt religious ideas and political institutions from India to establish centralized kingdoms encompassing large territories.

Between the seventeenth and eighteenth centuries, Cambodia was dominated by its neighbors, Thailand and Vietnam. France turned it into a protectorate in 1864, creating Cochin China in the Indochinese peninsula, where France had control of Cambodia, Laos, and Vietnam for almost 100 years. In 1907, France reached the France-Siam Treaty in which France gave Kut Island to Siam for Cham Yeam border pass in Koh Kong province. In the early 1950s, then Prince Norodom Sihanouk was appointed by France as a King of Cambodia, but later he made his best efforts to demand independence from France. After France granted Cambodian independence in 1953, Prince Norodom Sihanouk abdicated the throne to become a head of state, having founded the Sihanouk Regime whose policy sought to keep the country neutral in an effort to avoid being caught up in the Vietnam war while the Cold War was intense. Cambodia had been a victim of the Cold War between the blocks of the US and the Soviet Union. The politicians broke into many groups who favored the US, Vietnam communists, and Thailand, plus the royalists, and the security was very bad in rural areas.

Sihanouk was ousted in a coup in 1970 led by General Lon Nol, which prompted Sihanouk to form an alliance with the Khmer Rouge, a radical pro-Chinese Communist guerrilla movement fighting the new US-backed government. In 1975, the Khmer Rouge, led by Pol Pot, captured Phnom Penh, toppled the Lon Nol regime and established a communist regime known as Democratic Kampuchea or Khmer Rouge, a radical agrarian society under which more than one million people died of starvation, disease, overwork and mass killings. Pol Pot as Prime Minister led the country under the communist policy of self reliance, with support from China. He evacuated the people from the capital to rural areas where they lived in cooperatives with common kitchens, closed all schools and markets in Cambodia, abolished money and the baking system.

In late 1978, following two years of Khmer Rouge attacks across the Vietnamese border aiming to recover the Kampuchea Krom area that Cambodia had lost to Vietnam, Vietnam invaded Cambodia and set up a government in Phnom Penh headed by Khmer Rouge defectors and pro-Vietnamese communists called the People's Republic of Cambodia, also known as Heng Samrin Regime, on 7 Jan 1979. For thirteen years an exile coalition government, including the Khmer Rouge and non-communist resistance groups, continued to wage guerrilla war against the Vietnamese-backed regime in Phnom Penh. The country again fell back into the civil war, which had lasted more than 30 years.

On 23 October 1991, the four warring Cambodia factions signed a UN-sponsored peace agreement to set up a peace-keeping force to monitor the disarmament of the four armies, and civilian personnel to monitor a transition period leading to a free election. In May 1993, the first multi-party free election took place, and in September a new constitution was promulgated. The Cambodian people took politics into their own hands in 1993. Undeterred by threats of violence, they flocked to polling stations in May for the first multi-party election in more than 25 years. More than ninety percent of the country's registered voters cast ballots, demonstrating an unexpected commitment to democracy.

After long years of debilitating war, the country has at last found peace and security, and is now entering a period of economic development. Cambodia, a member of ASEAN, is at the geographic center of the countries making up the Mekong Region, home to some 225 million people, offering exciting potential for economic expansion. A recent conference of international donors and countries that are providing financial assistance for the restoration of Cambodia confirmed that this country enjoys the confidence of the international community. The Cambodian Government has been successful in creating the conditions needed to draw both investors and tourists back to Cambodia.

GEOGRAPHY AND HISTORY OF ANGKOR

The Angkor plain is found in the northwest of Cambodia, in the province of Siem Reap. It is dominated to the north by the Kulen Plateau and bordered to the south by the Great Lake (Tonle Sap).

Siem Reap is the small gateway town to the ruins of Angkor, located 250 km northwest of Phnom Penh and 15 km north of Tonle Sap.

The name of "Angkor" surfaced in the sixteenth century – the place was called Anjog, Onco, Anckoor, Ongcor, Angcor, and vat Nokor by western explorers. Angkor is believed to be a corruption of the Khmer "nokor" (nakhon in Thai, and nagara in Sanskrit), meaning the royal city of the Khmer empire. It was built between the ninth and fourteenth centuries as the administrative and religious center of the powerful Khmer empire. Bas-reliefs like those at the Bayon and Angkor Wat provide clues about life at Angkor.

The Angkor Wat temple was built in the twelfth century during the reign of King Suyavarman II (1112-1150), and is dedicated to the Hindu God Visnu. Angkor Wat is the main feature of Cambodian

tourism, the most visited temple among hundreds of Khmer temple ruins.

Angkor, the capital of the Khmer empire from the ninth to the thirteenth centuries, ruled a vast territory that is now Cambodia, Viet Nam, Thailand and Laos. During this period, the Khmers built hundreds and hundreds of temples and Buddhist monasteries throughout Thailand, Laos, and Cambodia, and the main temples are still seen sprawling over the hundreds of historical sites in these countries. The main temples of Angkor civilization and political culture, linked with its administration and power, are located in Siem Reap province.

ANGKORIAN ARCHITECTURE

How were these colossal works constructed? The caste system of the Khmers was similar to the hierarchy extant in ancient Egypt and Mexico when the Pharaohs and Mayas erected their pyramids. There was a line of kings, a class of priests and merchants, and castes of numerous slaves (captives of war), laborers, masons, sculptors, and decorators.

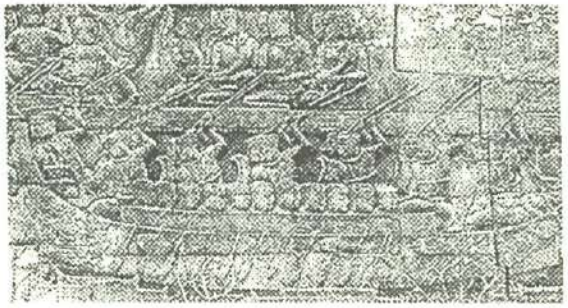
Artisans, including architects, belonged to the lower echelon of society. They remain anonymous – nothing is know of the stone masons and sculptors who worked for the Angkorian kings. Wooding buildings in the Angkor area have not survived. The use of brick or stone was reserved for sacred temples and monuments.

Architects must have worked with priests on the design of such buildings, as a number of them are temple-mountains representing the paradise of Mount Meru, the center of the universe common to Hindu Buddhist cosmology. A rigidly geometric and symmetric pattern, radiating in concentric zones, composed the ground of plans of a number of monuments at Angkor. The effect is similar to a mandala or sacred diagram of the cosmos, with Mount Meru at the center. To translate these concepts into three-dimensional form, Angkor's architects probably worked from wax models.

East Angkor buildings were made of large bricks, with mortar of vegetable-based adhesive. From the tenth century on sandstone foundations were laid, and laterite was used in the walls. Laterite is a red, porous material that is actually a kind of iron-bearing soil. It is easily quarried up, cut into large blocks, then left to harden upon exposure to the air. Angkor Wat and Angkor Thom rest on laterite foundations, the temples themselves were mostly fashioned from sandstone quarried at Phnom Kulen, 45 km northeast of Angkor. The sandstone exhibits a wide range of coloration, from gray to pinkish, yellowish buff, or greenish. The sandstone was floated down the Siem Reap river and dragged to the building site using ropes, rollers, and winches. A bas-relief in the west inner gallery of the Bayon depicts the hauling and polishing of sandstone. The roughly dressed blocks were perfectly fitted, smoothed off, and the surfaces decorated with bas-reliefs; some stones were held in place with bronze clamps, others relied entirely on gravity.

WOODEN ARCHITECTURE

Ox-cart in bas-reliefs of Bayon Temple



Boat in bas-reliefs of Bayon Temple

In spite of the wealth of stone buildings, most Khmer architecture was in wood. Excavations have revealed several elements of these, which are insufficient however for reconstructing any particular building, but other sources of information are available, including roof tiles which have been discovered in great quantity, modern beamwork techniques which preserve traces of ancient methods, and wooden buildings illustrated in stone reliefs, in particular at the Bayon.

The most important remains which allow for reconstitution are those of the Royal palace. Excavations have been conducted on the site, several stone reliefs illustrate palaces, and there are even some lines devoted to the building in the account of Chou Ta-Kuan (Zhou Daguan). These exceptional structures were conceived like temples and were built by competent master craftsmen. The houses of relatively well-off Khmers did not benefit from such attention and were built following models by artisans. This is true today; one form is repeated more or less successfully according to the means of the future occupant. The architectural illustrations on Khmer reliefs are almost always in orthogonal projection, which excludes all effects of depth, and also are only a decoration to a particular scene. The buildings are not reproduced for themselves but as scene-setters. These limitations considerably restrict the reliability which can be attached to the illustrations shown in the reliefs, but it is from these images that we shall attempt to describe these wooden structures.[1]

The first which we shall attempt to reconstitute is located on the relief of the western panel of the north side of the Bayon. It shows a long open building raised on piles, in front of which can be viewed a procession of animals.[2] This building is marked by projections where the most important persons would be seated. The roof is supported by pillars, without any indication of its base. But imposing capitals, protecting the ends of the pillars, are clearly shown directly beneath the line of end tiles. Between the pillars partly-pulled curtains are hung. The general form is that of a side gallery (given the way it is illustrated, it is impossible to say if it was doubled). The set-back of the plan is underlined by superimposed pediments, one at the roof coping is marked by a line of ridgepole finials.

A very similar structure, though with an upper floor, can be seen in the lower gallery of the Bayon, between towers 35 and 36. The entrance is from the side, and the elevation is not shown, but access to the upper floor is clearly indicated by a staircase which is shown in profile, and at its foot,

likewise in profile (the doorway shown is false and the portico facing the house is seen from the side) is a small shrine, doubtless built for the protective house god. The ground floor gallery probably goes all round the building, and is marked by small covered projections with short perpendicular roofing, and the entrance is topped by a pediment. This gallery is probably independent of the main building; the ridge-pole has a row of finials, which would not be there if it were a half-gallery linked to the main structure. From this there is a third building in the middle of the platform forming the base of this storey, which would greatly extend an already huge building.

This type of structure, with an extensive terrace in front of the main building on a raised floor, is carved on a relief of the south wall of the gallery between towers 37 and 22 of the Bayon. The ground floor gallery is shown as in the previous relief: it has a simple roof in two sections with openings forming porticoes. The terrace of the first floor is closed off by a balustrade consisting of a naga form, probably in stone, and the central core of the building is on piles. The space between the pillars is filled by what appears to be a vast tent; above are three buildings linked to each other by a gallery covered, as is standard, by tiles and a line of finials on the roof-ridge. But the particular interest of this carving is the capping of the three buildings, divided into four levels. At the bottom level is an opening, the exterior side of which is formed by a naga shape linked to the second level on a structure covered with tiles, and which is inserted laterally into the roofing of the gallery. The third level consists of a motif probably in light materials, on which is raised a roof finial. In the three cases, these are in the form of a trident, but each is completely different in size and setting. It would seem that this is probably an important dwelling, transformed for a feast day into a temple; for this reason the roof has been topped with light materials. This is what the stone structures represent in a more lasting form.

Simpler dwellings had much the same plan; thus the house shown in the relief located between tower 23 and 24 of the Bayon also comprises a gallery closed off by curtains going round a central building. Apart from the gallery, the upper storey of the central building is closed off by wooden panels in which windows have been inserted, decorated with bars of carved wood, which stone architecture so often reproduced. On one of these windows, a blind is half lowered in front of the balusters, like the decoration depicted in durable materials. The building has a tiled roof, and on the central part of the gallery the penetration of the roof is indicated exceptionally by the setting-back of the bargeboard.

In this same relief is another similar building, but much less carefully illustrated. Its gallery is shown interrupted by pavilions which correspond to the set-back of the cornice and the bargeboards, giving a more attractive shape. The central building is closed off by wood panels with barred windows, at which curtains are hung on the outside; to raise them they are simply tied around a decorative ring. The roof is tiled except for the central part of the main building, which is covered by a dome, probably temporary, which extends over the crossing of the roofs at the top. It is from these last two illustrations that an attempted reconstitution has been made.

These buildings, by their complexity and the care given to their construction, were, if not

exceptional, at least fairly unusual. Most of the small houses shown are simple shelters probably covered with thatch. There are very many of them on the reliefs of the first gallery, where, for example, vendors trade and a woman is even giving birth under a structure of primitive simplicity.

The other source allowing the reconstitution of buildings is derived from traces of wood found in different excavations, and the traces left by pillars and beamwork on stone buildings. These are only complements to existing architecture, but provide sometimes quite explicit architectural indications. When B. P. Groslier uncovered the north wall of the first stage of the Terrace of the Leper King, he excavated the fill and found the base of four pillars of very large dimensions, the foundations of which comprised a simple wooden crossing. Recent excavations in the royal palace enclosure conducted by J. Gaucher have uncovered very important wooden elements, and even some embedding features, which allow for possible reconstitution.

The use of wood reinforcement is an ancient technique in Khmer architectures. For example, in the Bapuon, the lintels of the gallery windows are hollowed out to allow for the insertion of a beam which was supposed to absorb the stress, as the builder had such little confidence in the properties of stone. Needless to say the wood has disappeared and only the hollowed stone survived. It is likely that during the thirteenth century, after having shifted so much to stone, there was a return to wood; certainly the additions at this period to the hung temples of Preah Khan and Ta Prom were made of wood. At Ta Prom we have reconstituted a portico in front of the west entrance pavilion of the southern annex shrine.

A considerable change in the beamwork can be seen: the purlins and the horizontal elements are doubled and separated by large dowels, showing considerable progress in the use of sagging beamwork, but this makes use of a lot of wood, and it was probably for this reason that the technique showed no further development. At the same period, many wooden structures were added to Phimeanakas, in particular the stairways were covered with a roof which was probably stepped. From the second level of the string walls, on each step there is, on each side of the stairway, a cylindrical hole made to receive a strong pillar. Theses pillars were the base of a roof covering the stairway; this roof was strengthened on both sides by a half-roof. These last two elements followed the stone gallery of the upper level of the building without completely hiding the stone, which probably appeared beneath the roof of the wooden structure. The appearance of the building was thus considerably changed.

At the important site of Wat Phu, probably of the same period, the surrounding gallery which was originally built in wood (probably during the reign of Suryvarman I) collapsed when the cliff slipped. It was decided to restore it while considerably changing its elevation. The reconstruction we have proposed depends essentially on the recesses of the horizontal beams in the retaining wall of the terrace. At first the gallery was simply covered by a roof in two sections; the rebuilding kept the same plan but the elevation was different. A gallery with aisles was desired, so the main roof is topped by a smaller roofing, resting on pillars which passes through the main building. This construction technique is still employed today in the Battambang region.

Though most of the bridges of this period were built in stone, it is likely that those constructed in wood were still numerous; for example that located on the axis of the Gate of Victory at Angkor Thom, whose laterite base has been discovered along with a part of the layout of the pillars. A reconstitution of this construction is not possible since it has mostly been covered by the Spean Thma built in the fifteenth or sixteenth century. However the reliefs of the first gallery of the Bayon (south side, west wing) show a floating bridge comprised of faggots tied together with ropes. This device was sufficiently strong for transporting elephants, though their loads were removed for the crossing.

The wooden structures required doorframes, notably the monumental doors which we are not able to reconstitute. On the site of Phom Bayang, where an important wooden structure was added to the temple but the remains of which are insufficient to reconstitute in their entirety, a very well preserved socket has been found with all its related parts. This door, giving its layout, certainly had two panels; the axis of each was covered with bronze and turned freely in a cup probably containing grease. The cup turns inside another which is fixed inside the threshold.

It is almost impossible, giving such fragmentary evidence, to try to reconstitute the overall layout of the cities. However, thanks to the reliefs in particular, we have some indications. First of all, the dwellings were not contiguous; as today, houses were detached from each other, surrounded by a small plot of land serving as a garden. The commercial quarter apparently comprised stalls set up with small thatch roofs resting on a few wooden posts. The main axes of the town of Angkor Thom were lined with canals; these were the best sites to set up stores. Around the Bayon, in excavations conducted close to the temple, numerous very ordinary tiles have discovered, and were probably not linked to the temple. They most likely came from the small shelters for traders located around the Bayon, which remained there until the sixteenth century. Similar installations were discovered by B. P. Groslier around the temple of Baksei Chamkrong, close to the southern gate inside Angkor Thom. Lastly, excavations near Thomanon have produced similar finds linked to the ceramics dating from the twelfth and thirteenth centuries, which is to be expected, since at this period, Thomanon was the first resting spot on leaving the city to the east.

While the layout of the commercial zone can be established by archaeological excavation, it is scarcely possible to locate the residential quarters. Excavations up to now have been conducted close to a temple or a stone structure, and so are unlikely to reveal residential quarters.[3] In spite of this uncertainty, we have attempted a reconstruction of a part of the town of Angkor Thom, along a street boarding a canal.

WOODEN STRUCTURES

For thousands of years wood was the only material known to resist both tension and compression and for this reason it was frequently used for horizontal structures such as beams, slabs and roofs, and as an alternative to masonry in arches and vaults; wood is also used on the surfaces of walls, domes and arches.

If so few timber structures survive today compared with masonry structures, it is because they were more often used to build less valuable buildings (whose life expectancy was therefore shorter), and because many wooden structures were destroyed by fire and due to their greater susceptibility to variations in the micro-climate. Condensation of water vapor in the absence of ventilation, and the presence of noxious substances in the air facilitate the development of microscopic moulds that cause wood to rot.

Piles are particularly affected by decay, resulting from periodic variation in ground water levels, and similar phenomena occur at the ends of beams inserted into masonry which can be affected by the humidity that penetrates from the external face. A technique of placing the beams on small corbels rather than directly in the wall avoids this problem.

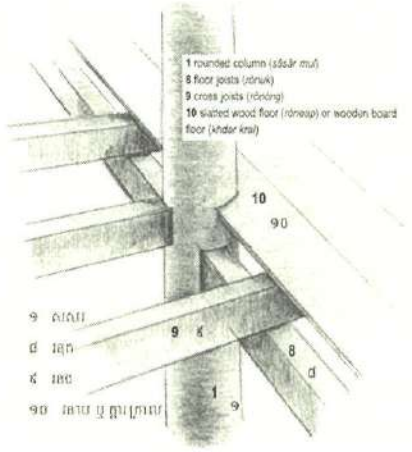
Insects such as termites, woodworms, etc., can also quickly lead to deterioration in wood by creating a network of small holes.

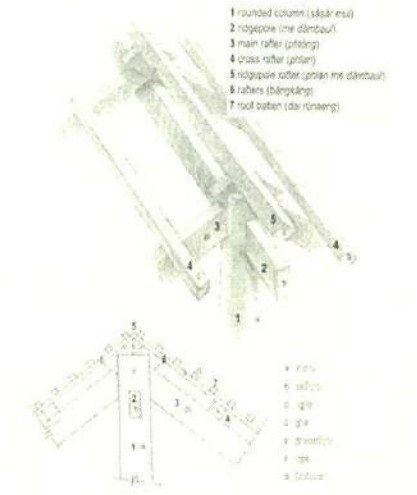
As wood is a highly anisotropic material, it is liable to shrink if not properly seasoned before use, with shrinkage occurring transversely to the fibers and cracks being formed along them. Where cracks are numerous, the shear resistance, and consequently, the bearing capacity, of the material are reduced.

Deterioration can most easily begin at the connection between wooden elements, especially if there is slack, or stirrups or pivots are present.

WOODEN HOUSE STRUCTURE

1-Rounded columns (sasar mul) possessing a diameter from 20 cm to more than 30 cm, are made from only one piece of wood, making the choice of a suitable tree difficult and expensive. Today most people use rectangular columns measuring 15 cm by 15 cm or more because they are easier to find and not as expensive; in the case of square columns, one tree can provide many sections.





2-Central columns (*sasar trung*) have no joints and are a little larger than the rafters. They connect the two end columns together, placed directly in the middle of these two poles is the ridgepole, where the yan or sacred yantra is traditionally located.

3-Main rafter (*phtong*), measuring at least 5 cm by 15 cm, connects the central columns to the side columns.

4-Cross rafters (*phlan*), measuring at least 6 cm by 7 cm, are horizontal members of a roof that span the main rafters and support the rafters.

5-Ridgepole rafters (*phlan me dambaul*) are slightly larger than the cross rafters and cap the ends of the main rafters.

6-Rafters (*bangkang*), measuring at least 6 cm by 3 cm, span the cross rafters and support the roof battens.

7-Roof battens (*dai ronaeng*), measuring at least 2 cm by 2 cm, span the rafters and support the roofing tiles. If the building is thatched, roof battens are not required. The thatching bundles fill this function instead.

8-Side sub-columns (*choeng kok rieng*) support the main rafters above the cross-column joists.

9- Cross beams (*thnum*) connect one column to another along the width of the center of the house and support the sub-column, if it exits.

10-Main sub-columns (*choeng kok*) are small columns placed on top of the cross beams to support the main roof of the house where there is no center column.

11-Column joists (*sang bandaoy*), measuring at least 5 cm by 15 cm, connect the row of side support columns over the length of the house.

12-Cross column joists (*sang totung*), measuring at least 5 cm by 15 cm, connect between side support columns over the width of the house.

13-Floor joists (*ronuk*), measuring at least 5 cm by 15 cm, connect columns for the length of the house and support the cross joist (*ronong*).

14-Cross joists (*ronong*), measuring at least 5 cm by 15 cm, connect columns for the width of the house. Additionally, they are spaced approximately 50 cm from one another and support the open slatted (*roneap*) or wooden board floor (khdar kral).

15-The slatted wood floor (*roneap*) is made of boards measuring at least 6 cm by 2.5 cm. Additionally it has supporting joists measuring 6 cm by 7 cm. The wooden board floor (*khdar kral*) has planks measuring at least 20 cm by 20 cm.

16-Wall supports (*roba chuncheang*), measuring at least 6 cm by 7 cm, connect one column to another, as well as supporting doors, windows, and walls.

17-Walls (*chuncheang*) enclose the house, leaving room for doors and windows.

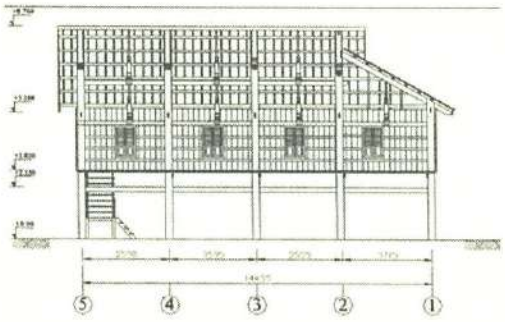
18-Wedges (*sniet*) are pieces of wood inserted to tighten the roof, floor or column joints. The type of wood especially chosen for this purpose protects the structure from bad spirits.

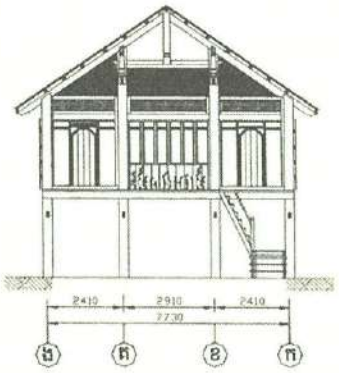
19-Locking pins (*kanlas*) are pieces of wood inserted into holes to lock the structure together. The type of wood especially chosen for this purpose protects the structure from bad spirits.

20-Column footings (*choeng sasar*) are normally circular or multi-faceted stone, a little larger than the diameter of the column, and placed in a shallow indentation in the ground. Sometimes the column is shaped and placed directly on the ground.

21-Stairway stepping stones (*choeng chundaoer*) are usually large shaped stones or similar hard surfaces, placed at the foot of the front stairs.

22-The foundation (*khoeun*) for sacred or important buildings is a sub-structure constructed to raise the building above ground level.





TRADITIONAL KHMER HOUSE

Sacred and profane wooden architecture

People in Khmer society greatly respected invisible powers. Long before receiving influences from India, many beliefs and practices about them existed, and these invisible powers were called neak ta. People require houses for shelter and to establish families. A village results when many families live near each other. After a village is created, it is customary for people to perform a cleansing ceremony, to secure health and happiness for the villagers.

The village cleansing ceremony begins at a central point in the village called the "village navel" (phchet phum). This must be located very precisely, established at the intersection of both north-south and east-west axes, where there is a concentration of houses. To locate this central point the village elders measure the length and width of the village, from east to west, then from north to south, counting from the first house until the last one in the village (ancient villages were usually circular in shape). Each axis thereby divided the village into two parts. The two axes meet at the "village navel."

After establishing this point, the villages build a tiered altar (rean) over the location, in order to perform the cleansing ceremony. This ritual can be large or small, according to the number of people and houses contained within the area.

Villages are composed of two kinds of buildings, the sacred and profane:

*monumental sacred buildings, such as temples or royal palaces

*residential profane buildings, including houses or other utilitarian spaces.

These two types of buildings are related and interact with each other, thereby constituting a village

and its society. Formerly, buildings were constructed using natural materials such as wood, bamboo, palm leaves, stone, clay etc. For monumental buildings, Khmers traditionally used high quality, long-lasting materials such as hardwood, brick, stone, etc.

Apart from the stone or brick palaces, most buildings which remain today are vihear (prayer halls), and sala (pavilions), that are normally found in a wat.

Many villages considered together form the basis for towns, cities and country. The lives and traditions of the people of a country compose its civilization.

According to their religious beliefs, they may build palaces or monasteries. The buildings are not only limited to those meeting the daily requirements of this population, but additionally include residences for the invisible spirits.

Building Characteristics

An *uposothagara* must have *sima* boundary stones encircling the building. This building is used for monks to perform the *uposothagara* ceremony and other rites. As for the Vihara, it is a large building to display the primary Buddha image. Traditionally, this building never had *sima* stones. However, recently villagers commonly build Vihara and *uposothagara* together as one combined building, so *sima* stones can be seen at many modern Vihara.

Sala are less important buildings than the Vihara and *uposothagara* in a wat compound. A *sala* also has 4 or 6 lines of columns and a central foundation area, corridor, and porches. These buildings are used as the places where monks eat, study chanting, and conduct various ceremonies. The different types of sala are the study hall for reading, the dinning hall for male and female lay members or the local community to congregate and offer food, and the kitchen for cooking.

Kuti are residences for monks. A *kuti* has a shape similar to that of an ordinary Khmer house, but contains some characteristics special to the two-roofed house (*keung*). In a larger structure it is usually completely open to the central colonnade in order to perform sacred rites.

Normally sacred architecture is built on an open plan with a central space for the deity and no central pillar or support column. The multi-level roof (*keung*) sometimes is surmounted by a "spire roof" (*mondop*), supported by a sub-column (*choeng kok*) and cross beam. The tiered roof may have

many levels depending on the status of the building.

Residential buildings

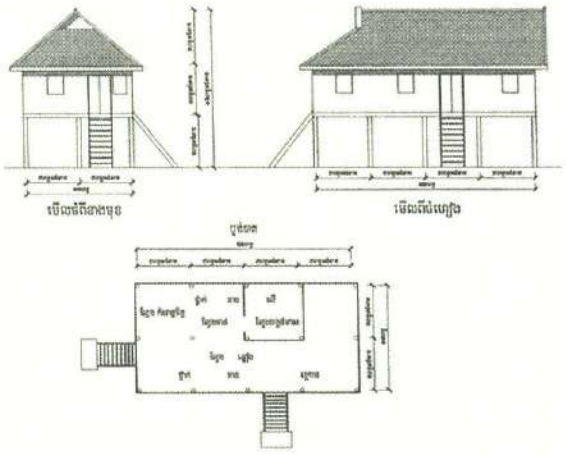
Residential buildings play an essential part in the everyday lives of people. These buildings include houses, stables, shops, storehouses, etc.

A house should normally be built with three rows of columns. The central row is taller than the others and is called the ridge column row or the main column row. If there are two central rows (as a result of having four rows of columns), the ridge column row is called the "chest column" row. The remaining columns are called "side columns." The roof of the porches is supported by means of three supplementary columns that are continuous through the floor up to the main roof. The roof appearance may differ according to the presence of porch eaves which guide air into the house.

A house requires a special place for spirits to live in harmony with the residents, such as the "head of the stairway," a place for the main spirit of the house or the sacred ridgepole yantra. This place doesn't need to be particularly large or spacious, but some houses do have such a space in the center of the building. This style of house is mostly owned by people of high status, such as royalty, high-ranking dignitaries, royal ministers, or the wealthy who believe that by providing this they can achieve an improved relationship with their spirits. Khmer architecture has very clear rules about proportion and measurement, which cannot be ignored. Khmer houses, therefore, must not be built according to one's whims, but measured and designed properly according to the type of building, its function, and status. They are characteristically endowed with many types of artistic decoration. There are many other types of buildings depending on historic periods examined, locations, lifestyles, and class of the owners.

For both sacred and domestic Khmer architecture, houses built on stilts and raised religious buildings are constructed symbolically above the ground level, resonating with natural peaks and the cosmic mount Meru. Further advantages include security from seasonal flooding.

Types of Khmer Houses



There are several types of houses in Cambodia that have different appearances. Some people made small houses, some make large houses, while some make long or short ones.

The roong daul *house*. This house is long with a V-shaped roof running lengthwise. *Dai sna*, or triangular supports, are added to the sides of the roof so that is does not sag. The ends of the roof are closed off by a vertical section called how *jeang*, that drops to join a projecting awning, called the *hob*. Houses with these projecting roof awnings in the front and the back are called *roong daul*. If the house only has a projecting awning in the front, the house is called a "house with the back hob cut off." Why are there smaller houses with the *hob* cut off? Because people who were lacking in equipment, materials, or possessions would build such houses. In the countryside these smaller houses with the *hob* left off the back are also called roong *daul*. The *roong daul* house with a front and back hob is built with three interior columns; the resulting house will have four *lweng* or interior spaces. Others are built with four interior columns, resulting in five lweng. The columns of the house may be dug into the ground, but stones or concrete are rarely used as a foundation.

The keng *house*. The purpose of this type is to serve as lodging for monks and has a multi-level roof. We can think of the upper roof as having two levels and the lower jutting roof sections as having two levels as well. The high walls are attached to the roof just at the point where it begins to slant outwards much more quickly. Outside, a level that is usually slightly lower than the inside space is enclosed by a balustrade. People do not generally live in keng houses, this type is usually found in (wat) pagoda.

The Khmer house. This type generally has four rows of columns with horizontal supporting beams (beams connecting to the columns). The Khmer house has two levels of floors. The entrance porch, or section of space under the protruding *hob*, is slightly lower than the interior living space into which it leads. The Khmer house is usually quite small (about 4 meters wide and 6 meters long). This type of house is often found in wats where it is used to lodge monks and known as *kut Khmer*.

The bet *house*. The *bet* house is built with no crossbeams supporting the roof. The main columns of the house support all the roof beams. The *bet* house is not as long as the *roong dual* house. It usually measures 6 meters wide and 9 meters long. Some *bet* house are built using wood columns dug into the ground, sometimes with a cement base. The space under the *bet* house can be filled in to make a cement wall space as well. The floor of the upper interior space can be tiled as well. Some *bet* houses have only interior columns and thus three *lweng* or interior spaces. Other *bet* houses have three interior columns and thus four *lweng* while still others have four interior columns and thus five *lweng*, or interior spaces.

The kantaing *house*. This type of house has a simple long hall with a v-shaped roof that has no *hob*. Sometimes this house is built with three columns along its long axis; the house usually measures 10 m in length and 6 m wide. The *kantaing* house can also have only two columns along its long axis, in which case it is usually about 6 m long and 4 m wide. Under the rule of King Reacheanukauod (1704-1727 C.E.), *kantaing* houses were almost exclusively built by Chinese and Vietnamese businessmen, who used the *kantaing* house to sell goods or offer food and drinks for sale. From the reign of King Monivong (1927-1941) onwards, the *kantaing* house became popular with the Khmer people as well. Some have kept it as a simple ground level structure, while others have built *kantaing* house on stilts, even adding several stories to them. The *kantaing* house can have additions and variation by which, for example, a hob or protruding awning is added to the front and back of the house. In this case it is called a *kantaing klay* or "changed" *kantaing* house. The *kantaing* house can also have an altered roofline if the ends of the long axis of the roof are cut off, leaving a slanting triangle at the each end that has a beak-like shape. A house with this type of roof alteration is sometimes called the *kantaing* bak nok or goose *kantaing* house (the word *bak nok* is probably Thai). The type of kantaing house that is most commonly built today is a house on stilts about 6 m wide and 10 m long.

The botel *house*: The *botel* house is not made of bamboo or wood. Instead it is made of cement, metal, gravel, sand, lime and bricks. The *botel* house can have one, two, three or more stories. Some are square others are rectangular according to the wishes of the owner. The *botel* house has walls made of brick. Its roof has none of the crossbeams and rafters of wooden house since the roof of the *botel* house is flat. This roof is not tiled but rather is built by laying down a metal mesh and pouring concrete on it. People in the Cambodian countryside do not usually built the *botel* house. It is in Phnom Penh that many of the houses are now being built, following the models provided by the royal family who were the first to build *botel* houses.

ANGKOR WORLD HERITAGE

After the civil war (1970-1993), the temple complex in the Angkor area was destroyed. It is important to safeguard monument in Angkor. Here are dates relevant to the preservation of the Angkor site.

- 1991. Appeal of King Father Norodom Sihanouk to UNESCO to Safeguard Monuments in Angkor.
- 30 Nov 1991. Appeal of the Director General of UNESCO to the International Community: "Save Angkor!"
- 14 Dec 1992. Conditional inclusion of Angkor on the World Heritage List of UNESCO as a "Site in Danger."

- 12-13 Oct 1993. First Inter-governmental Conference on Angkor was held in Tokyo, resulting in the adoption of the Tokyo Declaration, a fundamental text defining the spirit, framework and methods of international actions, plus the creation of the International Coordinating Committee for the Safeguarding and Development of the Historic Site of Angkor (ICC).
- 8 May 1994. Royal Decree establishing Protected Cultural Zones in Siem Reap/Angkor Region and the Guideline for their Management.
- 19 Feb 1995. Establishment of the APSARA Authority.
- Dec 1995. Classification of Angkor as a "Permanent" World Heritage Site.
- 25 Jan 1996. Promulgation of the Law on Protection of Cultural Heritage.
- July 2004. Angkor was removed from the status of "Site in Danger," and permanently inscribed on the UNESCO list of World Heritage.

APSARA (the authority for the protection and management of Angkor and the region of Siem Reap), was created by Royal Decree in February 1995, in responce to the enormous cultural, scientific, and economic importance of the sites and to the inseparable questions of territorial management. APSARA Authority assumes three levels of management responsibility: political, technical and operational.

APSARA AUTHORITY AND INTERNATIONAL COOPERATION

Initially, the APSARA Authority was mainly playing a coordinating role, focusing almost exclusively on safeguarding the dilapidated monuments of Angkor, due to the critical condition of the temple ruins themselves and the lack of substantial financial and human resources. However, more than might be expected, with considerable financial allocation from the Royal Government and improved human capacity accumulated through cooperation with international organizations so far, the APSARA Authority now is increasingly taking on comprehensive tasks and steadily taking charge on its own of major undertakings left over from international projects on the one hand, and addressing issues in the socio-economic development of the Angkor community and Siem Reap province at large on the other.

The International Coordinating Committee was established by the Intergovernmental Conference on the Safeguarding and Development of the Historic Site of Angkor and its Region, held in Tokyo 12-13 October 1993. The ICC is constituted, *de jure*, of all the States and International Organizations which adopted the Tokyo Declaration of 13 October 1993 and which, moreover, contribute financially or by providing expertise to the safeguarding and development of the historic site of Angkor. The ICC is co-chaired by France and Japan, represented by their ambassadors to Cambodia, and UNESCO acts as its Secretariat.

The International Coordinating Committee is a working body of UNESCO created in order to examine and solve technical issues regarding the safeguarding and development of Angkor. It constitutes the international mechanism for coordinating the assistance provided by the different

countries and organizations.

In order to assure its coordinating role, the Committee is to be systematically informed of the details of work being undertaken on the site and in the region. It ensures the consistency of the different projects, and defines, when necessary, technical and financial standards, and calls the attention of concerned parties when required. All decisions by the Committee are subject to the agreement and cooperation of the Royal Government of Cambodia.

In order to ensure the follow up of its work between the plenary sessions, the ICC decided to establish a Technical Committee.

To fulfill the mandate of the ICC, foreseen by the Tokyo Declaration, projects and details of work concerning the safeguarding and development of the Angkor site are systematically submitted to the Technical Committee directly or through the Secretariat. The Technical Committee has the possibility, before giving its advice, to seek the opinion of an Ad Hoc group of experts.

The Technical Committee meets three times a year, and the States or International Organizations which are members of the ICC are represented by their counselors in charge of cultural affairs of the Embassies or Representations. The Royal Government of Cambodia designates a representative at an appropriate level.

NGO's providing financial support or expertise for the safeguarding and development of the Angkor site are able, upon their request, to participate as observers.

At the end of each meeting, the Technical Committee provides a report to the Secretariat to have it presented for adoption by the ICC.

All projects are obligated to prepare two types of reports: Periodic Progress Reports and Final Reports.

The Periodic Progress Report, which should cover a change, an alteration of restoration techniques and methods, must be submitted to the ICC every year.

The Final Report, which describes the details of the work process, must be submitted to the ICC within one year upon completion of a conservation and restoration project. The Report shall primarily cover the elements such as a record of components and traces, a record of construction techniques and methods, a site plan, drawings of the monuments after completion, maintenance plan, etc.

The following is a list of a few of the organizations involved, which represent governments or NGOs, and some of their activities.

1-**World Monuments Fund (WMF)** of the United States of America; conservation and restoration of Preah Khan temple, Ta Som, Neak Pean and Angkor temple.

2-**Ecole Française d'Extreme Oriente (EFEO)** of France; conservation and restoration of the Terrace of Leper King, Terrace of Elephants and Baphoun temple.

3-**Japanese Government Team for Safeguarding Angkor (JSA)**; conservation and restoration of the Northern Library of Bayon and Prasat Sour Prat (1995-2005), and the Southern Library, Bas-reliefs and Central Tower within the Project, to be executed as joint

venture between JSA and APSARA Authority under the UNESCO/Japanese Funds-in-Trust.

4-Sophia University of Japan; restoration of Causeway Dyke of Angkor Wat temple.

5-Ingeniera Geotechnica I structura (I.Ge.S) of Italy; conservation and restoration of Pre Rub temple.

6-German Apsara Conservation Project (GACP); restoration of Preah Ko temple, and conservation and treatment of Apsara bas-reliefs in Angkor temple.

7-Chinese Government Team for Safeguarding Angkor (CSA); conservation and restoration of Chau Say Tevoda temple (since 1999), and surveying and planning for the Restoration Project of Ta Keo temple.

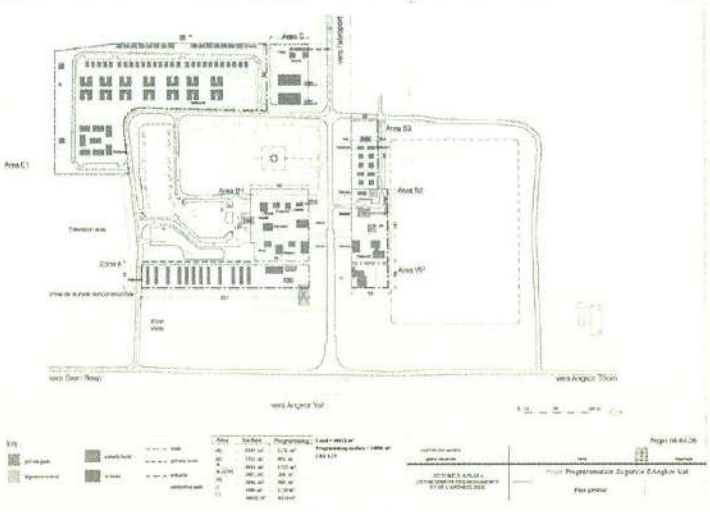
8-Banteay Srei Conservation Project (BSCP) of Switzerland; conservation and restoration of Banteay Srei temple.

9-Archaeological Survey of India (ASI); conservation and restoration of Angkor Wat temple, and Ta Prohm temple.

10-NARA (Nara National Research Institute for Cultural Properties); archaeological research project of the ancient kiln site at Tani Village.

PREVIOUS AND CURRENT WORKS

The Angkor Wat Parvis, the area in front of the temple complex, is being developed along the lines of a Master plan for tourist management at the Angkor park.



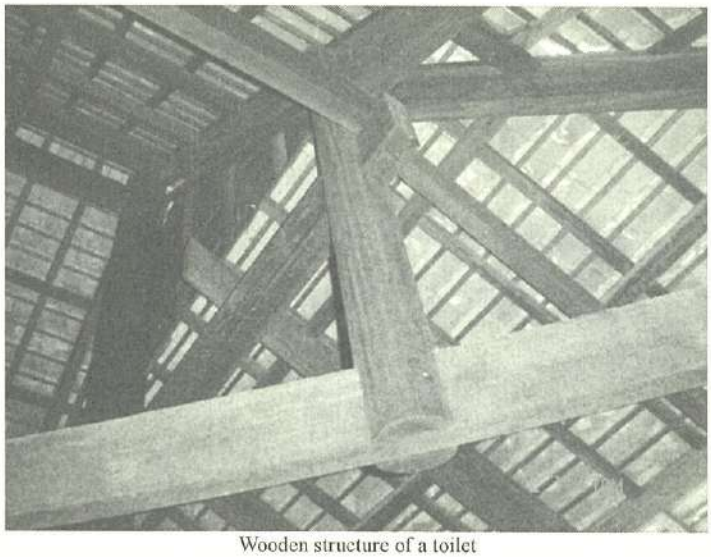
Angkor Wat Parvis

For protection of the temple, and help tourist when they visit, the plan is being developed to include the following.

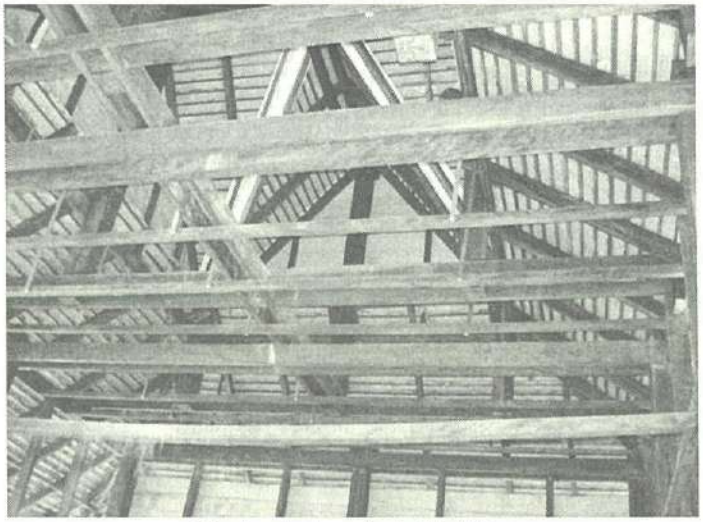
- Welcome center
- Commercial zone (Souvenir shop, Toilette, Restaurant, Boutique.etc)
- Parking
- Road
- Green zone
- Temple protection zone

For protection in the Angkor area, materials used for construction include wood, cogon grass, Khmer tiles, bamboo, etc., but no concrete or any heavy materials, especially for the structure of the roof, usually built with wood, with plywood for the walls. We also try to use electric cars to protect the temple from pollution by cars, trucks, and motorcycles.

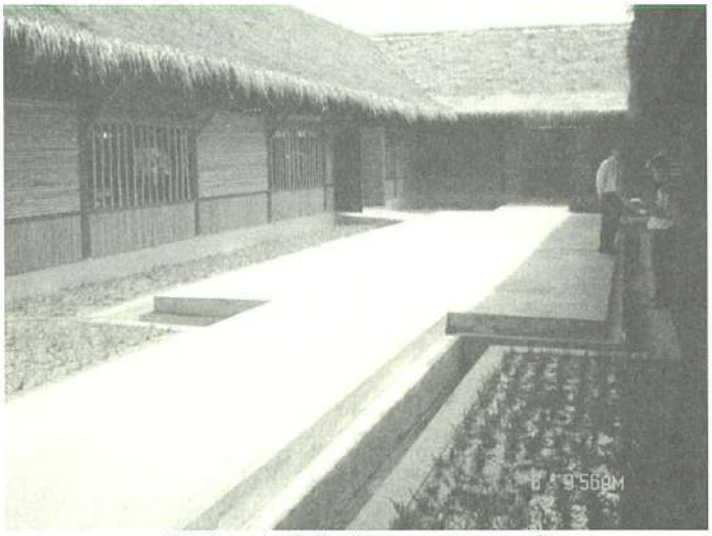
From 2001 until now thirteen toilets have been constructed (wooden structures); three toilet buildings and five more projects will be done this year after the archaeology team finishes its research; three parking lots have already been constructed, and twelve bicycle stations created.



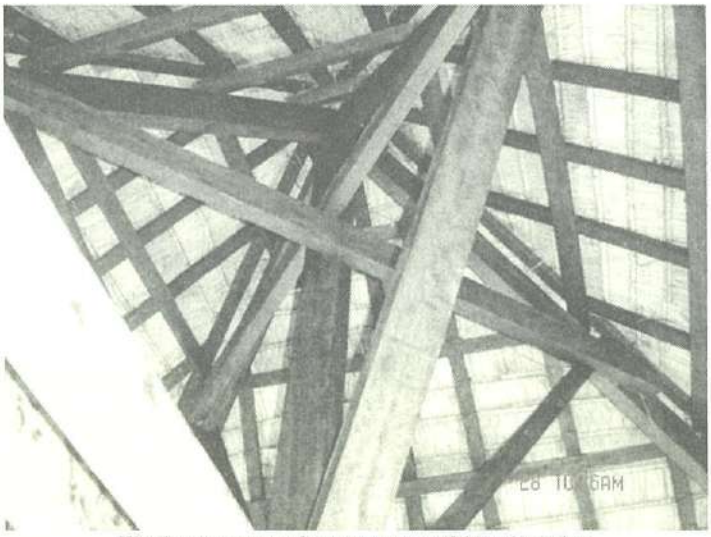
Wooden structure of a toilet



Wooden structure of a shuttle station

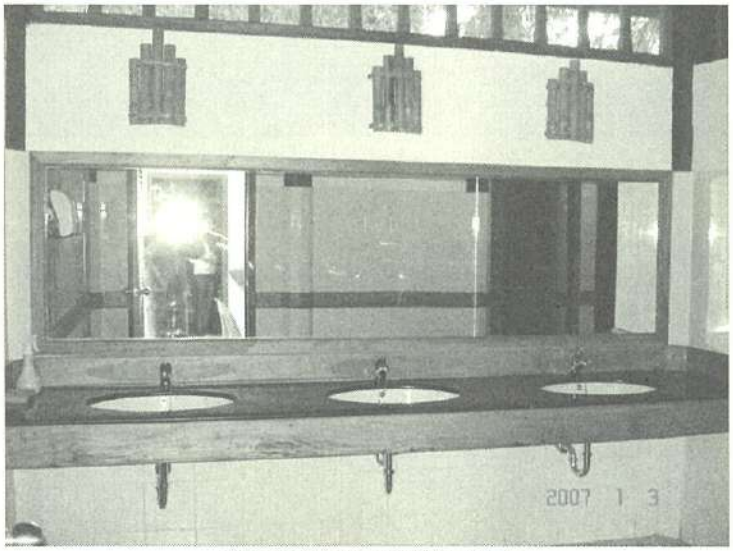


Bicycle station built with a cogon grass roof



Wooden structure and cogon grass roof, bicycle station

Angkor parking



Toilet (inside), Angkor Wat temple

Toilet in Banteay Srey temple

CONCLUSION

In view of the important and useful nature of this training program, on behalf of APSARA Authority and all Cambodians, I would like to thank very much the organizations of ACCU NARA, UNESCO, and the government of Japan for giving me a chance to join and learn from this program, which provides valuable, useful and advanced knowledge for the protection of tangible and intangible cultural properties.

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China

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A Study of Temple Festival Space of Jinze Town[①]

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Abstract: This is a case study of the conservation and regeneration of vernacular settlements located in the suburbs of a Chinese city. It takes Jinze town of Shanghai as an example to present a way of reviving the vernacular settings and activities so as to make the town maintain its traditional culture and meet the needs of the contemporary lifestyle.

Key words: Vernacular settlement, Jinze town, festival settings, conservation, regeneration

I The Problem of Vernacular Settlements

During the twenty-year urbanization process, the suburban vernacular settlements of Chinese big cities (especially the historic cultural towns of urban and rural marginal areas in this article) have witnessed profound changes with renovation and development. The original natural settings and socio-ecosystems have been broken with agricultural civilization, and the former character of the suburbs is now disappearing at a swift pace. It is obvious that this evolution will not change at human will, and at the same time, some vernacular settlements and their settings as well as their cultural identity, worthy of conservation, are disappearing with this trend. Only a few ancient villages and towns that are outstanding in their spatial arrangements are turned into scattered heritage after conservation and preparation, and sustained in the form of visiting spots. Another group of vernacular settlements is in the embarrassing situation of boasting high cultural value, but lacking suitable appearance for tourism, leaving it fit neither for reconstruction or development, nor for presentation as tourism sites that are viable economically. Therefore, the specific conservation steps and their effects for these settlements demand careful discussion.

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① This article is one of the series of research reports of a National Natural Scientific Funding Program (No. 50278066; chief: Chang Qing; members: Zhu Yuhui, Qi Ying, Shao Lu, Zhang Jian, Liu Wei, Hu Tao, Wang Jun, Wang Yan, Yao Yun).

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③ Zhu Yuhui, PHD of Architecture, lecturer at Tongji University.

In this way, it is by no means as easy as for the conservation of artifacts to define the conservation of vernacular settlements in such a complex situation. To take neighbouring Shanghai as an example, except for those towns whose traditional appearances are comparatively intact and were set apart for tourism, how can we deal with the remaining vernacular settlements? To be set apart for narrow-minded conservation or tourism as the "core area" in urban historic blocks? Or push them onto the real estate market or for other forms of economic development? As for the former, too much negative conservation is not practical for the current situation. The social life of these settlements will not be improved without great amouts of funds, also we could not expect them to be economically viable from tourism income. As for the latter, land development needs thourough consideration, for it may not only erase the vernacular character and change the social sturcture, but also dissolve the remaining or potential cultural resource, thus raising serious social problems.

Based upon these considerations, we began to pay attention to the conservation and regeneration of vernacular settlements in city surburbs since the end of last century. From an analysis of several cases, we maintain that conservation is the prerequisite while regeneration is the target, and conservation aims to extend historic space form while regeneration is for extending and developing the life style. Further, we should treat vernacular settlements as diverse culture resources of the suburbs in the urbanization process from the aspect of keeping adaptions to regional and traditional settings as well as to the ecosystems. In this way, our conservation and regeneraion design experiments take the basic strategy of "extend topography, retain context, preserve landmark," and take the prospect of renovating vernacular customs and historic scenes as the core task of settlements regeneration. In the design, we recognized, classified, and gave equal value to all the current architecture in the historic sites, giving full protection and respect to the vernacular settlements and their structural settings as well as to traditional architecture. Besides, we tried to conserve and regenerate late public architecture and industrial buildings which are typical of the times and valued in reuse. Further, we also explored the way in which new architecture reflects the taste and ambiance of new suburban landscapes. All these steps are to realize the final goal, which is integrating heritage and elements of different stages of civilization so as to form a "post-industrial landscape" of vernacular settlements. The experiment of Jinze town of Shanghai can typify our ideas and methods in the conservation and regeneration of vernacular settlements.

II The Case Study of Jinze

Jinze town (Fig. 1) is located in the southwest part of Qingpu district, Shanghai, as well as at the intersect of Jiangsu, Zhejiang province and Shanghai, facing Dianshanhu lake to the north, connecting with Xiqin and Liansheng in the east and linking with Jiashan and Wujiang in south and west. Jinze is a typical water town, for it was overflowing with rivers and lakes which cover more than one-third of its total area, and has been a point of exchange spot between Wu and Yue cultures since ancient times. Four thousand years ago, people were already living and working in the area. According to historical

records, Jinze was born in the Song Dynasty and prospered in the Yuan. It came to be affiliated with Qingpu in the Ming Dynasty, from Zhexi road and the Huating district in Beisong. Even now, characteristics typical to the agricultural civilization south of the Yangzte river are still visible in the town.

Central Jinze town is close to the Huqinping Highway, extending south to north along Jinze pond, and crossing with Beishengbang, which lies east to west. It also connects with Nanku harbor, Dongku harbor and Sanlitan pond in the south and north. The two streets on both sides of Jinze pond, and Chang street, extend in the same way as the main waters, forming a two horizontal lines and one vertical line as the main traffic system, with ancient bridges turning the rivers into an outer living space network.

Fig. 1 Historic picture of Jinze town

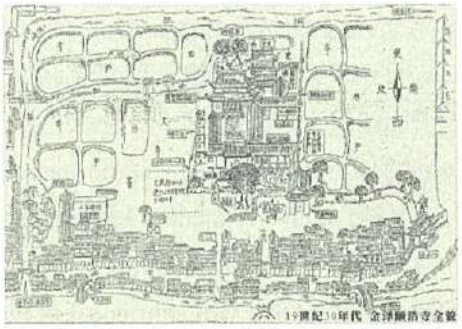


Fig. 2 Hand drawing of Yihao temple area by Wang Daijin

Jinze is a famous "bridge town," with 28 sites of ancient bridges which trace back as early as the Song and Yuan Dynasties. Small temples and stupas, as well as ancient streets and houses are scattered beside the bridges. They boast considerable historic heritage, such as the Yihaochan temple, prominent at one time for its size and influence among Jinze ancient temples, built in the Nansong Jingding age and reaching its peak in the Yuan Dynasty. According to the Songjiangfu Records, "although Hangzhou owns Linyin temple and Suzhou owns Chengtian temple, these two can never reach the grandness of Yihaochan." In addition, a traditional activity called "Miao Qiao" (literally, Temple Bridge) plays a significant role in Jinze history. In festivals, major or minor, villagers from towns all over the region come together for the celebration. On the occasion of two separate temple activities, the March temple fair of the Chinese calendar and the Festival of Double Ninth, large numbers of pilgrims, both local and from surrounding provinces, rushed into Jinze and encircled the Yihao temple. It was such a lively scene that the streets were crowded with people and the rivers all overflowed with boats, with everyone joining the splendid festival activities such as sacrificial rituals for the gods and Buddhas, crossing the bridges and parading through town, and participating in local drama in Wu and Yue styles (traditionally called "Sizhuban"), etc. These vernacular customs should be taken as the intangible cultural heritage of Jinze, but most of them have gradually perished (Fig. 2 and 3).

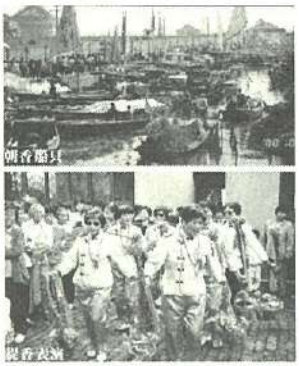


Fig. 3 Historic ritual activities

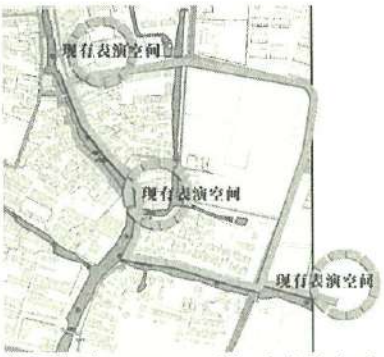


Fig. 4 Current route of the festival ritual

Fig. 5 Folk festival activities

During the 1950s and 1960s, large numbers of temples were destroyed and the links between temples and bridges dissipated; accordingly the bridges began to be only used as paths for ordinary traffic. This loss of cultural meaning attached to spaces leads to the breakup of the former spatial network. The festival route has shortened to less than one-eighth of the original length (Fig. 4, the current route of traditional activity). Yihao temple lies west of Jinze pond, and behind the traditional house complex south of the Beishengbang river. The major part of it no longer exists, except for only a few relics and ancient trees still surviving, but it remains a key cognitive landmark for the whole town and its surrounding villages, as well as the necessary central stage of the remaining festival rituals (Fig. 5, traditional activities). Although Yihao temple has undergone some reconstruction and restoration, the traditional activity spots are still on the decline, thus reflecting the distinct difference between China and Europe or Japan in terms of the course of city heritage conservation: namely, what China conserves is the body only and little attention is given to the vernacular customs, while Europe and Japan emphasize the traditional rituals embraced by the physical heritage as skeleton, and stress the diverse cultural values that festival settings brought to city life.

Let us take a look at the social structure. In 1980s and 1990s, light industry and trade were so prosperous that they were the major economic supporting pillars of the town, which had the advantage of convenient transport. In 2000, the original industry of had Jinze declined, especially in the central area, which was defined as a Shanghai historic feature reserve. Furthermore, the population has decreased lately with 1300 families making up only 2000 persons, and elders more than sixty and children less than sixteen counting for almost half the total. Because the non-agricultural population

takes up over ninety percent of the whole, and serious issues such as economic development and civil life have arisen as well, the conservation and regeneration of the historic feature reserve of Jinze needs to be based on these situations, which is also a universal situation for the whole of China.

Table 1. Current Bridges in Jinze Town

Name	Age	Character	Conservation authority	Other
Wan An Bridge (Cai/Fo Bridge)	Southern Song (1265)	One arch, 29 m long. Previously called Tiao Miao Bridge.	Shanghai cultural heritage conservation board	In Qiao Xi (west of the bridge). Originally a place for the God of Wealth.
Pu Ji Bridge (Sheng Tang Bridge	Southern Song (1267)	Renovated several times in Ming and Qing, with stone railings added. One arch, 26.7 m long, 5 m high.	Shanghai cultural heritage conservation board, fourth group (1987)	In Qiao Dong (east of the bridge). Originally a holy temple (built in Song Dynasty) existed.
Ying Xiang Bridge	Built in the Yuan Dynasty	Four stone piers standing in the water, the rifts covered with Machilus and the bridge surface covered with bricks. Built with brick, wood and stone, 34 m long, 2 m wide.	County cultural heritage conservation board	
Zu Shi Bridge	Built in the Yuan and renovated several times in Ming and Qing Dynasties	One arch, 20.8 m long, 3.4 m wide.	County cultural heritage conservation board	In Qiao Nan (south of the bridge). Shi Zu temple originally stood nearby.
Lin Lao Bridge	Built in the Yuan	Stone bridge, 24 m long, 4.5 m high.	County cultural heritage conservation board	Qiao Bei (north of the bridge). Guan Di temple originally stood nearby.
Zong Guan Bridge	Built in the Ming, later renovated in Ming and Qing times	One arch, 25.2 m long, 4 m high.	County cultural heritage conservation board	Close to North bridge. Zong Guan temple originally stood nearby.
Tian Wang Ge Bridge	Built in the Ming, later reonstructed in original form in Qing-Kangxi times	Triple arch bridge.	County cultural heritage conservation board	

Ⅲ The Conservation and Regeneration of Jinze Town

i. Definition and Object

Fig. 6 Master plan, before and after planning

It is obvious that the tangible culture heritage in Jinze needs to be conserved aggressively, but as for the scale and degree, it could not be treated as Zhou Zhuang, Xi Tang or Nan Xun as a completely viable tourism spot. Furthermore, it is also hard to meet both the needs of economic development and the citizens. Considering these limits, we developed our study, including site analysis, historic document research and comparison with Linyin festival settings culture in Hangzhou. The more we studied, the more strongly we realize that the life, regionality, and diversity of contemporary culture mostly relies on the intangible cultural resources, and that actually the historic custom festival settings and rituals of Jinze itself can be seen as this kind of resource. Their significance may be valued more than Jinze itself, and should be taken as a key to regenerating the traditional culture of Shanghai and its surrounding areas, which although in the decline, can be revived as the core of a course of conservation, by way of deliberate plan and design. Therefore, we took as goal the preservation of traditional culture and life style in the renovated ancient town, and the revival of tangible culture heritage as key elements of festival settings.

ii. Limiting Conditions

The prerequisite for regeneration design is the implementation of conservation, which entails several limitations:

1. Principle of Integrity First of all, we should practice the structural conservation of vernacular settings, which means to preserve the historic reserves and settings in their integrity, including the river systems and accordingly the road system, architectural complex, bridges and trees etc. As for the core areas, even the most ordinary house should be studied carefully and preserved to make the vernacular setting as complete as possible.

2. Principle of Authenticity The authenticity of vernacular settlements covers the authenticity of both tangible space and lifestyle. Based on the principle of integrity, the principle of authenticity of our interpretation of vernacular heritage is that architectural heritage which is reconstructed, transferred or destroyed needs to be analyzed layer by layer to confirm the age according to which the renovation is conducted, rather than construct as it originally looked as a whole. The inner spaces of architectural heritage need to be renovated to the satisfaction of contemporary life, so as to improve the life quality of the settlements. Meanwhile, fake life scenes as a show should be

avoided, as the principle of authenticity demands.

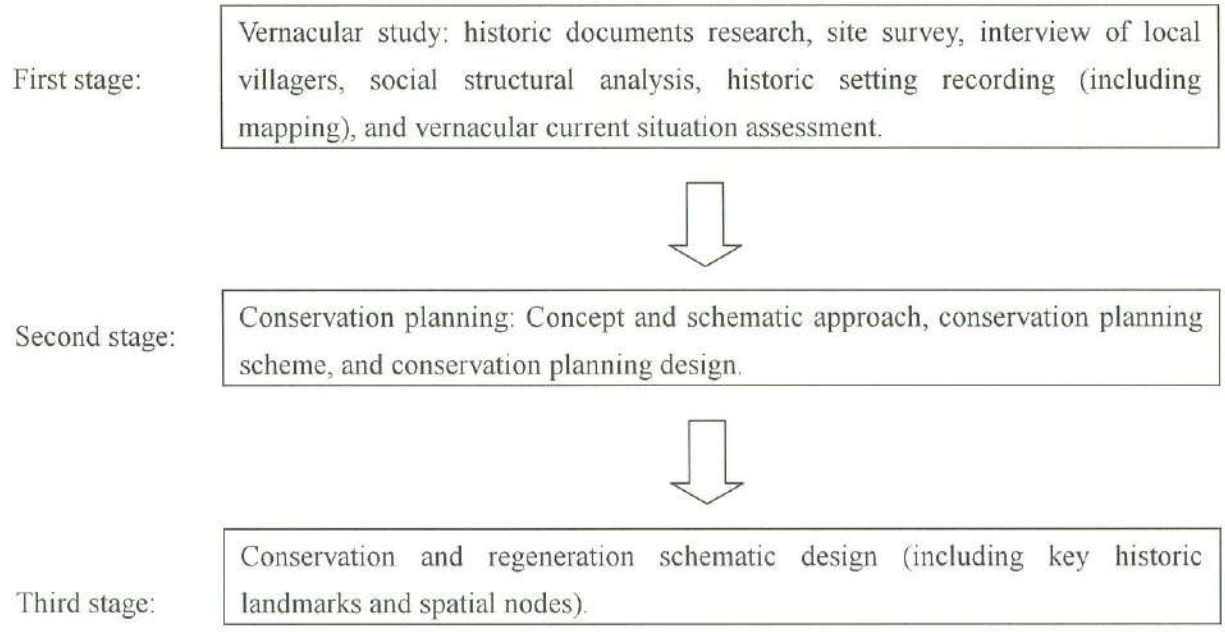
3. Principle of Regeneration As for vernacular settlement heritage, conservation is the prerequisite while regeneration is the object. This idea is presented through long-term study and practice, and was verified by great numbers of examples both home and abroad as well. Regeneration aims to integrate scattered and shallowly-organized heritage, together with the traditional culture into modern settlements and social life by means of proper functional design. Never take negative conservation, but rather regeneration, as the basis in the design of this kind of historic feature reserve.

4. Principle of "Natural Growth" "Natural growth" means respecting and reflecting the original topography and settlement context. The urban planning and renovation design of Jinze should not take the form of commercial development on a large scale, and should avoid the spatial allocation of lines. In order to realize it, the town is to be controlled as a complex form, and was studied separately in the design. The new parts should never copy traditional forms but to select and simplify prototypes and relationships through the study of typology, thus exerting a relation as "coordinate but different" between old and new.

iii. Key Points in the Design

Conservation and regeneration comprise a highly comprehensive course. Firstly, we should study the historic evolution, current problems and developing demands of the object so as to make the two steps in coordinated fashion. Only when the premise is fully developed and furthered can we find the spirit of design. The second step is the conservation planning, which is as specific as the reconstructive planning. We need to distinguish two different tasks: conservation planning norms, and conservation planning design. Among various objects with all kinds of conditions, conservation planning design emphasizes the design and can not be devised by word or drawings alone. Thirdly, maintaining landscape design also plays a key role, as urban design and architectural schematic design. Conservation and regeneration could be controlled, be instructive and practical when it reaches that depth. Actually, considering the particularity of the objects, the two steps may provide a foundation for the reasonable modification of controlling planning. The experiment of Jinze includes all these three parts.

Fig. 7 The design process of conservation and regeneration of vernacular settlements



1. Physical Form The conservation and regeneration of Jinze includes a core area and coordinating areas. As for the core area, we implemented structural conservation to the physical elements such as river-systems, ancient streets, temple relics, ancient houses and bridges, and repaired or restored the river side, floors, and various landmarks. As for the coordinating areas, space is distributed in courtyard enclosure form and keeps some typological relationship with historic context of the core area.

(1) Extend the Region Complex The "region complex" here especially refers to the integration of the specific regional nature and the human character of different ages. In Jinze, agricultural, industrial and post industrial civilization landscapes are mixed up in a complicated way. The process of mixing reflects the evolution of the topography, and whether the design is successful lies in whether the designer extends these processes of mixing and evolution (Fig. 8, region complex analysis).

(2) Maintain the Topography The Jinze historic feature reserve extends from south to north in a slim outline, which is decided by the environment and natural settings. To maintain the topography means to respect the vernacular settings formed over hundreds of years, and the potential rational and emotional elements. As for Jinze, the Jinze pond and Beishengbang have exerted decisive influence on settlement distribution. The renovation design can be summarized as follows:

Maintain the river system and its integrity, clear the river sediments, repair the banks, riversides and bridges, and connect with surrounding waters; combine the river system with festival settings along the route; repair the landscape for the riverfront folk houses; restore the paving of both sides of the river (Fig. 9, before and after waterfront landscape regulation).

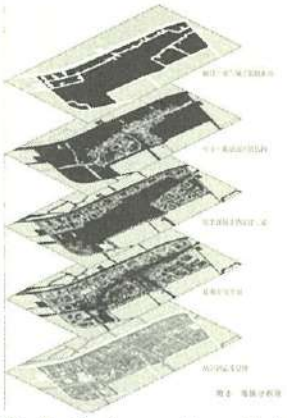


Fig. 8 Region complex analysis

Fig. 9 Before and after waterfront landscape regulation

(3) Promote the Landmarks The typical landmark of Jinze is "one temple, seven bridges." Raising a landmark is to recover and promote its cultural value and realize its function of integrating the scene as the basis of renovation. For example, the Yihao temple is the center of festival settings in Jinze, so reconstructing Yihao as a festival setting, and regenerate local customs is the object and method of landmark promotion. In our design, we clarified the spatial axis of Yihao temple at its peak through documentary research and site study, so that we could reconstruct the grand hall, Mile Buddha hall and all the buildings in the temple. Besides, the important architectural relics and extant architecture, such as the recently built temple gate, are all conserved (Fig. 10).

Fig. 10 Effect of Yihao temple after restoration

In the ancient streets, the key points are to renovate the Jesus Hall, Sanguanqiao restaurant, Zhuangyuanlou tea house, and implant new functions to form attractions for daily life and tourism. Further, some items of industrial architecture which typify the characters of their ages are conserved and renovated as special landmarks, thus turning the town into a cultural recreational space with industrial traces (Figs. 10, 11).

Fig. 11 The renovation of landmarks

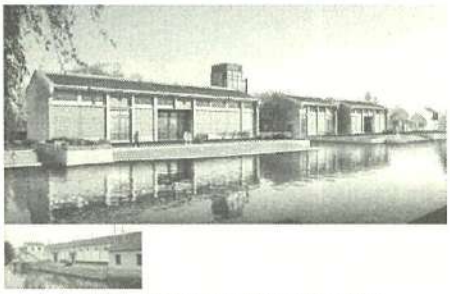


Fig. 12 Before and after renovation

(4) Restore the Vernacular Features Here, restoration refers to the regional identity and style of new architecture in coordinating areas. Considering the fact that the "European Continental style," which is not favored by westerners is quite popular in China, which could be explained as "exotic appreciation," and on the other hand, and that wooden-structured traditional folk houses in China are considered backwards and thus despised by many Chinese – while few realize that these traditional architectures are imitated in Japan, and even by F. L. Wright in his stepped houses in terms of the stretching form and spirit – the issue then concentrates on how to select from regional traditional houses with regard to type or form. In terms of this issue, Prof. Feng Jizhong has conducted experiments in the Fangtayuan Garden project, and Xiang Binren and Wang Xintian have also produced great work in this field, and referring to these achievements we based our research of new architectural styles on them and carried further their explorations (Figs. 13-1, 13-2 and 13-3).

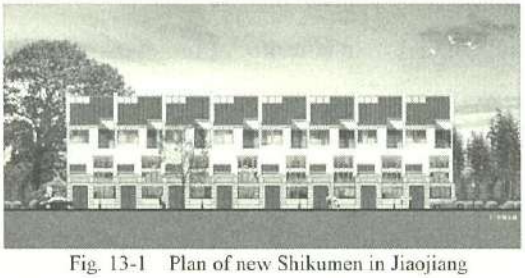


Fig. 13-1 Plan of new Shikumen in Jiaojiang

Fig. 13-2 Perspective of new houses in Changhe

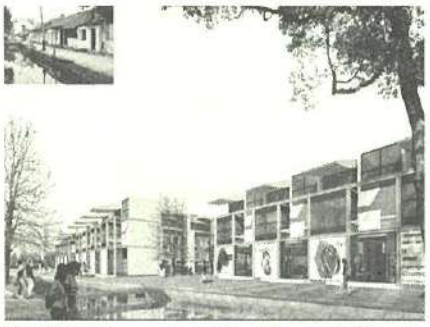


Fig. 13-3 Perspective of new houses in Changhe

2. Life style Shangtang and Xiatang streets are two trunk roads in Jinze, with one playing the role as the main route of traditional commerce which the economy relies on, and the other is the route of festival rituals. The two streets are connected by seven ancient bridges along the river, contributing to the pedestrian system of the historic core area. The original historic reserve and surrounding roads are conserved with a major entrance set in southeast which enables people to access Yihao temple, the festival center, as soon as they cross Jinzetang pond from Huqingping highway. Two minor entrances are also set in to the south and west.

In the lifestyle design, we took all the local customs such as festival celebrations, traditional craft workshops, and folk art into the scope of the conservation and regeneration program, so as to re-create the grand historic scene that centered on Yihao temple and stimulated diverse urban customs (Fig. 14).

The core reserve area is intended for tourism, business trade, and accommodation. So the commercial and accommodative functions of the architecture along the streets are preserved, and the key architectural heritage is to be renovated and turned into a museum for future tourism. The original functions of other buildings are conserved in their use as houses, craft workshops, and farm inns.

The coordinating areas are designed for accommodation, with parts of commerce and the accommodative-commercial space of the riverbank of Shangtang street inherited by them, creating a new water town network to attract daily, recreational and service commerce to meet the needs of daily life. In addition, we suggest providing positions for the local people and never building industrial sites in this area. The current light industry factories and workshops are preserved tentatively, but are supposed to be moved out gradually in the future.

Fig. 14 Route of festival settings in the plan

IV Conclusion

Although Jinze town has preserved the vernacular features that accumulated over thousands of years, it is no longer a typical and complete vernacular settlement of Jiangnan, due to social changes of the past half-century, and urbanization together with industrialization for more than twenty years. Jinze seems challenged by the contrasting demands of conservation and development, which is a universal situation all over the country for vernacular settlements in suburban areas. This time we have taken Jinze as an experiment to explore ways to integrate by design the heritage of different stages of the civilization process, so that it will form a "post industrial landscape" and a lively folk cultural scene for the vernacular settlements. In this way, we can avoid negative and ineffective conservation, as well as the destruction of the historic features caused by profit-oriented development and improper urban planning.

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Indonesia

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REPORT ON WOODEN STRUCTURES

A. Introduction

Many heritage buildings in Kotagede collapsed because of the earthquake of 27 May 2006. Many of them were Javanese traditional houses, made as wooden structures, which are regarded as the folk heritage of Kotagede. The problems that I want to report here mostly concern the structural damage to these wooden houses. This report is based on phenomena recorded in field surveys and in inventories made of wooden materials at the restoration site, while I was working in Kotagede to conserve and preserve the cultural heritage after the earthquake.

Kotagede is one of many districts in Yogyakarta which were severely damaged by the earthquake of May 2006. The Kotagede District was an old historic city of the Javanese Mataram Kingdom area in the sixteenth century. The very strong character of Kotagede history can be recognized from its architecture. The dominant type of settlement building has been the Javanese traditional house, but many of these buildings collapsed or were severly damaged. For this reason, the World Monument Fund has just listed Kotagede as one of its 100 Most Endangered Sites.

Kotagede itself is located on Opak Creek, which lies in an area of high potential for earthquakes. That means earthquakes will likely happen in the future because of its vulnerable location. Accordingly, it is important to implement risk preparedness for buildings, in this case the structures that are Javanese wooden buildings. It is very important to reanalyze and reevaluate the structure of the Javanese wooden buildings, in order to apply structural adaptations for earthquake resistance which will nevertheless be in line with conservation and restoration concepts, in an effort to protect the cultural heritage still in existence.

B. Working Results

One week after the earthquake, we started a heritage post in Kotagede. We worked according to a process designed to conserve and safeguard the vulnerable heritage in Kotagede. We divided this process into two periods, as follows.

Immediate Response Period

1. Rapid assessment (completed)

Based on the Rapid Assessment of Damage to Joglo Traditional Houses in Kotagede Historic District, prepared by Jogja-Central Java Heritage Restoration Team, the estimated damage, and the rehabilitation and reconstruction costs for these traditional houses are as follows.

a.Estimate of damage to cultural heritage.

- Of approximately 150 Joglo traditional houses, the team estimated damage to a total of 88 houses.
- 8 houses (9%) were destroyed.
- 47 houses (54%) are uninhabitable.
- 16 houses (18%) are partly collapsed (not completely habitable).
- 17 houses (19%) are cracked.

b.Estimated Cost:

Conservation of these 88 houses would cost = Rp. 18.922.540.000,--

2.Aid provided for construction (completed)

We provided bamboo, woven bamboo, fiber cement, and cement to support collapsed buildings and to make temporary shelters, with the support coming from many donors.

Revitalization Period

1. CEP Community Empowerment Programme, supported by JICA (completed)
2. Pusaka Jogja Bangkit (Jogja Heritage Revive!) (ongoing)

In these programs, we followed a six-step revitalization model, as follows.

1. Documentation and presentation (survey and documentation of 487 houses)
2. Building and district design: preparing reconstruction by making DED, restoration budgeting and fund raising
3. Promotion: to save heritage by exhibition made to local residents, government agencies, and donors.
4. Activity planning
5. Organization and management
6. Economic restructuring

C. Damage assessment of wooden structures

I found several cases of damage to wooden structures by making inventories of wood during the process conducted in preparation for restoration. After making a detailed assessment for fund raising, the next process is making a DED (Detail Engineering Drawing) for each wooden house which has secured a restoration donor. The houses are under private ownership, but the restoration function is public.

Pre-reconstruction and Wooden Inventory Activity

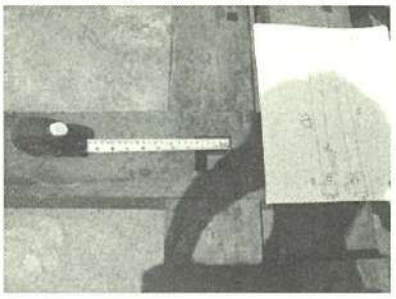




Fig. 1 (left). Jagalan Sub district (Bantul Municipality)

→ Pendopo joglo lambang gantung pk Gembong, supported by Royal Netherland.

→ Pendopo joglo Mr. Edy Priyanto, supported by Royal Netherland

→ One complex of damaged Javanese house has been bought and will function as Gajah Mada University-Heritage Movement. The ndalem (main house) restoration is supported by Total Indonesie and Pendopo support by JICA.

Fig. 2 (center). Prenggan Subdistrict (Yogyakarta Municipality)

→ pendopo kampung Mr. Kokok supported by Royal Netherland.

Fig. 3 (right). Purbayan Subdistrict (Yogyakarta Municipality)

→ pendopo Mr. Mukadi supported by Total Indonesie.

Reconstruction has been done as far as possible in the parts of the two municipalities, Bantul and Yogyakarta, which are integrated into the Kotagede Heritage District. The original Kotagede area is divided between these two municipal authorities.

All of this restoration work is just a starting point, and it involves only a small amount of the total of collapsed heritage buildings in Kotagede. There are still many houses in need of restoration. The locations of collapsed wooden houses in Kotagede are shown by the map below (orange color).

TRADITIONAL BUILDING MAP OF KOTAGEDE

Source : Documentation and Presentation
CEP JICA - Revitalisasi Kotagede 2007

Another aspect of the cultural heritage which we found is the indigenous code of Javanese wooden house. This code is based on the four corners of wind direction, as a system for naming every corner of a wooden connection. This code has been found as a hurt line near the connection (purus) in the wood components.

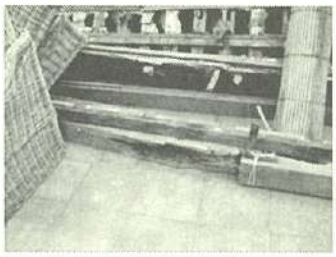
Structural Problems of Wooden Components in Javanese building

The damage problem caused in the Javanese wooden houses by the earthquake can be divided in three parts: damage to the roof (head), to the house frame (body), and to the base (leg).

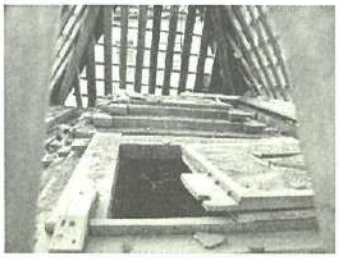
Damage to the head



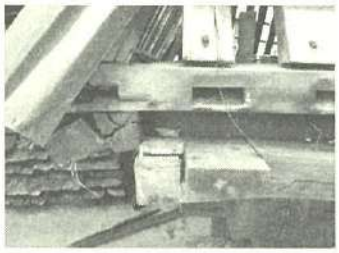
Dudur and blandar tritis (ring balk) was broken and caused the *usuk*, *reng*, and *genteng* (tile) slippage.



The cracked *blandar* (balk) and its corosion.

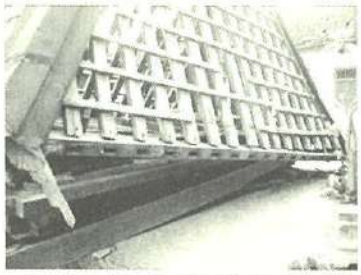


Singup in *tumpang sari* part not functioning structurally, but it was much too heavy for the collapsed saka (column).



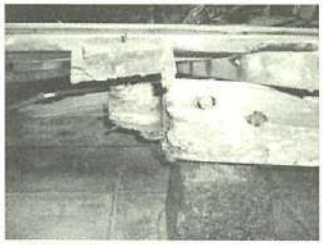
The cracked *blandar lar-laran* which has to receive the force from *takir* in the above.

The steel plate in *joglo lambang gantung* slipped.

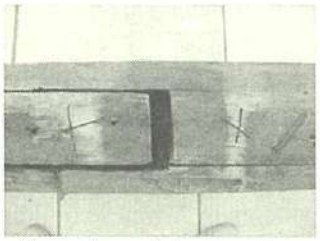


Brunjung (the head part) slipped off its *tumpang sari*.

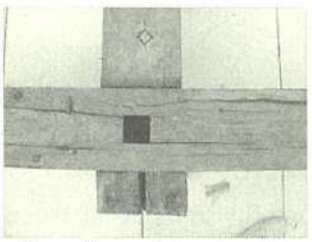
Takir slipped because of the small connection (*pasak*) fell away from its *blandar* (balk).



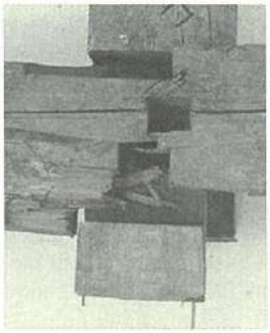
Connection between *blandar* (balk) broken by corrosion.



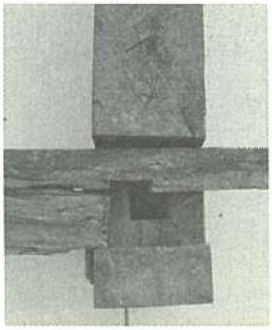
Connection between two *blandar* cracked.



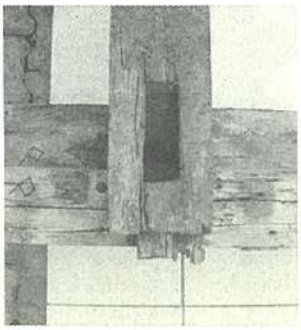
Connection between two *blandar* cracked.



The broken connection (*purus pecah*)



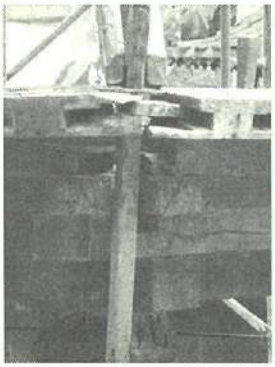
Connection between two *blandar* cracked and coroted.



Connection between two *blandar* cracked.

Pre-reconstruction with original material.

Pre-reconstruction with original material. The connection of *sunduk-klit* and *soko guru* was broken.



Pre-reconstruction with original material. Connection between *takir* in the corner was broken so the *duhur* cannot line its force.

Bahu danyang (console) was corroded.

The bend of *bahu danyang*

Untu walang, the connecting element between *soko guru* and *sunduk*, was broken.

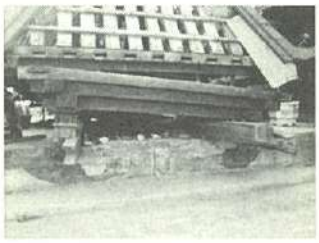
Damage to the body

Soko guru broken, making the entire roof fall down.

Soko guru broken, making the entire roof fall down. But the *tumpang sari* still rigid.

Soko guru broken, making the entire roof fall down.

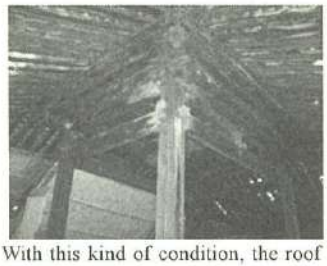
Sunduk pemanjang and *penyelak* as the key structure was broken.



Sunduk pemanjang and *penyelak* as the key structure was broken.

Soko guru broken, making the entire roof fall down.But the *tumpang sari* still rigid.

All of *soko rowo* (peripheral column) collpased, but the roof still stands with only the four *soko guru* (main column)



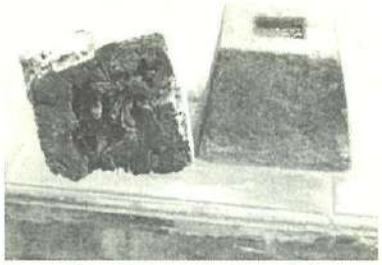
With this kind of condition, the roof component needs to be taken off one by one, because connections must be corroded.

The twisted (*muntir*) *soko rowo* and *soko guru*. But the roof still stands.

Damage to the leg

Displaced *umpak* (foundation).(photo: author)

Broken *umpak* (foundation)



Purus (connection) corroded

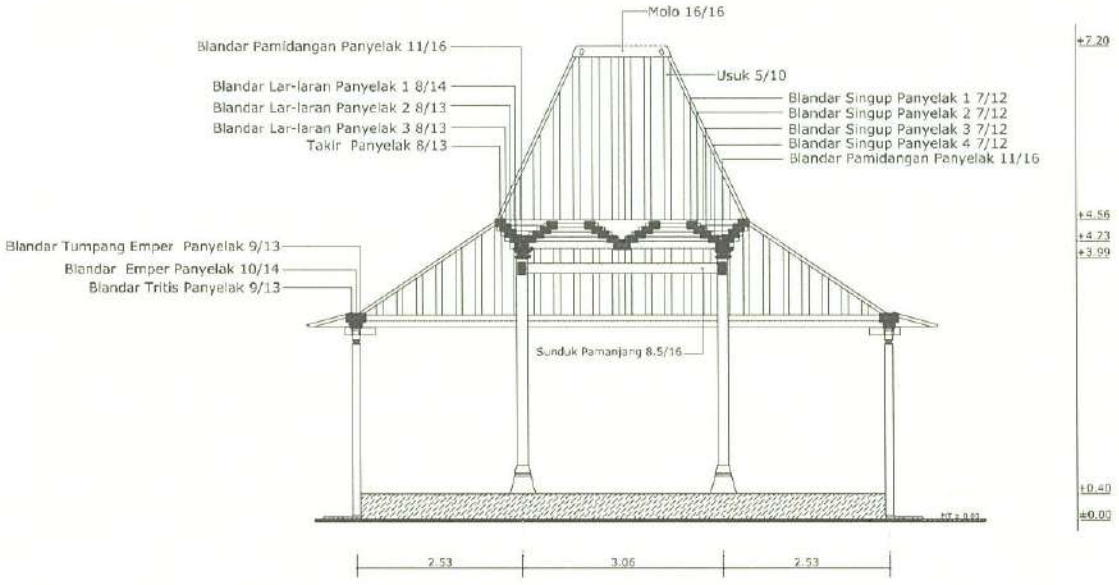
Soko guru and *soko rowo* (main and peripheral columns) displaced from their foundations because of the vertical and horizontal quake.

Damages in the mixed connections (wood and brick)

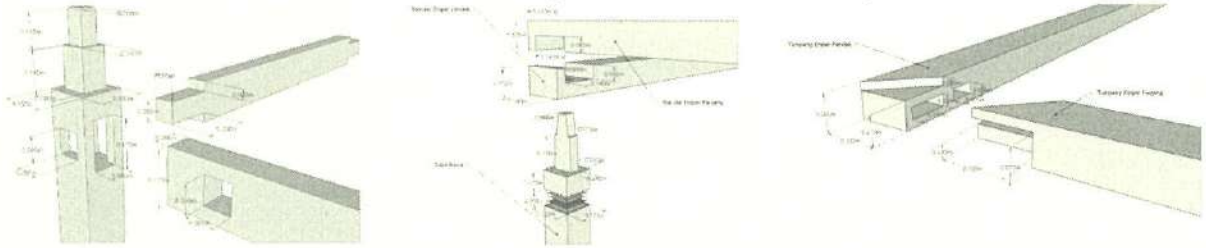
Javanese Building Typology : Pendopo Joglo- Damages inventarization

source : DED Pendopo Mr Edy Priyanto

Foster parents reconstruction – Jagalan-Kotagede Revitalization Team

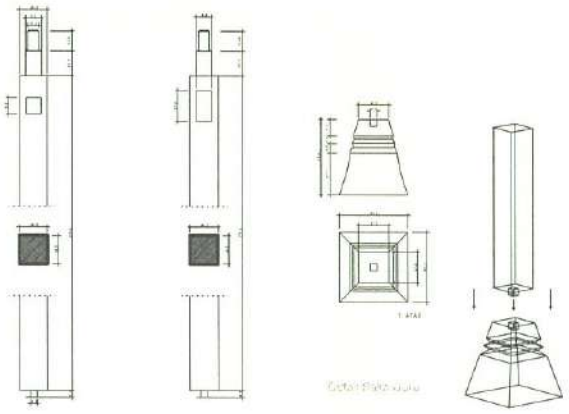


Structural connection points which broken mostly

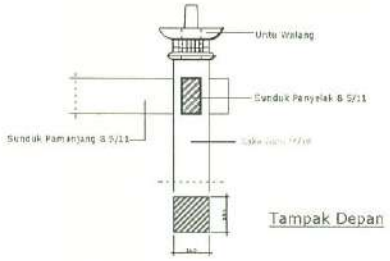


As we know, wood is strong and flexible enough to withstand the quake, but in many cases I found that:

1. In Javanese wooden structures, many points of weakness lie in the wood connections. And many of these weak points located in main structures of the whole component.
2. The age of the wood is very old, and they were built in around the year 1800.
3. Maintenance of the wood has not done periodically, so this has made the wood corrode.



Many *soko guru* and *soko rowo* slipped from their foundations. This connection can withstand the horizontal quake, but not the vertical quake because it is only 3-5 centimeters deep.



Iran

Hooman SOBOUTI
Head of Architectural Conservation
Iranian Cultural Heritage Organization of Zanjan

The Function of Wood in Islamic Architecture and its Maintenance Methods

Studies confirm that wood, due to its abundance and easy accessibility, is the oldest material that has served humankind well. Distinct indications of using wood are seen in paintings belonging to the Acheulean and Magdalenian civilizations.

Archaeological studies in historical regions of Iran, such as the ancient settlement of Tappeh Zagheh on the Qazvin plain, the historical site of Tappeh Yahya in Kerman, the burned city of Sistan, the historical area of Silk in Kashan, which all belong to the Paleolithic and Neolithic periods, prove that wood has been used very much in constructing monuments and covering roofs. Also, it has been used in making agricultural tools, military instruments and industrial machinery. The function of wood in the evolution of human civilization can be seen in a great number of major art museums such as Ancient Iran Museum in Tehran, the Natural History Museum in London and Altona Museum in Hamburg.

During the Achaemenian period in Iran, woodworking flourished and the beautiful ceilings of the Achaemenian palaces in Persepolis were built with inlay-decorated beams of wood. Our information on the function of wood in the Parthian and Sassanian periods is scarce and confined to monumental architecture and other architecture which was supported by the government. In this architecture, where the main architectural elements included arches and domes, it seems that wood was not used in any remarkable fashion. Unlike this scarcity of information on the function of wood in the architecture of Parthian and Sassanian periods, we have good knowledge of and documents on the extensive use of wood in the architecture of the Islamic period, which is worthy of distinction.

In this architecture, the element of wood was used in various shapes and for different functions, which can be classified as follows:

1. Covering function
2. Static function
3. Component (or componential) function

4. Decorative Function

For ease of discussion, we will examine here only the covering and static functions of wood in Islamic architecture, and its maintenance methods.

FUNCTIONS OF WOOD

1_ Covering Function

This function is represented by the very general use of wood in construction, and is as old as the history of architecture in the Iranian plateau. In order to serve this function, the wood of trees with broad leaves such as plane trees (sycamores), and poplars are used, supported with beams spaced so that there are three supports for any length of one meter (Photos 1, 2).

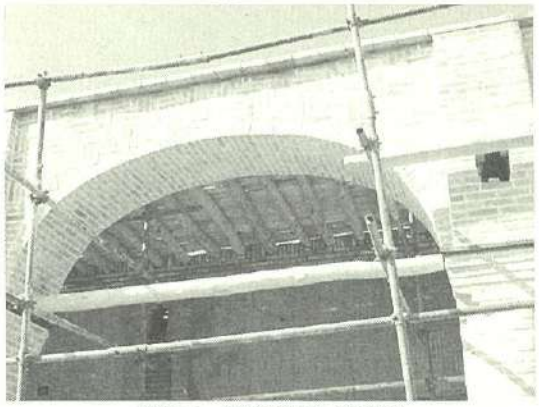


Photo 1 (SOBOUTI. H 2005)

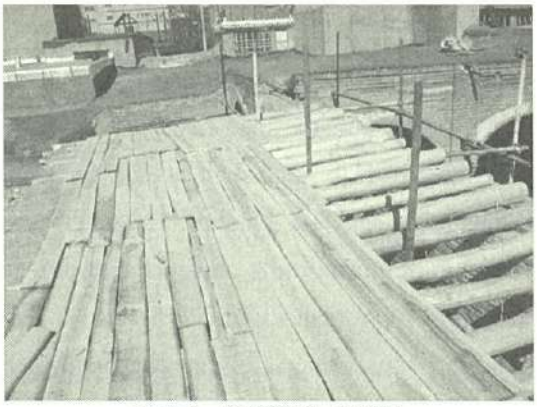


Photo 2 (SOBOUTI. H 2005)

2_ Static Function:

Among all the building materials used in the ancient architecture, wood is the only material which possesses elastic strength. Therefore, wood has found favor with the architects in the Islamic period to enhance the static strength of monuments. In this regard, the most important functions of wood are explained below.

2_1_ Function of wood in cradlings

Since arches and domes are main components of Islamic architecture, and because of these structures' physical shape and their main building blocks (such as mud brick, brick and rubble stone), and the region being earthquake-prone, they are naturally of great weight. In addition, these structures possess a lot of pulling and thrusting forces. Hence, the architects in this period have optimized the use of wood by understanding the mechanical behavior of the components, neutralizing the above-mentioned destructive forces, and finally attaching the architectural parts to each other through various methods.

2_1_1_ Using wood for the joints of building

As stated above, because thrusting forces are so active in the joints of Islamic monuments, the placement of wooden cradles in these places is of great importance. These cradles have mainly been selected from pine trees which have regular secondary branches. Therefore, in terms of building materials, they play the role of a bent bar in reinforced concrete.

The size and dimension of these pieces of wood have been chosen on the basis of the size and dimension of the architecture (Fig. 1).

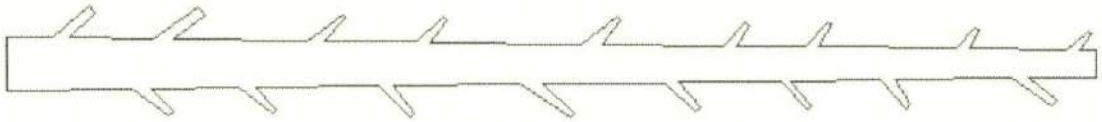


Fig 1 (SOBOUTI. H 2006)

2_1_2_ Using wood for the homogeneity of architectural components

In order to integrate the homogeneity of architectural components, wood has played an active role particularly as a structural element. In all brick columns of every shape in cross-section, including circular and square ones, wood has been placed at regular intervals; usually at distances of 100 cm (Photo 3). They wood layers are at least as thick as a brick with mortar (5 cm) and at most as thick as two bricks with mortar (10 cm, Photo 4). For the same reason, wood has been placed in all bearing (supporting) walls.

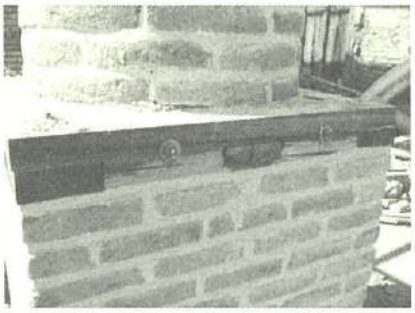


Photo 3 (SOBOUTI.H 2005)

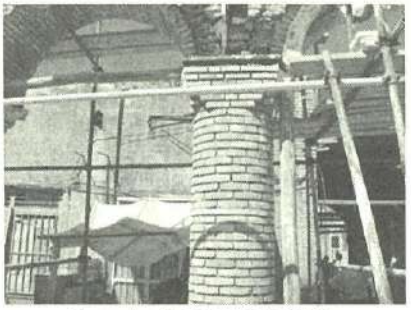


Photo 4 (SOBOUTI. H 2005)

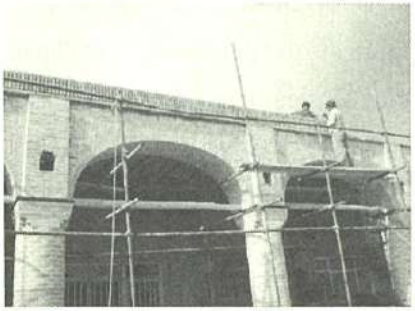


Photo 5 (SOBOUTI.H 2005)

2_1_3_ Using wood for cradling of arches and ribs

For strengthening arches and ribs against the destructive forces of earthquakes, wood is used for fastening columns in structures such as mosques with prayer halls. In so doing, interesting details involving the execution of the design have been devised by Islamic architects for these structures.

In other words, in order to have a firm connection of beams to columns, wooden cradles are placed under the beams. The beams are riveted to the cradle boards with nails having bent tips. These details have been considered on the four sides of the columns (Fig. 2).

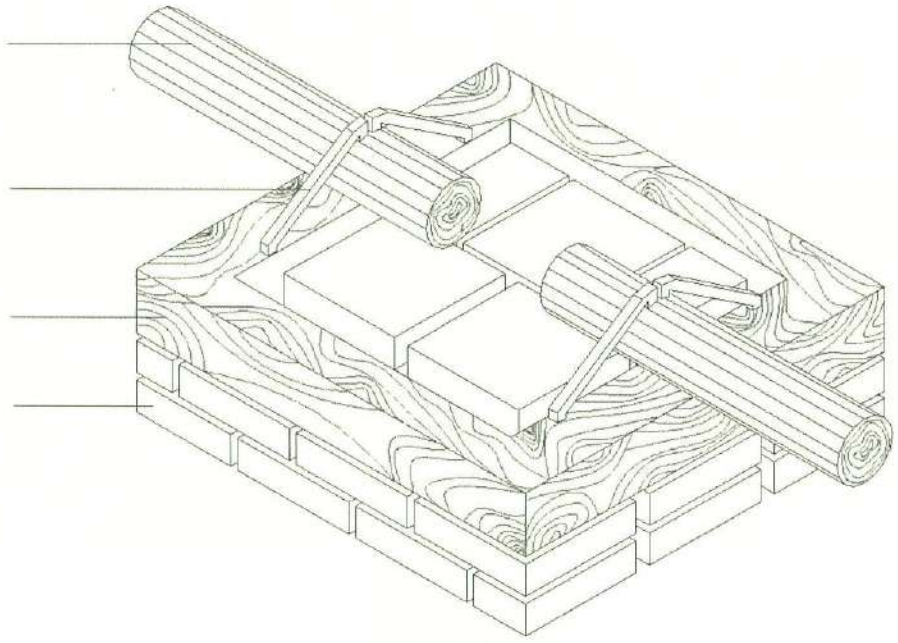


Fig. 2 (SOBOUTI. H 2006)

2_1_4_Using wood for strengthening domes

One of the main elements of Islamic architecture is related to different types of domes with various geometry. Regarding the geometric form and convexity of these tall and two-layer elements, they have a strong tendency to deform when hit by earthquakes and strong winds. Therefore, having known these destructive phenomena, the architects of such monuments have attempted to harness these forces with the aid of wood. In so doing, they vertically connect the outer shell of the dome to the inner shell with a beam with a fairly large diameter. Then, other wooden beams, with an approximate diameter of 15-20 cm, rivet the inner surface of the outer dome to the thick vertical beam.

This task can be done differently on various surfaces depending on the height and diameter of the dome. Therefore, any exertion of pressure on any side of the dome, which has been reinforced with

these beams, will be transferred to the opposite shell and the static power of the dome becomes double the amount of the primary resistance (Fig. 2).

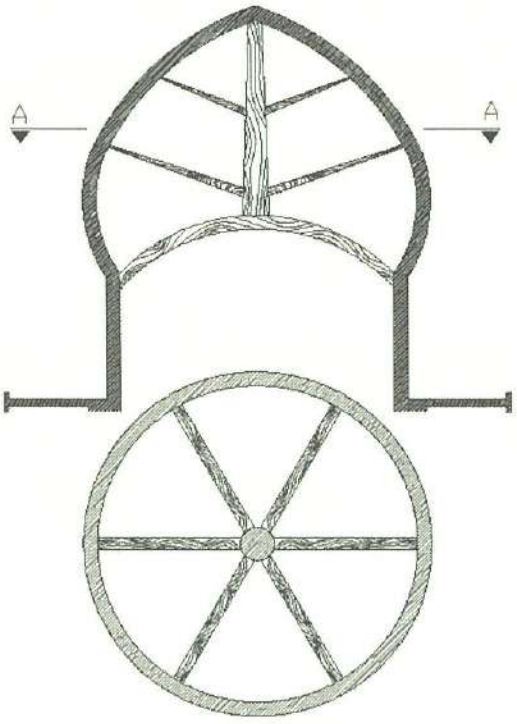


Fig. 2 (SOBOUTI. H 2007)

WOOD MAINTENANCE AND PROTECTION

It goes without saying that wood, like other building materials, has internal and external weaknesses, and therefore, for increasing the static power of wood, it is essential to consider its nature and some of its features.

The internal weakness of wood is mainly caused by a large number of biological factors. For instance, the hardness or softness of woods depend on their types and cellular structures. Differences between plant (tree) species, local geological conditions, environmental and climatic factors, height of the area where the forests are, and various plant diseases are some of the effective factors influencing the cellular structures. Accordingly, these factors have a great impact on the durability of wood.

However, the most severe factor related to internal weakness is the interaction of wood and moisture, the increase or decrease of which in the environment causes significant changes in wood, such as warping, cracking and bending. Accordingly, one of the protective methods for wood is to control its contact with moisture.

The external weakness of wood is, however, described as below. It is worth mentioning that external

weakness of wood has a very close relationship with its nature and features. In any case, the main weakness of wood is due to the act of eating away the woodwork by various species of small and large creatures. This is because wood is replete with food materials. Wood is consumed by microbiologic creatures under all conditions. In other cases, it is attacked by biological creatures.

The most prevalent creatures are represented by the microbiological growth of fungi and molds in wood. They flourish when the local moisture and temperature in wood is appropriate. In other words, the most suitable local temperature for the growth of fungi and molds in wood is at 21 to 29.5 degrees Celsius. The suitable moisture is above 40 %. Under such circumstances, the erosion of wood by molds starts and may lead to the destruction of wood.

The second important destructive factor regarding wood is attack by ants and termites. These insects, by organizing crowded colonies and building nests in woodwork, continue working until all the cells in wood are eaten away and nothing is left.

Architects in Islamic periods, having identified the major reasons for such weaknesses, attempted to fight these destructive phenomena. The most common technique against wood erosion done by the activities of molds, fungi, termites and ants is the saturation and poisoning of wood.

In other words, the woodwork used in Islamic architecture of Iran has been poisoned and saturated with a substance called tar. This substance itself is obtained from boiling the willow. It is seen in dark brown to light cream colors.

Depending on the type of wood, wood used in monuments is first saturated and poisoned with tar. In other words, a jelly-like substance obtained from boiling the willow is placed in the pores of wood and turns into a stiff substance. Then the wood loses its quality of absorption, and the wood becomes impenetrable and thereby durable, and its long-term existence is guaranteed.

There is another action taken by Islamic architects for poisoning wood against its being eaten away by ants, termites and fungi. To do this, they use a mixture of willow sap and alum. For example, all of the wood used in the historical Dome of Sultanieh, belonging to the 8th c. A.H. (14th c. AD), and the historical monuments of Sajas and and Ghorveh Jaame' Mosque, belonging to the 6th c. A.H. (13th c. AD) have been poisoned and saturated through this method. Their woodwork, despite being 800 years old, is still of high quality and the primary resistance of wood is still observed.

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2. L. O. Anderson, Taylor F. Winslow. *Wood-Frame House Construction*. 1999.
3. American Plywood Association. *Plywood Residential Construction Guide*. 1974.

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RESTORATION WORK FOR THE ROYAL PALACE MUSEUM OF LUANG PRABANG

1. HISTORICAL OUT LINE OF THE PALACE BUILDING

The Royal Palace was built between 1904 and 1909 as a residence for King Sisavang Vong and his family. The building was commissioned by the French colonial administration to enhance the loyalty of the king, and to ensure continued French influence in the region. By the 1930s the palace appeared at its best in keeping with the original design intentions, providing maximum comfort to the royal family in the warm tropical climate.

When King Sisavang Vong died in 1959, he was succeeded by his son Savang Vattana. Subsequently, in the course of a few years several alterations and additions were made to the palace. A subsequent period of modernization took place in 1968, on which occasion "glass bricks" were put up in several places blocking the original arched openings of the ground floor porches. As a matter of more prominence and prestige, the stair and open terrace in front of the main wing were covered with marble flagstones.

During a short period from 1958 to 1960, the exterior facades were color washed with a pale ochre hue, possibly as an effort to subdue the glaring reflections of the bright sun light from the otherwise white-washed facades. On the front façade, the stone revetment has been washed with cement giving a dull gray appearance.

As a result of more recent repair work, the top of the spire was renewed in 1976 after storm damage. In 1990 the gutter and fascia boards along the front of the main wing were renewed, unfortunately not matching the original structure in color and detail.

The compound of the palace, taking up an area of about 35,000 square meters, is surrounded on all four sides by a high brick wall, plastered and regularly white washed, at least where it faces the main streets.

The former boathouse, adorned with the royal symbol of three elephants at the pediment, is situated immediately outside the palace compound on its back side, overlooking the Mekong. Unfortunately, this attractive building is presently used as rather inferior storage room.

The "winter house" and tennis court date from the period of modernization. Built as a simple structure and roofed with corrugated asbestos sheets, the building has no particular architectural merit. Likewise the kitchen building, the staff housing, the garages and maintenance building, as well as the guards' quarters, were all constructed between 1963 and 1975 as reinforced concrete structures in a

rather simple design. These economic buildings are not included in the actual restoration project, but properly maintained, they compose an indispensable part of the total museum environment.

The Luang Prabang conference hall, situated in the southern corner of the palace compound, was originally intended to become the reception hall for the coronation of King Savang Vattana, but the ceremony was preceded by the 1975 revolution. The conference hall is now used for public meetings and conferences.

2. THE RESTORATION PROJECT

Considering the complexity of the restoration plan presented by the Department of Museums and Archaeology, of the Ministry of Information and Culture, the restoration work for the Royal Palace Museum of Luang Prabang was funded by SIDA (Sweden) and was conducted from 1992 to 1995. The main aspects of this project were as follows.

2.1 The roof structure

Existing roof tiles, handmade from clay, were taken up from the roof slopes and put back in place. The surveyor directed that each tile was to be handled with great care, and cleaned mechanically with a hard brush to eliminate lichens, possibly in combination with diluted ammonia, horticultural tar or a similar toxic wash. As many as thirty percent were in need of replacement by new tiles of equal format, color and texture. A test area was used to set the standard of required replacement and the contract was adjusted accordingly. Old tiles have been used on outward facing roof surfaces, and new tiles mainly on the surfaces turning towards the inner courtyard.

As plain tiles have nibs which enable them to be hung on the battens, nails are not generally used. However, at corners above overhanging eaves, in very exposed situations, every third course of tiles has been applied with corrosion resistant nails, two nails to each tile, to avoid misplacement due to wind pressure.

Once the tiles have been stripped from the roof, a thorough investigation could be carried out on the rafters and battens. Insect-infected timber or fungal-decayed members were treated with liquid insecticides and fungicidal solution. The exposed surfaces had been flooded, but without causing excessive staining, though special attention was required for all timbers embedded in positioned near a wall. Structural timber (hardwood mai du) in need of replacement was been calculated, and accounted separately on approval by the site architect. All new timber was hardwood and well seasoned.

Cat walks were laid out under the plane sloping roofs for inspection purposes and for mounting electrical wiring; altogether 185 running meters were used, plus two ladders to reach the roof above the throne hall.

All exposed and visible timber under the first floor eaves was given a coat of oil-based paint, in traditional red brownish color. Existing paintwork which was still intact, but due for repainting, was washed with soap or detergent and water, and rinsed thoroughly with clean water. The surface was

then be rubbed down with abrasive paper, and rinsed clean before applying undercoat and topcoat. New joinery required a complete painting, including priming. It was considered important that all end grains, edges, and faces were properly coated.

All timber exposed at the gables, and under the eaves above first floor level, was treated twice with a colorless organic solvent for preservation, and teak oil to substitute for loss of substance due to weathering and ultraviolet radiation.

Any decayed and structurally weakened timber was repaired, preferably with new timber sliced or scarped to the original member.

All ridges and finials were repaired in the traditional way by the use of hydraulic lime mortar, lime cement mortar, and subsequently were white washed and consolidated with clear lime water. All mortar fillets between the brick vertical surfaces and roof coverings were repaired and renewed with lime mortar, to allow for a certain elasticity. Existing cracks and fissures in the masonry were raked out, cleaned and repointed. Gables and walls above plane sloping roofs were repaired by the same process, when the scaffolding was erected. Loose lime was brushed down, plaster repaired, white wash was applied and consolidated with two applications of clear lime water.

2.2 Roof drainage

The average life span of the 14-gauge zinc sheeting of 40 years was sharply reduced by many factors, such as bad craftsmanship and atmospheric pollution, to about half of this period. The actual condition of the zinc required complete renewal. Any work involving gutters, troughs, drainpipes and flashings in zinc was the professional craft of a plumber, not generally found in Luang Prabang.

Stripping off the fabric of existing gutters and troughs, the zinc flashings and fascia boards were punched underneath where possible. As the best option, felt was recommended as an underlay for new zinc flashings to allow free movement with thermal expansion.

All gutters, troughs and flashings were renewed in the appropriate zinc. Defects in the construction were corrected by adding a tie rod between the boards and the fascia every 1.8 meters to secure the half round gutters and fascia in the correct position, to prevent sagging when gutters are full of water. Screens or strainers, to prevent debris from clogging the drains, were installed, and fascia boards were replaced. Existing timber boarding was examined for any signs of decay before new zinc sheeting was applied.

2.3 Central spire and pediment above the main entrance

The extent of structural repairs to the spire were determined after the scaffolding was put up. Renewal of structural timber and cladding were determined in liaison with the site architect.

Loose varnish, paint and gold leafing were brushed away. Paint which was seriously decayed was rubbed down with abrasive paper. Existing surfaces still intact but due for new treatment were washed with soap to provide an even and clean surface for the application of gold leaves. Lacquering according to traditional methods, by the use of Nam kiang as a base for the application of gold leaves;

early ordering and procurement were required.

The elephants and snakes (royal ensigns and symbols for the protection against any evil, respectively) on the pediment were coated with gold leaf in the manner of established tradition, and the background treated with oil paint, in the traditional red pigment.

2.4 External facades

All gables and external facing above the plane sloping roofs were repaired when scaffolding was erected for the renewal of the roof covering. All old lime pointing was raked out from cracks and fissures, which were cleaned and repainted; the plaster was repaired with lime mortar, the surfaces white washed, and consolidated twice with clear lime water.

Red plastic paint was stripped off from the foundation wall. The surface was brushed clean of any loose plaster not adhering well to the backing, the plaster was repaired with lime mortar, given a color wash, and the surface consolidated with clear lime water. The lower parts of leaders of cast iron were repainted with paint matching color with the foundation walls.

Brick paving surrounding the palace was repaired with cement, lime, and mortar to ensure that it remains watertight. Special attention was needed for faulty joints between vertical and horizontal surfaces to prevent water from percolating into the foundation. Extra storm drainage was required along the facade of new extensions from 1963; in addition, bad repair work carried out after the removal of former stairs to throne hall had to be redone, as obviously water had become stagnant there due to insufficient slope towards the storm water drainage.

Champa trees growing on each side of the eastern stairway were cut down and replaced. Old varnish was removed and rubbed down with abrasive paper to clean and even the surface. Existing glazing was repaired with new sprigs and putty.

For the main entrance, consisting of double-leafed doors, old varnish was removed, and the surfaces cleaned and smoothed by hand scraping and grinding with abrasive paper surface for new treatment with Nam kiang priming, undercoat and finishing coat with intermediate abrasion. Gold decoration was renewed according to the existing pattern.

Lattice work of twenty-two new iron grilles (mild steel) were mounted in front of the glazed windows on the first floor of the main wing and extension, replacing existing ones. All inward opening windows were furnished with weather boards and brass bars to prevent wind-blown rain from penetrating the interior.

Myanmar

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PROBLEMS AND NEEDS FOR CULTURAL HERITAGE PROTECTION AND RESTORATION ACTIVITIES IN MYANMAR

1. Introduction

Myanmar is a Theravada Buddhist country in Southeast Asia. The historical period in Myanmar began from the Pyu period (1st century BC to the 10th century AD). The Pyu period was followed by the Bagan period, from 108 to 1369. After the Bagan period was the Pinya-Inwa period (from the 14th to the 17th centuries), followed by the Taung-gu-Nyaung-yan period (from the 16th to the 18 th centuries) and the Konbaung period (from the 18th to the 19th centuries).

A large number of religious monuments such as pagodas, temples, stupas, monasteries, *tazaung, pyatthat, zayat*, plus palaces and dwelling houses have been built throughout the country since the Pyu period. These monuments are made of stone brick and wood depending on the availability of the material. Among these buildings ancient monasteries are one of the most interesting religious monuments. They are mostly made of wood which is in abundance especially in upper Myanmar, in hot regions, like Mandalay, Baan, Innwa, Sa-Le, Sa-Lin and Palhan-gyi.

In my paper, I would like to deal mainly with the preservation of wooden monasteries and the problems faced in our department.

2. Major Laws Concerning the Preservation of Culture Heritage

In Myanmar, the cultural heritage of ancient monuments and antiquities has been protected since the passing of the "Burma Antiquities Act" on 1 April 1957. Later, in 1962 the Government of the Union of Burma amended this Act. A new law entitled the "Protection and Preservation of Cultural Region Law" was promulgated in September 1998. It consists of nine chapters, namely:

(1) Title and Definition
(1) Objectives
(2) Determining Cultural Heritage Region
(3) Function and Duties of Ministry of Cultural
(4) Protecting and Preserving the Cultural Heritage Region

(5) Applying for prior permission Scrutinizing and Issuing

(6) Prohibition

(7) Offense and Penalties

(9) Miscellaneous

3. Organization Responsible for Preservation

In Myanmar, the government organization which is responsible for the preservation, restoration and reconstruction of cultural heritage monuments is the Department of Archaeology, National Museum and Library. There are six archaeology branch offices in six historical cities. These offices are as follows.

(1) Mandalay Archaeology, National Museum and Library divisional office.

(2) Bagan Archaeology, National Museum and Library branch office.

(3) Innwa Archaeology, National Museum and Library branch office.

(4) Pyay Archaeology, National Museum and Library branch office.

(5) Bago Archaeology, National Museum and Library branch office.

(6) Myauk-U Archaeology, National Museum and Library branch office.

4. Wooden Architecture in Myanmar

Wood has been the prevalent material for the construction of all residential buildings, from the makeshift huts of the lowliest commoner to the sumptuous gilded palaces of the kings of Myanmar.

The majority of Buddhist monasteries were also built of teak wood. Unlike their masonry counterparts the wooden edifices of Myanmar owe more to the indigenous domestic architectural tradition. Traditional buildings in Myanmar were only one storey. Due to the sacred nature of the human head, Myanmar people did not like the idea of others living above them.

Erecting a house in Myanmar was a relatively simple affair. Building materials, such as palm, bamboo and wood were readily available. Professional architects and carpenters were not required, for house-building was a skill passed down from generation to generation. With the help of relatives and neighbors a simple, four-roomed dwelling made of bamboo and matting, and consisting of a shrine-parlor, bedroom, kitchen and storeroom could be built within a day or so. The average life of such a house was not more than ten years, since hazards such as insects, fire, flood and war did not encourage the construction of structures of a more permanent nature.

The well-to-do, however, preferred something more substantial and permanent. They would contract a master carpenter who would have his journeyman build a larger, but basically similar style of house, using teak posts and plank partitions instead of bamboo. However, this was subject to sumptuary laws. Carving, gilding and elaborate roofing systems were limited to monasteries and the

homes of nobles and high officials.

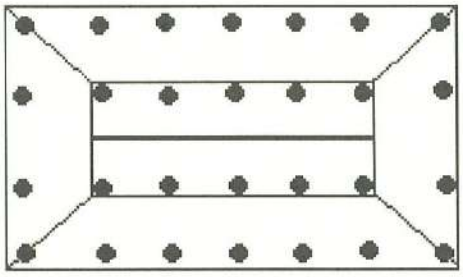
For the building of a monastery (*hpongyi-kyaung*), a contingent of carpenters and wood-carvers would be contacted by the donor, who would specify the length and breadth of the desired edifice. The master carpenter would then be able to calculate the dimensions of the various component parts comprising the image room (*pyathat-hsaung*) in the east, followed by the room for the chief monk or Sayadaw (*a sanu hsaung*), the reception hall school-room or dormitory for monks (*hsaung-ma-gyi*) at the back and the surrounding veranda (*zinggyan*). He would base his calculations on the traditional Myanmar system of measurement, which used the approximate dimensions of various parts of the body.

Once the carpenters had assembled the basic post and lintel skeleton, the carvers would begin the arduous work of carving hundreds of decorative details for the doorways, windows, balustrades, and multiple roofs from planks and blocks of well-seasoned wood. Decorations were carved section by section and assembled later. They were attached to the building by tenons and nails. A large monastery might take from three to ten years to complete. Artisans were usually paid in silver and received food and lodging for the duration of the project.

5. Purpose of built wooden structures

The period of the Konbaung dynasty (1752-1885) left examples of different traditional wooden buildings. Religious structures known as *zayat*, *tazaung*, and *pyathat*, plus monasteries (*pongyi kyaung*) and royal palaces (*nandaw*) are all represented in various versions, differing form each other both in volumetric composition and in type of decoration.

Zayat



The zayat is the most common building in Myanmar after the dwelling house. Generally the zayat is a very simple structure looking like a roof on posts. Zayat are well known
under different names in many oriental tropical and subtropical countries. Each country developed its own type, made of different materials and different
proportions and decorations. Myanmar zayat are nearly always built of wood. The entire structure of the simplest zayat is defined by a roof supported with log posts, and a wooden floor lifted slightly above the ground.

One can find such structures in every village and monastery, at all the sacred compounds, and in its simplest form along the roadsides. The main purpose of

the zayat is to serve as a place for resting and lodging. In the most sacred places of worship, zayat are also used for some religious ceremonies, for preaching, or simply as meeting places in villages.

Sometimes zayat are built for a special purpose, particularly for ecclesiastical examinations. Buddhist Singh organize such examinations regularly to test the level of learning reached by the monks. Zayat built especially for the Buddhist examinations are called tudhamma zayat. They have two-staged roofs and wall panels richly decorated with woodcarvings.

Often these structures form a thoroughfare leading to the foot of the hill. A magnificent ensemble of 33 tudhamma zayat were built at the foot of the Mandalay hill in 1862 by an order of the King Mindon before the Fifth Great Synod of Buddhism, to house the 10,000 invited monks. Nearly half of these zayat stretch in a straight line of about 450 m along the North moat of the Mandalay Royal City.

Nowadays tudhamma zayat have lost many of their original details. Beautiful woodcarving on roofs has virtually disappeared. Lifting walls, clearly visible on century-old photos, do not exist anymore. In spite of all the losses, these building in their rhythmic like rows still express monumental unity.

Tazaung

Tazaung is another type of wooden structure widespread in Myanmar. In the broad sense *tazaung* is a temple. Placed at the foot of a pagoda, these buildings shelter statues of the lord Buddha under their roofs, in front of which people pray and meditate.

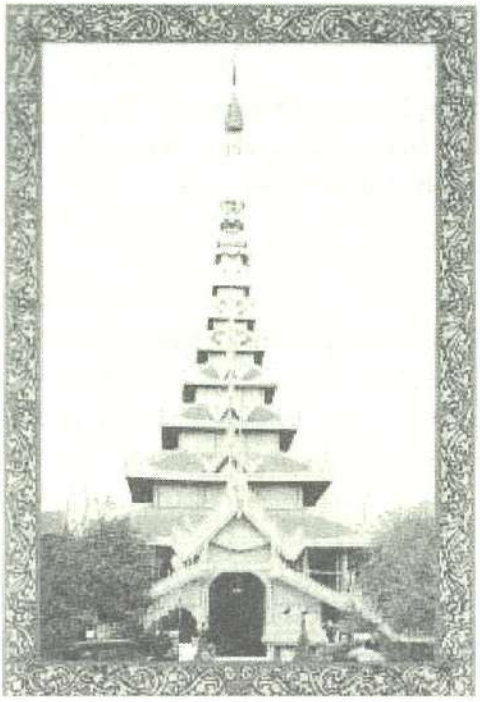
Pyathat

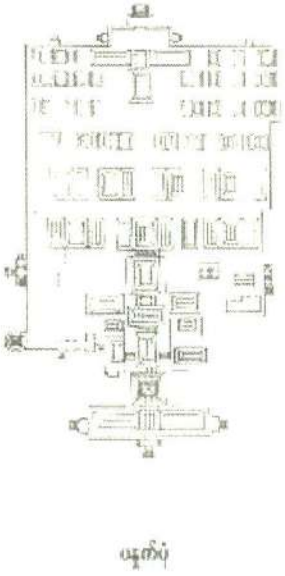
The most widely used roofing of the Myanmar *tazaung* is a *pyathat*, a very specific Myanmar architectural form with an original pyramidal shape, *pyathat* consist of an odd number of square roofs, decreasing upwards. Roofs with small decorative gables in the center of each pitch are most common. Roofs are nearly always richly decorated, usually with woodcarvings. The crowning part of a *pyathat* resembles an onion shaped body elongated upwards and square in plan. It is a conventional image of a *hnepyobu* – a banana bud which is required to complete each Myanmar pagoda and *pyathat*. An iron *hti* (umbrella) crowns the *hnepyobu*. Significant *pyathat* often had a gilt covering.

Myanmar *pyathat* look intricate, but in fact have a simple and logical structure. A wooden skeleton is formed by a number of three-dimensional frames narrowing upward. Over the bottom frame lie two strong beams, crossing in the center of the *pyathat*. The support pole is considered the spire of the *yathat* skeleton. The pole ends with a *hti* (umbrella) and other crowing elements. A system of internal diagonals ensures the strength and stability of the structure. The frames are faced with boards. Decorations of elaborately carved elements hang on the *pyathat's* frames. Even without this suspended adornment the shape of a *pyathat* looks clear-cut and expressive.

The roofing levels of a *pyathat* were not allowed to exceed nine in number. Usually there were three, five or seven roofs (see photo above), the number depending on the significance of the *tazaung*. *Pyathat* with three roofs bore the name *yahma*, with five, *thuba*, and seven, *thuyahma*. The silhouette of a *pyathat* is common in Myanmar scenery just as the silhouette of a pagoda is in China. *Pyathat* over the *tazaung* crowning gates and towers of the Mandalay Royal City are among the most significant examples. Their refined and fragile shapes tower over mighty brick walls and form an impressive composition based on their sharp visual contrast. Some of the Mandalay *tazaung* are considered old, although they belong to the middle of the 19th century.

Palaces





In Myanmar, palaces were built throughout the historical periods. During the Pyu period (1st century BC to the 10th century AD), ancient cities were found at Pyay (Sriksetra) in the south, Beikthan in the center of the country and Hanlin in the north. Each Pyu ancient city had fortified city walls. The Beikthano Pyu city wall is square in shape, whereas the city wall of Sriksetra is oval, and the city wall of Hanlin is rectangular in shape. At every Pyu ancient city the palace site was found to be located in the center of the city. The palace site was usually fortified with a massive brick wall and surrounded by a wide moat. Archaeological excavations have revealed the location of remaining brick platforms of the palace. All of the palace superstructure was totally destroyed due to fire, weather, and other factors, and thus it has been under reconstruction since 1989 by the government.

Monasteries

Monasteries occupy a very important place among traditional wooden buildings in Myanmar.

They are called *kyaung* or *pongyi kyaung*. *Kyaung* also means school and *pongyi* means monk. Monasteries and schools bear the same name because during the feudal period only monasteries functioned as schools.

A Myanmar Buddhist monastery may consist of one or several buildings that look like ordinary dwelling houses. The monastery, surrounded with a fence (serving more of a symbolic function than for real protection), can be seen anywhere, such as among dwellings on the territory of sacred compound, in a picturesque grove on the riverside, or near a pond. The number and composition of monastery buildings depend on their significance, size and wealth.

Among many monasteries one can single out examples built according to the regular plan which are sometimes genuine pieces of folk wooden architecture. How and when the classical composition of a Myanmar wooden monastery building developed is not certain. However by the end of the 18th century this was well established.

A classical Myanmar wooden monastery is generally divided into two areas. An official area for visitors occupies the eastern side of the building, with the residential area on the western, private side. This scheme resembles that of the Bagan monasteries, where the official public hall with a Buddha statue built of wood adjoins a brick dwelling building. This similarity in the overall general planning concept is the only common feature to the Bagan and wooden monastery buildings of the 18-19th centuries. The latter are known only in the form of fully developed examples that have no analogues in India, China, or in any other neighboring country.

A Myanmar wooden monastery is, as a rule, symmetrical along the east-west axis. Its floor is elevated 2.5–3 m above the ground. The building is surrounded by an open gallery accessed by several massive, plastered brick stairs. Every monastery room is covered with a separate roof. Shweinbin Kyaung in Mandalay, erected at the end of the 19th century, is a definitive example of traditional monastery composition. The main entrance is the eastern one. The King and the abbot were the only persons who had the right to use the eastern stairway. The first entrance hall formerly enclosed one or several Buddha images and is crowned with a *pyatthat*, hence its name *pyatthat saung*. The next small room, *sanu saung* (intermediate room), is sometimes considered the abbot's residence and was also used by him for talks with visitors, and for receiving presents and donations to the monastery.

The *sanu saung* leads into the maraphin *saung* (*saung magyi*), a large hall-like room divided with a partition into western and eastern parts. The name of the hall originates from this partition because *maraphin* in Myanmar means "partition," or "dividing a hall into two parts." It is always the largest room in a *kyaung*, covered by a separated three-tiered roof. Clearly distinct in the composition of the building in the eastern section of the *maraphin*, near the center of the partition, stands a throne with an image of Buddha. The floor in the middle of the *maraphin* is always elevated for two to three steps, with a low fence usually surrounding this elevated area. This is the scene for various activities. A monk sitting on the elevated floor delivers sermons, teaches novices and monastery school pupils who take their place on the lower level. At the western part of the *maraphin* is a private room closed

from strangers. Monks used to sleep on the bamboo mats along the walls in the different pats of the *maraphin*. *Boga saung* or *anau saung* (Western room) on the main monastery axis is separate from the *maraphin* house novices and pupils, and it may also be used as a storeroom.

6. Preserved monasteries of upper Myanmar

In upper Myanmar, there are over 50 ancient wooden monasteries. Among them the following have been preserved by our Department of Archaeology according to our budget. A partial list of preserved monasteries is as follows.

(a) Thin-Gazar wooden monastery, Mandalay
(b) Bagaya wooden monastery, Innwa
(c) Pha-wut Kyaung, Legaing
(d) Lay-zin Kyaung, Salin
(e) Hmankin monastery, Salin
(f) Yoke Sone wooden monastery, Legaing
(g) Beikmarn Bonthar Koe Saung Kyaung, Salin

Thin-Gazar wooden monastery, Mandalay

Built sometime during the reign of King Mindon (1853-1878), this monastery is supported on a platform approximately 2 m high and 40 m long. The shrine room (*pyathat-hsaung*) intermediate area (*sanu saung*), main hall (*saung-magyi*), and storeroom (*bawga-saung*) are surrounded by a corridor following the typical Konbaung axial layout from east to west. The main hall has been partitioned into a reception room and sleeping quarters. Extra apartments on the left and right sides (*ya-hsaung and we-hsaung*) have been added to the wings on the north and south sides. Access is by way of a pair of mango bud masonry staircases on the north side and single staircases on the east and south sides. There is a masonry ordination hall on the south side.

The Department of Archaeology undertook the preservation of this monastery in 2000.

Bagaya wooden monastery

The Bagaya Kyaung, measuring approximately 31 m from north to south and 56 m from east to west, has been built from a total of 276 teak posts, the largest of which is 18 m high and nearly 3 m in circumference. Access to the 2 m high platform is via five "mango" spiral masonry staircases, three of which are located on the north side while the remaining two have been situated on the eastern and

southern sides. The cruciform-shaped shrine room at the eastern end is in the form of an open-sided pavilion and is marked externally by a gabled *pyathat* spire. The section that follows is a plain, unpretentious apartment covered by a single style of roof, which is dwarfed by the large towering apartment of the triple-tiered roofed reception hall (*hsaung-magyi*). There is no separate apartment for a storeroom.

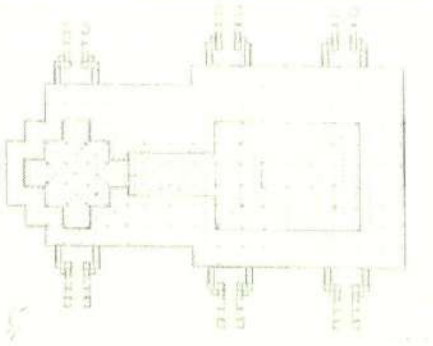
The image room (*pyathat-hsaung*) was leaning badly in different directions, and the handrails and floorings were disintegrating in some parts. The leaning problem was corrected by the Department of Archaeology in 2000.

Pha-Wut-Kyaung at Legaing

This wooden monastery is situated at Legaing, one of six old cities in Pwintphyu township, Magway division. It was built in the 19th century by a rich man who dedicated it to a frog which died after listening the teachings of Buddha near that site.

This monastery is slanted due to earthquakes. It has now been straightened with traditional Myanmar techniques, and provided with post footings of concrete.

Salin Kaung (Myauk lay zin kyaung)



Situated in Salin, this monastery is approximately 49 m from east to west and 25 m north to south, and has been built from a total of 244 teak pillars, the largest of which is 20 m height and nearly 0.5 m in diameter. It was donated to the order in 1868 by a Daw O Kyee.

This monastery has a complete set of three rooms, beginning with a *pyathat* or shrine to place the Buddha image for worshiping, a sanu saung (passage) joining the *zetawon saung* (the reception hall), and is surrounded on all side by a veranda. It is of classic proportions, and the shrine room (*pyathat-hsaung*) is seven-tiered, and cruciform in shape.

There is no storeroom (*bawga hsaung*). Access is by way of six brick and stucco staircases on the north and south sides. Because of crumbling masonry and encroaching vegetation, only two staircases are currently usable. The special charm of this monastery lies in its fine proportions and its well-appointed under-roof ventilation in the form of boldly carved open-work screens under the eaves. The paneling

on the exterior of the shrine room is also worthy of note, as are fragments of crisply carved floral balustrades which unfortunately are in the process of being devoured by invasive creepers. There are still a few examples of competently carved smaller dragons in relief attached to the top of some of the outer foundation posts below the floor of the building. The Department of Archaeology preserved this monastery in 2003.

Hmankin monastery

This monastery is situated at Sagu, one of the six old cities in Minbu district. It was built in the 19th century by a rich man of Sagu. It consists of 136 wooden columns and four stairways. The length from east to west is approximately 35 m (116 feet), and from south to north the width about is 20 m (67 feet). There are many Jataka stories in wood carvings decorated around the monastery, such as Maha Paduma Jataka, Utaena Jataka, and Byatwi and Byatta story from Bagan period. The façade of the building still remains, and it was originally roofed with 18 x 10 x 1.25 cm (7 x 4 x ½ inch) teak shingles. This monastery and its wood-carvings are very well cared for by the monks who reside there.

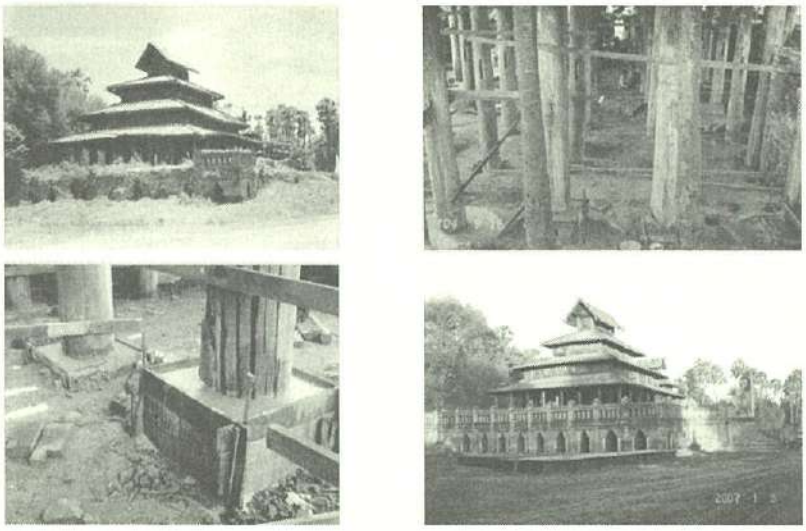
Yoke Sone wooden monastery, Legaing

This monastery, measuring approximately 52 m (174 feet) from east to west and 21 m (68 feet) from north to south, has been built from a total of 214 teak posts, the largest of which is 15 m high and nearly 30 cm in diameter. It was donated to the order in 1890 by U Anthawni, whose family had it built. The building is of classic proportions, consisting of a shrine room (*pyatthat hsaung*) in cruciform shape, *sancehsaung*, *zetawon hsaung* with *bawga* store room, and *boga hsaung*. The *pyathat hsaung* collapsed 20 years ago, but its posts remain decorated with beautiful carvings. The store room (*bawga hsaung*) collapsed before we could restore it. Other restorations were made with funds provided from the government's budget.

7. Conservation Measures

As architectural engineer, as well as deputy director in the Department of Archaeology in Myanmar, I have the responsibility for the conservation of the ancient monuments of Myanmar. I would now like to make a brief account of the conservation measures that I recently carried out at Beikmarn Bonthar Koe Hsaung wooden monastery in Salin in 2003.

Beikmarn Bonthar Koe Hsaung wooden monastery, Salin



Background History This building was donated to the order in 1818 by U Paw and his sons, U San Aung and U Aye. The construction of the building was commenced in 1818 and was completed in 1823. It was restored in 1908 by U Pan and Daw Tok O, relatives of the first donor. It measures approximately 30 m from east to west and 15 m from north to south, was built entirely with teak posts, the largest of which is nearly 30 cm in diameter. The wooden building is surrounded on all side by a veranda, which is a brick structure. The wooden flooring, walls, and teak posts of this building were damaged.

The conditions of the monastery before conservation I will now discuss the Beikmarn Bonthar Koe Hsaung monastery that was recently preserved in 2003. It would be still be in danger, and we would lose this precious cultural heritage building, if we did not have a chance to preserve it.

According to our traditional building methods, all of the monasteries were built by digging holes for wood pillars. Thus, the parts of the wood pillars in the ground were ruined in a matter of several years. Following this, the upper part of the monastery leaned in different directions and eventually collapsed into a heap of wood. As a result, our Department tried our best to save the remaining parts of monastery.

After thoroughly examining the causes of deterioration, the following damage was noted.

(1) Rainwater leaks through drains, windows and the roof, so that some parts are badly deteriorated.

(2) During the rainy season there is water accumulation around the monastery that stays the whole year round and therefore some supporting pillars under the monastery sink and are fragile.

(3) Due to the water accumulation, another problem is that the whole building is leaning approximately 20 degrees towards the east side, and also in different directions, so that it is dangerous for the monks who live there.

(4) The sculptures and carvings outside are decayed and eroded due to prolonged exposure to weather.

Process of conservation work carried out Before starting the conservation work a photographic record was taken from each and every angle. The process of conservation work was carried out as follows.

(1) Each of the pillars was dug out at the foundation in a square shape.

(2) Some portions of the structure, such as a projecting corrugated iron sheet roof at the side of the monastery, the roofs of the main structures, and the side windows, etc., were dismantled temporarily in order to reduce the heavy weight of the entire structure as far as possible.

(3) Then the whole structure was pulled back and straightened upright by workers, and then supported with long wooden posts from the side to which it was leaning.

(4) When the whole structure was straightened up vertically, all the bases of the pillars were encased with concrete in poured into square shaped molds, in order to reinforce the whole structure.

(5) The ground level under and surrounding the area of the monastery was made slightly higher with an added layer of soil, and a slope was constructed to prevent water from stagnating around the base again.

(6) Some decayed wooden pillars, floor planks, and iron sheet roofs were removed and replaced with new ones.

(7) Portions temporarily dismantled were replaced.

(8) All the missing portions of the brick staircase were repaired to restore the original shape and design.

(9) All the pillars and exposed parts of the building were given an application of thick crude oil, in order to protect them from the effects of weather.

(10) All the zinc sheets were painted externally with red oxide in order to protect them from rainwater.

Problems faced during the preservation work Problems faced during the preservation work are listed as follows.

(1) Due to lack of sufficient funding, the work was not completed the in time frame originally expected.

(2) Up-to-date construction equipment, such as cranes and derricks, have not been used, and accordingly more money has been spent unnecessarily for labor charges during the operation.

(3) Additionally, there have not been enough skilled workers, and more are required.

(4) As teak wood is very expensive and not readily available, other kinds of wood had to be used and the replaced wood is not as durable in the long run.

(5) Although the conservation work for monasteries has been completed, an annual maintenance fund is still required.

(6) In terms of further conservation work, advanced methods of conservation are required there are a few well-trained technical assistants in my department, and it is difficult to cope with the large number of ancient monuments in need of work.

8. Benefits from the Training Course

After attending the 2007 ACCU training course, I believe that I will be able to undertake further preservation and restoration of historic wooden buildings in my country. I will apply the useful techniques and methods of preservation of wooden monuments that I will study in Japan to my restoration and presentation work in Myanmar. I will also share my experiences with younger conservators.

Thank you.

Nepal

Mangala PRADHAN
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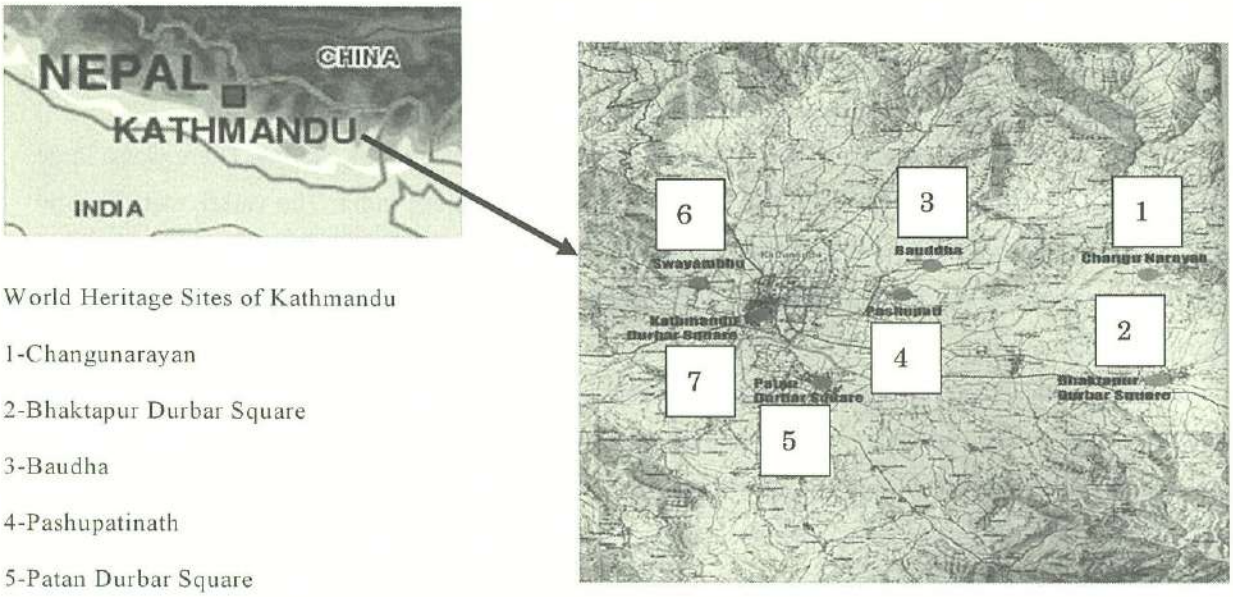
Conservation of the Wooden Architecture of Kathmandu Valley

1. Introduction

Nepal lies between two big countries, China at the northern Himalayan crestline, and India to the east, west and south. The area of the country is 147,181 sq. km. Its altitude ranges from 50 meters above sea level in the southern plain foothills to more than 8,000 meters on the northern side. Nepal's length is 800 km, and it is 170 km in width. Nepal is one of the richest countries in the world in terms of biodiversity, due to its unique geographical position and attitudinal variation. The varied elevation of the country results in climatic conditions from sub-tropical to arctic.

The population of the country is 22 million, and displays cultural diversity due to the varied geographic condition. Nepal has more than 61 ethnic groups and 70 spoken languages. Nepal has four major seasons, namely (1) winter, December-February (2) spring, March-May (3) summer, June-August (4) autumn, September-November. The Himalayan kingdom has the richest and most diverse cultural landscape found anywhere. Nepal is considered a Holy Land for Hindus and Buddhists, where both have lived together in harmony for centuries. As is well known, Lord Buddha, the light of Asia and apostle of peace, was born in Lumbini in Nepal's southern plain.

Kathmandu Valley is the capital of the Kingdom of Nepal. The rich tapestry of the cultural heritage of Nepal is synthesized in the Kathmandu Valley, where Patan, Kathmandu, and Bhaktapur represent the epitome of harmony in urban design, elegant architecture and refined culture. These cities pack a concentration of religious monuments unequalled in the world. The Kathmandu Valley was listed as world heritage site in 1979, comprising three royal palaces of the three cities, two Buddhist sites Swoyambhunath and Baudhanath, and two Hindu sites, Changu Narayan, and Pashupati. All the seven sites are considered Protected Monument Zones [BKT, KTM, PTN, CN, BN (1984), SN (1995), PN (1999)] of Kathmandu Valley World Heritage Site (KVWHS). The location of the Kathmandu valley along with location of seven PMZs is shown below in Figure 1.



World Heritage Sites of Kathmandu

1-Changunarayan

2-Bhaktapur Durbar Square

3-Baudha

4-Pashupatinath

5-Patan Durbar Square

6-Swayambhunath

7-Hanumandhoka Durbar Square

Figure 1. Location of Kathmandu Valley with PMZs

Adding dazzling colour to Nepal's myriad attractions, there are many festivals that dot the calendar, celebrated over the years in traditional style, and highlighting enduring customs and beliefs. There are many village settlements, surrounding the valley on ancient trade routes, which show off their multi-ethnic makeup to give first hand experience of their customs and life-styles. Figure 2 shows an example of social networking of the local people during these festivals.

Figure 2. Social gathering during the festival

The history of the valley begins with the accounts preserved in a number of later chronicles. Chronicles mention the Gopalas and the Mahishapalas, who may have ruled the valley as far back as the 7th century BC. The mention of non-Sanskrit names in Lichhavi inscriptions indicates that the valley was ruled by an ethnic group that spoke a Tibeto-Burman language; those were the Kiratas.

The Lichhavi period is considered to be the "Classical Era" and is sometimes called the

"Golden Age" of Kathmandu. The highly developed Gupta culture in India influenced the Lichhavi era. The Lichhavi are known from the time of the Buddha as a tribal republic on the northern Gangetic plains. They probably moved up from the plains around the 2nd -3rd centuries AD.

There is little evidence for the period between the Lichhavis and the Mallas. There was a large influx of immigrants fleeing from the Muslim invasion from northern India. The valley was ruled by many powerful Thakuri rulers. Very few buildings remain from the 12th century, although the valley must have been developed with settlements, Hindu and Buddhist monasteries (Vihara and Bahas), and shrines as well.

The greatest contributors to Nepal's architectural and cultural heritage which still survives were the Mallas. This dynasty was founded in 1350 by Jayasthiti Malla. Many of the finest monuments, artwork and items of culture owe their existence to the four centuries following Jayasthiti Malla's rule. After 1428 the valley was divided into the three separate Malla city states of Kathmandu, Lalitpur (Patan) and Bhaktapur. The late Malla period was the "Golden Age" for architecture and works of bronze, wood, stone in the valley. The Mallas developed the craft of constructing with bricks and wood to such perfection that whether temples, palaces, or private and public houses, the buildings have aesthetic value as well as being adapted to the climate.

After conquering the valley, the Gurkha Shah rulers adopted the Malla tradition and started to spread. In the Shah Period, Mugal influence was accepted in some parts of the palace.

The period of Rana rule was a time of white stucco palaces, copying the prevalent European neoclassical style. With time, this architecture developed into the Rana style. In 1950 the Shah regained the hereditary power from the Rana regime. After 1951 Nepal opened its borders to the world.

The various monuments of architectural importance, mostly centered in and around Kathmandu Valley, comprises numerous palaces, monasteries, temples, private houses, public rest houses, water systems, etc. Intricately carved wooden architectural members like pillars, windows, doors, brackets, tympanums, and struts over and around a core structure of bricks is the characteristic feature of traditional Nepalese architecture.

2. Wooden Structures in the History of the Early Nepalese Architecture

Human beings have been using wood from the time immemorial. Prehistoric men used trees and parts like leaves, branches and timber in their daily activities and for dwelling purposes. It is believed that early men were inspired by tree to make a shelter or house for their well being. Since timber is a perishable material no traces of such kind of evidence are found. In the context of Nepal, an archaeological excavation conducted in Tilaurakot of western Terai region had revealed some evidence of timber used to build a house which was dated to the pre-Christian era (6th century BC). The history of India from approximately the same time also gives some idea of the palace of Chandra Gupta, made of timber, as Greek writer Magasthanis states.

In addition, Nepal is rich in excellent wooden art. The carved doors and windows of monasteries, temples, palaces and private residences are their most decorated elements, and in fact constitute some of the most elaborate examples of wood carvings to be found anywhere. Deo (1968) states, "The decoration on the wooden constructions is so lavish that virtually no part of the wood is left blank."

We cannot find any traces of woodwork from the Lichhavi period. We can only rely on the inscriptions and the Chinese travel accounts. Some Lichhavi inscriptions shed light on the different temples, like Changu Narayan, Vishnu Vikranta, and Pashupati, on the palaces, like Managriha Kailashakuta Bhavan and Bhadradhivas Bhavana, and on monasteries, like Guvihara, Manvihara, Raj Vihara, Kharjurika Vihar, and Madhyam Vihar, etc. Inscriptions of Anshuvarma, found from Patan Sundhara, mentions buildings made with brick and timber. In another inscription a certain amount of tax money was allotted to "Sinkara," which was probably for the wooden materials. According to Chinese accounts, houses were built with timber and the walls were decorated with paintings. They praised very highly Lichhavi palaces the Kailashakuta Bhavan. Reports from the Chinese travelers in the years 647/48 and 657 are recorded in the Tang annals about this place. These annals state that the palace that was more than 5 m (200 inches) in height and "80 *pen*" (400 ft., 120 m) in circumference. It was divided into three terraces, and each terrace divided into seven storeys. It further says there was a tower of seven storeys made with copper tiles, balustrade, grills, and columns which were decorated with precious stone.

The medieval period is the best known period for the existing art of the valley. This period is famous for wooden art objects and architectural forms. The oldest example of wooden architecture in Kathmandu valley is Kasthamandapa. According to Gopala Raj Vamsavali it was built by Gunakamadeva in 12th century. After this the oldest evidence of wooden works are struts of Rudravarna Mahavihara (Buddhist Monastery) of Patan, Itumbahal of Kathmandu, and Indreshwor temple of Panauti. We can say that art of woodcarving is indeed the pride of Nepal. Both in secular and religious buildings wood, beautifully shaped and formed and carved in intricate patterns and designs, was extensively used in door-frames, door-leaves, windows, cornices, brackets, lintels, struts, pillars, in fact in all available surfaces of wood. Wood is not only used in architecture but also in iconographic representations.

3. Description of the Existing Wooden Monuments of the Kathmandu Valley

The Kathmandu valley is known for the remarkable wooden components used in traditional style temples, palace, monasteries etc. Wooden work with architectural design has spread throughout Nepal from its origin in Kathmandu. From the early history of Nepal we can find only remains of small and large stupas made of monolithic rock, which is of only archaeological value. In some cases we can find some so-called early stone temples, which are very simple with four pillars and a stone slab covering at the top. The interval between the Lichhavi and Malla is considered as the dark period of

Nepal's history. But the development of wooden art and architecture of the later Malla period is worthy of study. During this period, in spite of the political instability, people of Kathmandu valley boasted immensely of art and architecture, including wooden art, to show the glory of this age. As a result, the surroundings, suburbs, villages and the three major cities of the valley are filled with these treasures. This being the case, the study of Nepalese wooden architecture can be based on the monuments extant at Kathmandu, Patan and Bhaktapur.

There are numerous wooden monuments in the valley from throughout the ages. There are many difficulties in studying them properly. Most of the architectural constructions have undergone repair and alteration several times which give a big confusion to date and record them. Likewise the application of black preservative coat, enamel by the locals also makes it difficult to know the details.

S. B. Deo (1968) has calculated the date of the construction of some of the wooden temples and viharas on the basis of epigraphical records. They are as follows:

13th century AD – Rudravarna Mahavihara, Patan

14th century AD – Chhusyabahal and Musyabahal Vihara in Kathmandu and Inreshvara temple in Panauti

15th century AD – Chandeshwari temple Banepa, Bhuvaneshvara temple near Pashupathi, Devapatan.

15th-17th century AD – temples of Kirtipur, Patan, Bhaktapur

16th-17th century A.D – Chaturvarna Mahavihara, Bhaktapur

17th-18th century AD – Nyatapola temple of Bhaktapur, Hanumandhoka Palace of Kathmandu.

As far as the extant architectural monuments are concerned, no monuments built earlier than the fifteenth century have survived to this date due to frequent earthquakes which occur in the valley. Several inscriptions indicate the large scale of damage and destruction of monuments and public houses. The other cause is because wood is perishable in nature, and is quickly affected by rainfall, high and low humidity, vegetation and wood-eating insects. Thus the general surveys of monuments in this study are mostly those which belong to sixteenth century onwards. Monuments of Kathmandu, Bhaktapur and Patan are taken in this study.

4.Types of Traditional Architecture of the Kathmandu Valley

The architectural style of Kathmandu Valley can be grouped in to (a) traditional Nepalese origin, and (b) borrowed architectural styles. The traditional architectural style comprises mainly *pati* (wayside resting places), *powah* (community dormitories), *dhungedhara* (public taps for drinking water and open air bathing place), private houses, palaces, temples, monasteries, stupas, fortifications, etc. The other group of architectural style comprises of items of varied construction which do not have Nepalese origin. The Indian Shikhara style was acquired to build the masterpiece temple of Krishna

(1677) and Mahabauddha temple (16th c.) in Patan. Likewise Rajput, Mugal and European neoclassical style were borrowed to build palaces, temples etc. The neoclassical style now named the Rana Period style has also become as a part of our history. This study mainly focuses on the traditional style, which was developed during Malla period and continued tradition to Shah, Rana and at the present as well.

The existing traditional wooden structures can be grouped into five types, and each type has its distinct feature, which can be differentiated by their character and utility. The types are:

(4.1) Royal palaces
(4.2) Private houses
(4.3) Public rest houses
(4.4) Temples
(4.5) Buddhist monasteries.

(4.1) Royal Palaces

Layaku is the old Newari term for the word "palace." *Durbar* is the Nepali term for the same, which refers to palace buildings. Large squares and temple groups surrounding the palaces are named after the various *toles* (neighborhoods) in which they are situated, the bazaar streets which they adjoin, or take their names from important buildings or sections of buildings. The name "Durbar square" is usually given to the complex of palace buildings together with palace gardens, courts and temple groups. All the palace complexes of the three cities (Kathmandu, Patan and Bhaktapur) differs their appearance, according to their positions in the city, and the grouping and style of the buildings. But still all three palace complexes are left with their basic plan, groups of various courtyard buildings which are intermingled with or supplemented by multi-storied temples.

The earliest Malla royal palace of Bhaktapur has lost part of its original features because of the devastation caused by the earthquake of 1934. It is said that the palace of Bhaktapur complex consisted of 99 courtyards surrounded by buildings. But there are only nine or ten left. The existing building and the courtyard still have the essence of the past, showing its grandeur of art and architecture to give viewers a hint of its past. Its original construction dates back to 1427 in the reign of Yaksha Malla. Most of the following kings added wing after wing, but according to sources most of the present construction has been carried out by King Bhupatindra Malla in late 17th century. The Bhairav Chowk (courtyard) and Kumari Chowk have survived in the last few centuries with little alteration. The 55-Windowed Palace is undergoing its major *in situ* conservation project.

The most remarkable palace in Kathmandu is the Hanumandhoka Durbar whose foundation was laid by King Ratna Malla in 1484. Restoration of the old buildings and a little new construction was credited to King Pratap Malla in the 17th century. Likewise, in the time of King Prithvi Narayan Shah, and again during the Rana regime, some extensions were made which added distinct character to the palace. There are five main courtyards which still exist in the palace complex. The Mul Chowk

or main courtyard (built by King Mahendra Malla in 1565) is the most important, where all the religious celebrations and coronations of Malla Kings used to take place. Sundari Chowk and Mohan Chowk were built by Pratap Malla 1641-1674) for the residence of king and royal family. The Nashal Chowk built by Pratap Malla was the venue for the coronation of the Shah King. Lohan Chowk was built by Prithvi Narayan Shah and his successor Pratap Singh Shah. At present, part of the palace has been converted into a museum displaying the Shah ruler's biography.

Another most impressive palace is Patan Durbar. The palace buildings materials are of bricks and timber, and are distinctive in their features. It is the best preserved palace and retains most of its original form. This palace square comprises the palace with its temple, courtyards and the group of temples built in front of the palace complex. The palace buildings seem to have been built in the 17th century and later. The present form took shape during the reign of Siddhinarasinha Malla (1620-1660) and Srinivasa Malla (1660-1684). Sundari Chowk, the most beautiful part, was completed in 1627 as the residence of Siddhinarasinsha Malla and his family. The temple inside the palace complex either stands on a raised platform or emerges on the palace structure itself. A series of super-structures of brick over a plinth of stone or brick is lavishly decorated with wooden carvings. Figure 3 shows a typical example of the wooden structures in the 55-Windowed Palace Conservation Project in Bhaktapur.

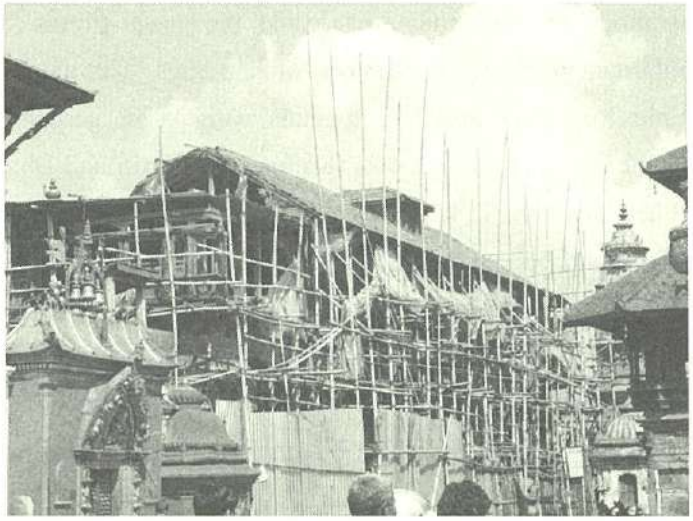


Figure 3. Wooden structures in the 55-Windowed Palace (currently under renovation), Bhaktapur

(4.2) Private Houses

A typical traditional domestic house is made of brick and a large number of timbers. The houses are arranged in groups, with common walls in between a series of adjoining houses, or in complete isolation, as the availability of land permits. Generally private houses among the poorer inhabitants occur on the fringes of towns. The houses are of four storeys in the center of the town. Every house or group of houses having open spaces serves as a playground for children, a warming area, and provides a sitting area. The common lifestyle within each habitation, together with similar buildings methods, led to uniformity in architectural style, with little variation.

Generally each house has at least three floors. The ground floor is used for storing wood, farm implements, tools, and livestock. The street side serves as a shop which has an arrangement of wooden doors. The pillars and posts are carved with various designs. The first floor is divided into a number of small rooms (*mata*) which serve as bedrooms. The second floor, with lavishly decorated bay windows or simple windows, serves as a sitting room. The top floor serves as the kitchen and shrine room.

We can find masterpieces of different types of windows in public houses. Because of the unique character of the traditional buildings, there is a building bylaw to protect and to preserve the traditional look which is implemented within the protected monument zones (PMZ) of Kathmandu valley.

(4.3) Public Rest Houses

Public rest houses, known as *pati*, *powha*, *sattal*, *mandap* or *dharmashala*, etc., are traditional rest houses mainly made for travelers, pedestrians and for members of the communities themselves. They are mainly centered near the temples, palaces, wells, and public water conduits or near the sources of water along a trade route, in public courtyards along the road and private rest house. They are built by the royal families or religious groups. The oldest rest house in the valley is the Kasthamandap (wooden *mandapa*) built in $11^{th}/12^{th}$ c., also known as Maru Sattal.

The more specific term *pati* for a *dharmashala* refers to the smallest and most widely distributed of the rest houses, which despite its limited size, has similar functions to the other types. As well as being a shelter for travelers, it serves the closely interwoven Newari society living in its neighborhood, as a meeting place for games or social and religious gatherings.

The layout of each *pati* is identical and consists of a rectangular brick platform raised about 60 cm and covered with wooden floor boards. *Sattal* is another type of rest house which is generally a two-storied or Mandapa type, or a house type. These three differ in plan, firstly, in the ground floor which is either square or rectangular, secondly, layout like open halls and room division and thirdly, the height or number of storeys. These rest houses contain a large number of wooden members with carvings such as pillars, lintel, windows, representing traditional workmanship.

(4.4) Temples

Nepal is famous for its unique multi-roofed temples. The oldest temples are Changu Narayan temple (dating as early as 325 AD), Pashupatinath temple (6^{th} c.), Kumbheshwor temple (14^{th} c.). Char Narayan temple in Patan, Dattatraya and Nyatapo in Bhaktapur ($16^{th}/17^{th}$ c.), and Taleju of Hanumandhoka are the best examples of temple workmanship.

The overall description of the temple style can only be very generalized, for despite the first impression of uniformity, many conceptual differences occur within the one basic style. The temples are built in square, rectangular, circular or octagonal plans. The structures are built of bricks around and over a wooden framework. The walls of bricks are pierced by decorated wooden windows,

doorjambs, and other pieces of woodwork (to be described below) breaking the monotonous look. The storeys are supported on the wooden brackets. The higher storeys are arranged in a diminishing manner by reducing both their height and expanse. The roofs are also reduced in some manner forming a pyramid, to give a very beautiful rhythm, pleasing to the eye. There are certain rules of design for temples. Definite preferences are recognizable in the choice of plan, the structure as a whole and its orientation, while the number of roofs, the types of building material quality, carvings and sculptures on the other hand are according to strictly defined canons. Most of the palace squares have temples which were built by kings and have been raised on several plinths to give them special prominence above the surrounding buildings.

(4.5) Buddhist Monasteries

Buddhist monasteries are a particular type of building known as vihara, which is usually a two-storied court style building. The various types of viharas are differentiated by their Newari and Nepali descriptions, such as Bahi and Baha (Newari) or Bahil and Bahal (Nepali).

The concept of vihara as a dwelling place was developed during the lifetime of Lord Gautam Buddha. When Buddhism was getting popular, many Sangha were being formed by followers of the Buddha. In Buddhism, the Tri Ratna (the three jewels, Buddha, Dharma, and Sangha) were considered most important to sustain Buddhism. Sangha played the key role in spreading the teachings of Buddha. When the Sangha became larger the good followers of Buddha started to donate land and started to build permanent dwelling places for the monks and the followers. They built Viharas in a specific architectural form sustaining the basic principle.

Kathmandu valley housed more than 300 Buddhist monasteries with a common basic plan and slight differences from each other according to the path they follow, Mahayana or Theravada. The later developing Vajrayana path gave a more elaborate look in the development of monasteries. The vihara, set on a raised platform, is a two-storied structure surrounding an enclosed square courtyard. Except for the main entrance, which consists of a small centrally placed doorway flanked by two blind windows in the main elevation, the ground floor is totally sealed off from the outside. Arcaded porches on all four elevations over look the inner courtyard. Directly opposite of the main entrance is the room for the main shrine which is a simple rectangular room. In all the four corners a staircase leads to the upper floor. Upper floor is used as living quarters, prayer or open hall for the Monastic ceremonies. The monastery is decorated by the intricately carved wooden windows, doors, struts, etc., and most are decorated with metalwork.

5. Components of Traditional Wooden Architecture in the Valley

In all types of traditional style architecture, the framework is of wood in the form of pillars, doors, widows, beams, rafter, brackets, struts, tympanums, etc. The arrangement of struts and bracket capital, and sometimes the use of arc-brackets, distributes the load of the structure. The roofs are arranged in

the square within a large square and joined at both ends by wooden pins. The load of the beams falls on the transverse beam with supporting pillar brackets or bracket capitals. The horizontal beam's load is transferred to the struts. All the exposed surfaces of the wood are exquisitely carved to make the façade more elegant. They show a very high quality of woodwork. Woodwork is a living art in the Kathmandu valley even today. Here are some types of wooden components.

(a) Tympanum

The tympanum is called *torana* locally, which is a Sanskrit word that generally means a gateway. But to the Nepalese *torana* is something very special that most distinctively dominates the temple doorway. What is even more unique about the *torana* structure is that it gracefully hangs with many religious figures set above, offering onlookers a fairly good view to look at. This is suggestive enough for the locals to realize the significance of the *torana*, to which they bow down to show their respect. It is one of the most fascinating features of the Nepalese temple architecture. *Torana* is basically a semicircular form placed above temple doorways, windows, and between the pillars. Most of the *torana* are made of wood and stone, and some are gilded reposé brass. The *torana* are important from the point of view of iconography, art and mythology as they generally depict a form of the deity enshrined in the temple or an associate deity connected with it. Besides the deities, the panels bear motifs of the crocodile or *makara*, called *hitimaga* in Newari, dragons, lion heads, or a Chhepo holding serpents in both claws. The best example of *torana* are seen at the temples of Patan, Kathmandu, Bhaktapur palace etc.

(b) Doors, Doorjambs, Lintels

The main types of door are rectangular, triple cupped or trefoil, foliated and arched. The rectangular doorframes are generally found in the main entrance of the palaces and monasteries. Some temples have a rectangular main door with the trefoil pattern at the flanks. The doors, their leaves and doorjambs are excessively decorated.

(c) Pillars

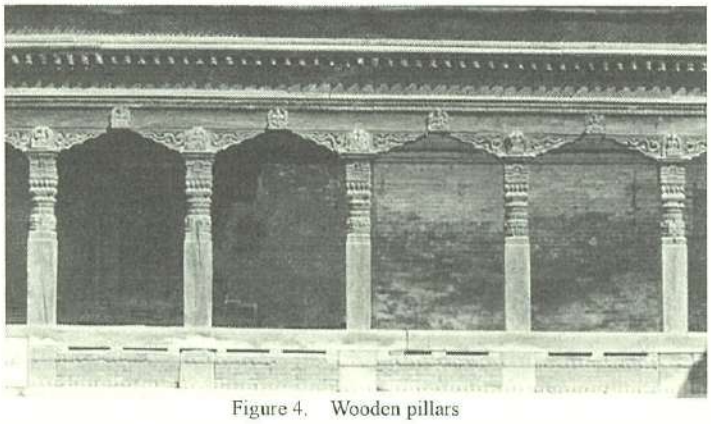


Figure 4. Wooden pillars

Wooden pillars, whether belonging to royal palaces, monasteries or temples, are heavily ornamented with motifs and molding. Such pillars can be grouped under four categories: (1) square, (2) cylindrical, (3) cypress, (4) composite. All types of pillars are carved at the capital. The carved portion bears names each like Gatapallavo, Patravali, Ratnahara, Puspapati, Kumbha, Kalassa, Amalaka etc. Some of the best examples of pillars are found at the Patan Palace, at temples around the palace, and in temples at Bhaktapur, Hanumandhoka, etc. Figure 4 below shows an example of wooden pillars in monuments.

(d) Windows

Windows play a vital role in medieval wooden architecture. Windows are the most elegant and varied feature, which can be grouped into three categories: (a) groups of windows covering most of the façade, (b) normal windows, kept engaged in the wall between pillars, (c) balconied windows.

The most remarkable example of the first type is seen at the 55-Window Palace of Bhaktapur. Other windows, like the peacock window of Pujari Math Bhaktapur, Kumari temple and Sweta Bhairav temple in Kathmandu, and windows of Patan Palace, are also elegant examples. Another well-known type of window is the Desemadu Jhya (not found throughout the country), placed on a private house, which is indeed a unique example as the name suggests. The balconied windows like Biman Jhal and San Jhal are the most exquisite examples of intricate art and architecture to look at; to feel and see the outside world through them are a totally different experience. A typical three-bay wooden window structure of traditional buildings is shown in Figure 5.

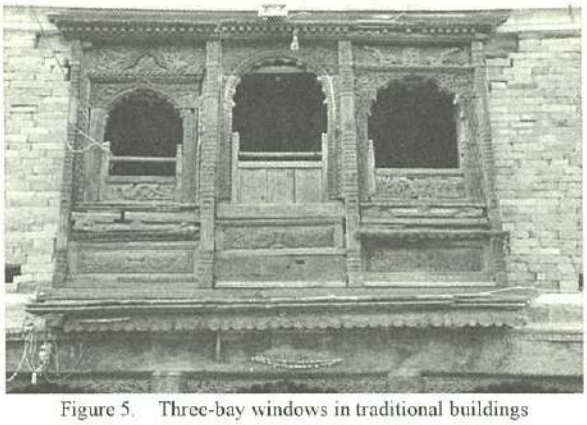


Figure 5. Three-bay windows in traditional buildings

(e) Struts (*tundal*) or Brackets

Tundal or *tunala* are placed to support the projecting eaves of the roofs. This can be seen particularly in multistoried form palaces, monasteries, and in some houses, and are Nepal's very own contributions. The intricately carved *tundal* are also considered as a very dominant feature in traditional architecture. The struts with semi religious motifs comprise representations of mythological figures like those of Bhimsena, gods associated with the constellations, Sala Bhanjika, etc., and social scenes as well as moral and erotic scenes are depicted on the lower part of the struts. The outstanding features of these struts is that they are generally labeled in Newari or Sanskrit, either

in explanation of the figures depicted, as in the Chaturvarna Mahavihara at Bhaktapur. Likewise names of the donors, names of *nakshatra* (stars), names of the musical instruments are depicted on the struts. These are useful in understanding the various motifs and the religious and social conditions of the late Malla period. Figure 6 shows an example on a traditional building in the valley.

Figure 6. Typical traditional building in the valley

6. Conservation Practice for Wooden Structures in Nepal

Conservation and preservation of historically and archaeologically important monuments were initiated from the 3rd century BC. The pillar inscription of Nighlihava clearly mentions that King Ashoka of India reconstructed the wrecked stupa of Kanak Muni Buddha during his visit to India.

Of the 200 inscriptions of Lichhavi period, some also state the preservation and conservation of historic monuments, water spouts, etc. The Sekubahi (Patan) inscription dated 573 AD clearly mentions the erection of the replica of terracotta icons of female goddesses. Similarly the Sundhara (Patan) inscription of Ansuvarma of 608 clearly mentions the temple of Matin Gram being damaged by mice, mangos, birds, and people's carelessness. The temple was later renovated by the royal patronage. Similar inscriptions shed light on funding for the well being of the monuments like the Gosthi or Guthi. Guthi is a kind of property or land and the income raised from the land is used to maintain monuments of different kinds. At that time as well, old torn icons or building materials were replaced, maintaining the original character. Similar customs were followed during Malla period as well. The extant architecture is made of brick, wood, stone, etc., which can be reused. When an earthquake occurs, all the materials which can be are reused, and the damaged parts that are beyond repair are replaced. For this purpose, for example, the struts of a temple were numbered at the time of construction. So at that time people were already aware enough to retain the originality of the monument. The architectural construction was made in such a way that conservation work could be done for any particular part only. For example, the traditional windows are made and arranged like Lego toys, so that if a small portion is damaged only that part is removed and replaced with a new part in its original shape. The same procedure can be followed to conserve wall bands, doors, brackets, lintels, rafters, pillars, etc. This tradition is still in practice in Kathmandu Valley.

Apart from these, vegetable oil was used to paint the wooden surfaces to protect them from

insects and climatic effects. In the traditional culture of Kathmandu valley, there is a custom of cleaning wells, public water spouts, and drainage, and of clearing and polishing wooden members before the start of monsoon or rainy season. This is the continuation of culture which was started from time immemorial.

7. Status of Wood Conservation in the Kathmandu Valley

There are hundreds of monuments scattered all around the Kathmandu valley. They possess beautiful wood carvings along with medieval Nepalese woodwork. As I have mentioned earlier, purely wooden structures are not found in Nepal as in Japan, but every structure includes wooden doors, windows, struts, entablatures, beam brackets, door wings, rafters and tympanums. These parts are integral to Nepalese architecture. Basically, Nepalese style temples and traditional houses made extensive use of wood. The wooden parts of these monuments are conserved by the people with their traditional knowledge from time immemorial. After the establishment of the Department of Archaeology, certain acts were promulgated for the conservation of wooden structures included in the monuments. We have hundreds of monuments all around the Kathmandu valley, so it is very hard to conserve them within the limited budget of our government. The government agencies use modern technology for the conservation of these old architectural specimens, while people prefer to adopt traditional technology for maintaining these monuments. At present, many problems can be seen regarding the conservation of wooden specimen in Kathmandu valley. They are as follows.

- Lack of budget.
- Lack of experts.
- Lack of modern technologies.
- Lack of proper management.
- Lack of coordination between government agencies.
- Lack of sufficient manpower.
- Lack of coordination between traditional and modern technology.
- Lack of documentation of the wooden specimen.
- Lack of public awareness.

These are the major problems that currently exist in the field of wood conservation. The Department of Archaeology, KVPT, Bhaktapur Municipality, and Patan Municipality and Heritage Society are working together for the conservation of wooden heritage of the valley. Over the past twenty years many conservation projects have been conducted by these institutions around the valley. Some of this conservation work is described in the following sections.

7.1 The 55-Windowed Palace

The uniqueness of the 55-Windowed Palace derives from (a) its 55 bayed Viman windows and the Chota, (b) its key room, the Matan bedroom of king Bhupatindra Mallas with a mural painting on one side and alcoves shaped to fit the bed side utensils for royal use. An innovative masterpiece, the Palace presents the summary of the Malla period palace construction not only in terms of architectural design and craftsmanship, but also in its structural approach. It expanded the Viman window to cover the whole external surface of the Chota floor wrapping it around using 55 bays on the long side and 11 each on the short sides. At the same time it structurally summarized the knowledge of the Ku-Jhya, a corner window, and streamlined and merged it with that of the structural system of the Viman Jhya, a projecting multilayer vertical window. The palace building is undergoing major conservation work and will be completed within a year. Figure 3 above shows the ongoing conservation project, and Figure 7 shows the details of roof tiles being laid.

Figure 7. Roof tiles and planking in the roof of the 55-Windowed Palace, Bhaktapur

The figure below shows the use of local material; mud is used in the above conservation project.

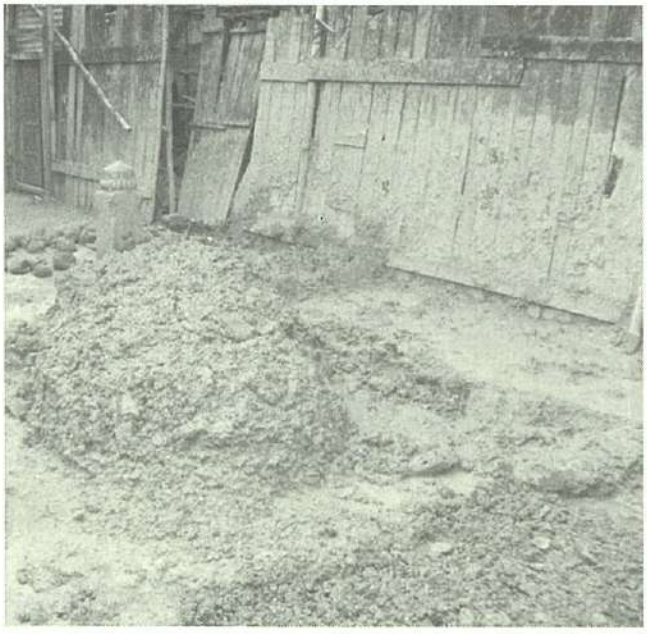


Figure 8. Local material stock (mud) on site at the 55-Windowed Palace

7.2 Pujari Math

This monument is located in Bhaktapur city and is famous for its intricate wood carving. The world famous peacock window is also part of this monument. Beautiful wood carving can be seen here. Especially the wooden doors, windows, pillars, entablatures, eve boards and tympanums are noteworthy. Some of the wooden parts and structure collapsed few years back. The consulting firm John Sanday & Associates, with the support of Germany, restored the wooden structure again in a proper manner. The consultant also conducted chemical treatment on the wooden structure.

7.3 Jagannath temple

This monument is a part of the Hanumandhoka royal palace area. The roof of the temple collapsed 67 years ago. The Department of Archaeology reconstructed the entire temple from the plinth level.

7.4 Chandeswori temple

Banepa is a famous medieval town where the Newar population is large in number. This area used to be an important center on the trade route to and from Tibet in the medieval period. Chandeswori temple is located in the northern part of Banepa city. For the past four years renovation work is being conducted. During the renovation work the whole temple was dismantled and rebuilt using existing materials. Some of the wooden parts were also reused after performing chemical treatment. The team of the chemical conservation section of Department of Archaeology still regularly performs chemical treatment for reusing medieval wooden members from this temple.

7.5 Maju Dega

Placed in Kathmandu Palace Square, this monument underwent conservation a few years ago.

7.6 Conservation of Samrajeshwor temple and Dharmashala of Banaras, India

This wood conservation project was started in 1993 and completed in 2000. Banaras is 77 m (255 ft) above sea level. It is near the Ganga River where moisture increases in winter. In winter the temperature range is between 4 and 16 degrees Celsius (40 - 60^0 F), and in summer it rises to between 39 and 46 degrees Celsius (103 - 115^0 F). This fluctuation of temperature promotes the increase of termites. For preservation, a mixture of 1 percent chlorpyrifos, 9 percent kerosene, and 10 percent linseed oil was applied to the surface of the wood.

7.7 Conservation of Sweta Bhairav temple of Hanumandhoka

In 2007 this temple underwent major conservation work to strengthen the wooden components.

7.8 Conservation of Khardar Pati:

In 2007 the old dilapidated *pati* (public rest house) was conserved with its major wood conservation.

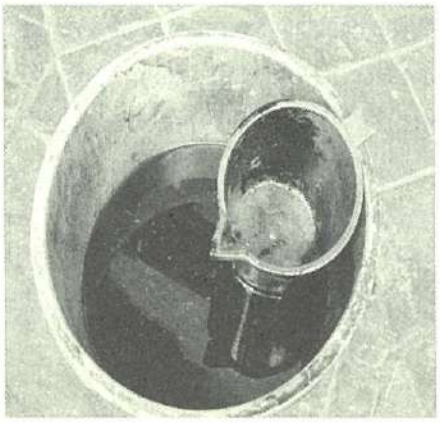
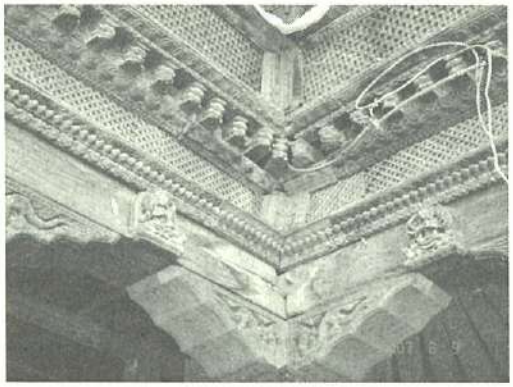
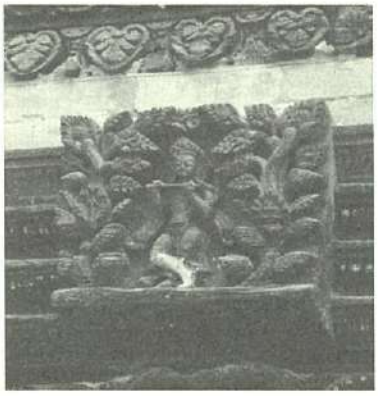


Figure 9. Solution of kerosene and linseed oil

Figures 10, 11. Cleaning and applying a kerosene and linseed oil solution (Patan royal palace)





Figures 12, 13. Replacing old woodwork with new (55-Windowed Palace, Bhaktapur)

8. Causes of decay

Wood objects deteriorate from damage by insects such as termites and beetles. The effect of such bio-deterioration mainly depends upon the quality of wood and the surrounding environmental conditions. Apart from these, other causes of destruction are age, natural factors (earthquakes, floods, wind, rain, fire, dust, ground water, lightning, and germination of trees over the structures), and negligence in maintenance or shortages of money and human resources. Further damage may be done

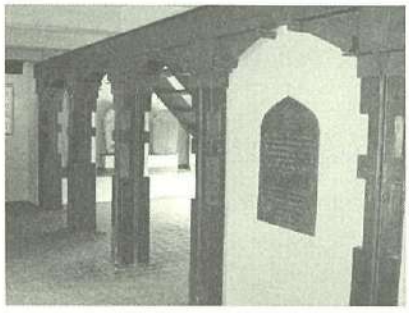
to the structure by paint, neglect, alterations, vibration, pollution, theft, tourism, calamities, wars, and animals. There are many records of these causes. Soft woods are affected quickly by insects, but this is a problem in hard woods as well. After the earthquake of 1934, the majority of wood used for replacing Kathmandu Valley's architecture was soft wood. Accordingly, the bio-degradation rate increased. In soft wood, insect food materials like carbohydrates, starches and some insect-edible plant cells are present. The durability of wooden species is divided into six categories. They are (1) extremely durable, (2) very durable, (3) durable, (4) fairly durable, (5) slightly durable, and (6) perishable.

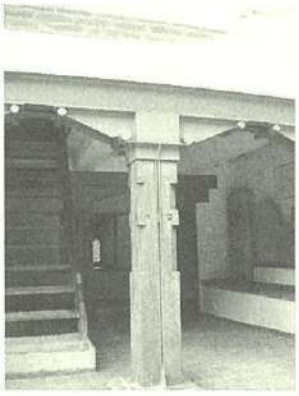
9. Treatment of wood

Most of the wooden elements in traditional buildings and monuments are degraded because of the causes mentioned above. Most of the wood used after the great earthquake was pine. Chemically, it contains resin and turpentine oil. It is durable but not extremely so; besides this *sal* and *sakhu* (types of wood) were also used, which contain chemicals like formic acid, but this wood is very durable. Both woods are organic compounds which attract insects like termites, and fungi. To prevent this, wood insecticides are used to threat the wood. The chemicals most commonly used in practice are chlorpyrifos in kerosene and linseed oil; the mixture is applied to wooden objects by brushing. The kerosene oil carries the insecticide and penetrates deeply into the wood. The linseed oil shields the porous part of the wood, which gives good resistance against insects and water. One of the major chemical conservation projects for the eradication of termites was done in Shristi Kanta Lakeshwor, a temple in Nala near Kathmandu valley. This year the Department of Archaeology is doing major chemical conservation work in the palace of Patan. The central chemical conservation lab is involved in this project. Treatment of the timber will prevent further attacks, but unless the sources of the insects are found they will continue to return until they locate sections of timber that have missed treatment, such as those embedded in the structure. They can be traced by the earth tunnels to their nest. Although little research on termite attacks has been carried out in Nepal, it appears that salwood (Shorea robusta) is seldom attacked with any severity, but that timbers such as pine are very susceptible. Likewise another important conservation project was done on Bhaktapur Durbar area's eight cornered pavilion (Cyasilin Mandap). The Mandap wood conservation and restoration, and all the structural work, were done by a German team. The same project began the famous Hindu priest house (Pujari Math) conservation. In the case of mechanical failure of timber in joints, the main causes are bad initial design, lack of proper ties in the roofs, shrinkage or swelling of timbers with distortion or undue strain on the joints, etc., or the removal of original bearings due to shrinkage at joints, and very commonly subsequent alterations to the original structure without due regard to the structural mechanics of the design.

Defective rafters, usually at the feet, and beams, usually at the bearings, can be repaired by splicing (i.e. adding short new lengths of timber) to replace the decayed sections, using a joint.

Decayed beams that have rotted in the core can be repaired by cutting away the defective centre and inserting either new timber or slipping the member into iron plates. Decayed joints can be repaired in a variety of ways by using some ingenuity in inserting new material. In repaired parts, iron straps can be usefully employed to tighten members, and mild steel sections for restoring bearings. They should be painted or varnished to inhibit rust. Framed structures which have become distorted can be pulled back into shape or jacked up, but before either pulling up or jacking a distorted frame, it is essential to clean out thoroughly all the joints of possible hindrances, such as accumulated dust and dirt, because this will prevent any movement. Newly developed materials like metal work can be useful in cases where strength is vital. Epoxy glues made up of two compounds can be used to make a very strong bond between two or more pieces of timber, and the joint can be of greater strength than the wood epoxy, and polyester resins can be used to repair wood work and make a strong bond to timber. The compounds can be mixed with sawdust, but any inert material such as stone dust can be used also. These raisins set in about half an hour, became rock hard in thirty-six hours and they can be sawn, chiseled and planed like ordinary timber.





Figures 14, 15. Iron plates

10. Conclusion

Current needs are to initiate a solid strategy, which will not only create awareness but also motivate the people, without whose concern it is almost impossible to preserve our heritage. If people become aware of their architectural heritage and are supported by the concerned authority, we can bring our traditional materials back to life. The traditional lifestyle may not be appropriate today, but its essence still has a place in our behavior and life. It is not a carbon copy that we have to bring up in the name of conservation; it is the sprit and the essence that we have to bring to these buildings by revitalizing and reusing their potential according to current requirements. Conservation needs to be treated as an issue of culture, not morally that of monuments. Cultures require situation-specific assessment and action. There is clearly a need for further thought. Conservation is an issue that cannot be closed.

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New Zealand

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Problems and Needs for Cultural Heritage Protection and Restoration Activities in Maori Built Heritage in Aotearoa/New Zealand

Introduction

This report has been produced for the 2007 Training Course on Cultural Heritage Protection in the Asia-Pacific Region - Preservation and Restoration of Wooden Structures. The report focuses on current problems and needs for cultural heritage protection and restoration activities in Maori built heritage in New Zealand.

The built heritage of New Zealand is the result of a variety of both indigenous and international influences that have evolved into an assemblage of typologies that are in many instances unique to the country. Although it is important to understand the variety of architecture in New Zealand's built heritage, however such a broad ranging study is beyond the scope of this report. This report will look primarily at Maori built heritage, and more specifically at wooden built heritage of significance to Maori generally from the period following European contact, through to 1950. Within the realm of critical architectural research and discourse in New Zealand, Maori architectural history is easily the most under-represented field of inquiry, and the primary objective of this report is to provide an overview of the existing range of Maori built heritage and the protection and restoration initiatives available for the maintenance of the structures and statutory mechanisms to ensure heritage sustainability.

The secondary objective of this report is to address the current means and methods of documentation and assessment of Maori built heritage, and look at possible alternatives or new strategies for more effective protection and advocacy for the management of Maori built heritage.

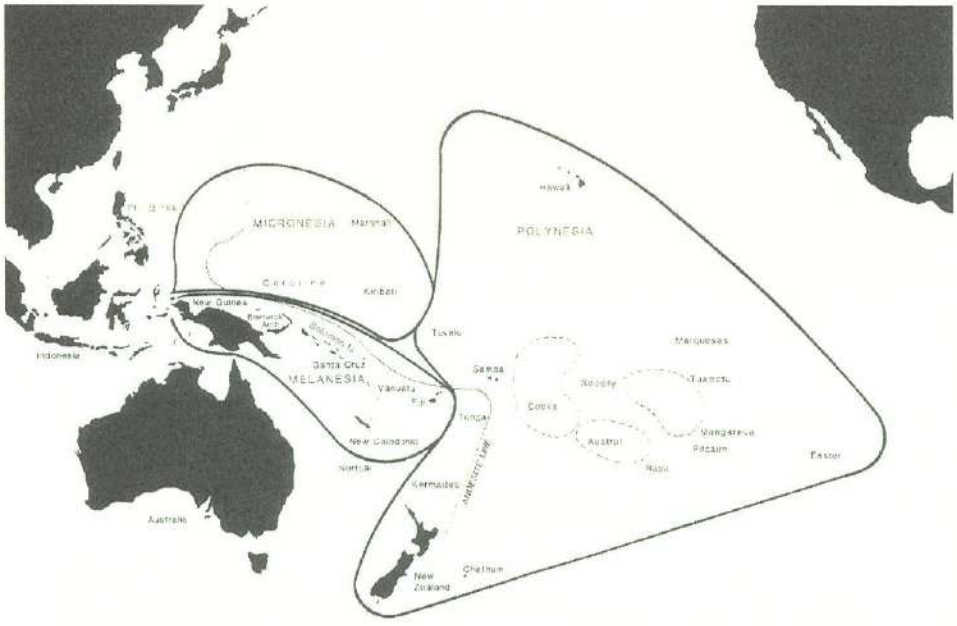
This report has been prepared by Ellen Andersen, Maori Heritage Advisor for the New Zealand Historic Places Trust- Pouhere Taonga, with support from the Maori Heritage Team, for the Asia/Pacific Cultural Centre for UNESCO Cultural Heritage Protection Cooperation Office (ACCU), Nara.

Chapter 1 – Origins

Polynesian origins

The Pacific is the largest ocean in the world, covering 30% of the earth's surface. The Pacific basin is a young area in geological terms, with the age of the sea floor rarely exceeding 100 million years (as opposed to 1000 million years in other continents). Polynesia encompasses more than 1000 of the islands of the Pacific, and is the largest physical expanse of the globe to be classified as one cultural group (Goldman, 1970:573).

The term 'Polynesia', from the Greek *poly* – many, and *nesos* - islands, was invented by the French writer Charles de Brosses in 1756, and was originally used to refer to all of the islands of the Pacific. Jules Dumont d'Urville gave a lecture to the Geographical Society of Paris in 1831 and proposed the additional terms Micronesia (literally the tiny islands) and Melanesia (the dark islands, in reference to the darker pigment of skin of the inhabitants of this region) in order to further define the regions of the Pacific. This three-way regional division remains in widespread use today, but of all the island group names of Melanesia, Micronesia, and Polynesia[1], it is the latter that has continued to show the most coherency for a sub-grouping of the Pacific Islands (Kirch, 2000:4).



Map 1: The Pacific Ocean showing the regions of Melanesia, Micronesia, and Polynesia (Irwin 1991)

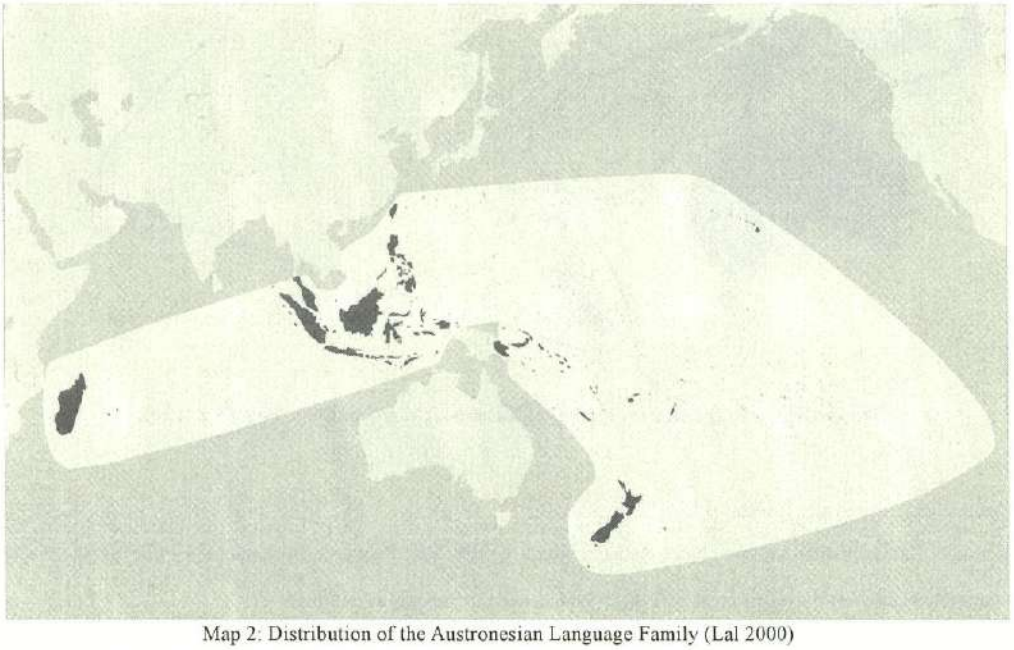
[1] Polynesia is usually further divided into two more distinct cultural groups, East Polynesia (including the Cook Islands, Society Islands, Hawaii, and Marquesas) and West Polynesia (such as Tonga, Samoa, and the Polynesian outliers).

Polynesia in Pre-European Contact Times

> "How shall we account for this nation spreading itself so far over this vast ocean? We find them from New Zealand to the south, to these islands to the north, and from Easter Island to the Hebrides"
>
> Captain James Cook in 1778 in Hawai'i
> (Beaglehole, 1967,279)

The colonisation of the wider Pacific began approximately 30,000 years ago with the settlement of the Bismarck Archipelago and parts of the Solomon Islands. Evidence of human habitation in Australia and New Guinea can be dated to more than 40,000 B.P. (Irwin, 1992, 5). Although archaeological remains can be found in Australia and as far east as the Solomon islands dating to this era – Polynesia has a much more recent history, in fact, evidence of movement further east is not seen for another 25,000 years. Irwin attributes this fact to the increase in island dispersal distance beyond the Solomon Islands (Irwin 1996:7). The evidence of relationships between the people of this region of the world comes primarily from linguistic analysis and the discovery of a type of pottery on many of the islands of western Polynesia. In more recent years, studies of mitochondrial DNA has also supported theses theories (Genet 1995:403). The Maori Anthropologist Te Rangi Hiroa Sir Peter Buck, writing 60 years ago on the homogeneity of the Polynesian islands noted that *"it may be argued that the similarities belong to an earlier common stage, and that the differences indicate later local development"* (Buck 1945:7).

Austronesian Origins

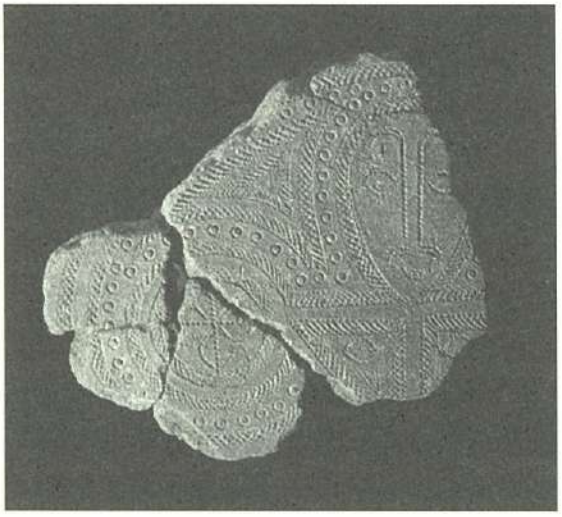


Map 2: Distribution of the Austronesian Language Family (Lal 2000)

The Maori language is a subgroup of the language family defined as Austronesian. This is the most widespread linguistic group prior to European colonisation recorded (Lal 2000). This language group can be traced across half of the earth, from Madagascar to Easter Island, with dispersal occurring between 3000 BC and 1000 AD.

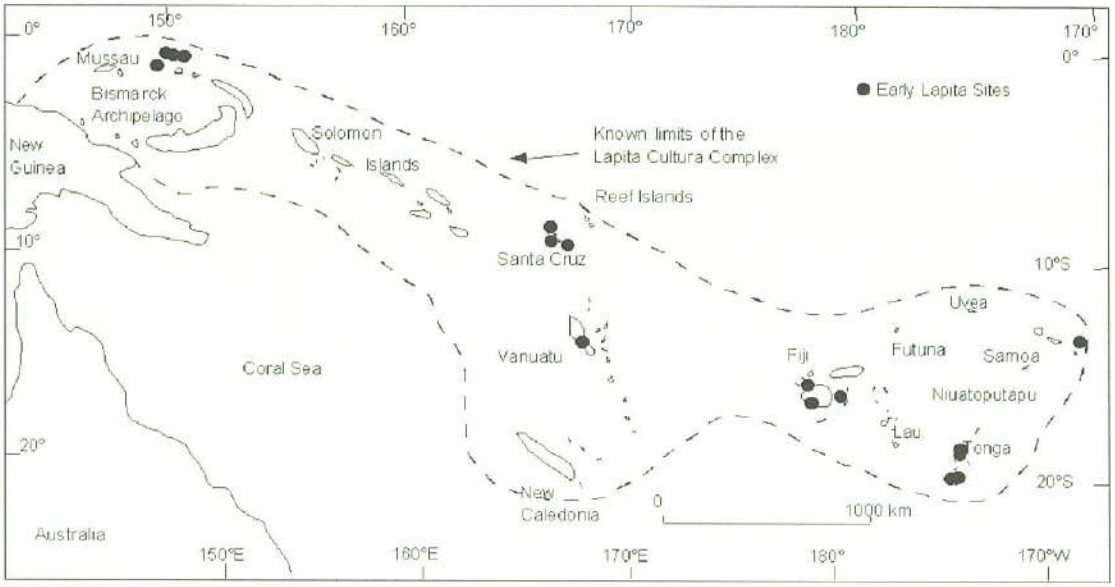
Lapita culture

The Proto-Oceanic stage of early Austronesian colonisation of the pacific coincides with the period of Pacific history known as the Lapita Culture of archaeological history, which saw a population spread from the Bismarck Archipelago to the eastern Solomon Islands, then on to much of Melanesia and western Polynesia at the end of the 2nd millennium BC (Kirch 2000:209). Lapita settlements have been found in coastal areas, and on smaller off shore islands, and were made up of small villages, and remains have been found of stilt houses built over lagoons that are associated with this period.



Lapita culture is largely defined and differentiated by its decorated pottery, which was first identified in 1909 by Father Meyer – a Catholic missionary in New Britain. The presence of this pottery in Polynesia dates from approximately 1500 BC at its first appearance, and continues for 1000 – 1500 years. Lapita Pottery is see as "non-Polynesian" material culture (Poulsen 1987), however it is part of the Polynesian genealogy, and is perhaps more accurately defined as pre-Polynesian, or proto-Polynesian. Polynesians are the direct descendants of these Lapita peoples, and antecedents can be seen in Lapita monumental and sacred architecture (Bellwood 1995). The exact time period that this movement took place is not unanimously agreed upon by scholars. Lapita culture is said to have been present in the Polynesian islands of Samoa and Tonga from 500 BC. The presence of Lapita culture has only been found in western Polynesia, and does not seem to have moved to the eastern Polynesian islands.

Linguistic analysis suggests that eastern Polynesian settlement originated from the western Polynesian areas of Samoa, Tonga and Tuvalu. The region of Polynesia is refined into eastern and western groups according to language affinities and settlement theories. Western Polynesia includes Tonga, Samoa, Futuna, Uvea, Niue and Tikopia, and is regarded as an area of earlier settlement than eastern Polynesia which includes Hawai'i, Aotearoa New Zealand, Easter Island, The Islands of French Polynesia, Mangareva, and the Cook Islands (Goldman 1970:xxvii).



Map 3. Limits of the Lapita Culture (from Kirch, 1997)

Open Ocean Voyaging

> "We know that colonisation was deliberate, because explorers took with them the plants and animals, women and men necessary to establish viable settlements"
>
> (Irwin 1992:7)

Figure 3. Sketch of a double hull open ocean canoe between Tonga and Samoa by Dutch

Early Polynesian voyagers employed a whole range of navigational techniques to assist in open ocean voyaging. These methods include the use of the stars, the movement of ocean currents and wave patterns, the air and sea interference patterns caused by islands and atolls, the flight of birds, the winds, clouds, and the observation of weather patterns.

At the time of Polynesian settlement of New Zealand there is extensive evidence of established voyaging and trading in eastern Polynesia. Archaeological, linguistic and traditional evidence suggests that Maori migration came from these eastern Polynesian islands including the Society Islands, the southern Cook Islands and the Austral Islands in French Polynesia. DNA from New Zealand's Pacific Rat indicates diverse lineages from the Society and Cook Islands (Matisoo-Smith & Robins 2004), which suggests that several canoes came from a

number of sources. A study of human DNA also suggests that there was a minimum of 70–100 women as founding ancestors (Anderson 2003:71-74).

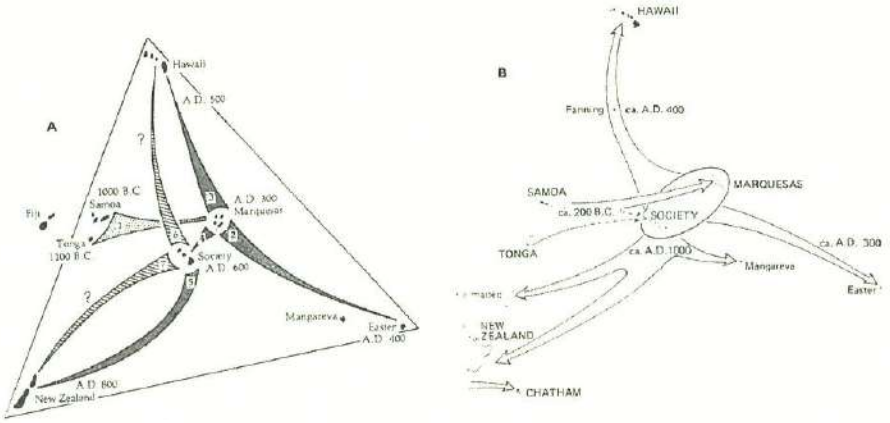


Figure 1: (A) shows the model of Polynesian dispersal proposed by Emory and Sinoto in 1965. (B) shows Kirch's revised model of 2000

Settlement of New Zealand

Although there is a strong connection between the Maori of New Zealand and their counterparts in eastern Polynesia, the landscape of New Zealand that the ancestors of the Maori settled in was vastly different to anything seen in the rest of Polynesia in terms of geography and climatic conditions. The geological diversity of the land is unlike any seen in Polynesia, with a range of sedimentary, igneous, and metamorphic rock, high mountain ranges, large lakes and extensive river systems. The majority of eastern Polynesian islands are a basaltic rock formation due to their volcanic origins, and are generally High Island, Island-Arc or Atoll formations. New Zealand is the highlands of a submerged continent called Zealandia (McSaveney & Nathan: 2007), and the oldest rock in New Zealand can be dated to the Cambrian period approximately 510 million years ago, in contrast to the more recent formation of other Polynesian Islands.

Many Maori oral traditions assert that the Polynesian explorer Kupe was the first of to visit New Zealand from Tahiti in approximately 925 AD, and was followed by another explorer, Toi, in 1150 (Taonui 2006). A migration known as the 'Great Fleet' of seven canoes is said to have arrived circa 1350, bringing the ancestors of Maori to New Zealand. In the 1960s and 70s, with the aid of radio carbon dating, it was deduced that New Zealand was settled by people from East Polynesia, who set off in different canoes at different times, with the first canoes arriving some time in the 1200s. Canoe traditions and genealogical affiliations to migratory canoes are important to Maori identity. *Whakapapa* (genealogy) traces back to the crew of founding canoes, and identifies inter-tribal relationships.

Upon arrival in New Zealand, the migratory groups spread out around the country in kinship-based extended networks. There is very little information about the earliest types of settlements and

dwellings in New Zealand, since much of the construction palate of the early Maori was with highly perishable material (Trotter & McCulloch: 1989).

Colonial Contact

Prior to the 17th century the Pacific Ocean was traversed by Spanish and Portuguese explorers, but exploration never travelled south far enough to sight the islands of New Zealand. The Dutch explorer Abel Tasman was the captain of the first European ship to reach New Zealand in December 1642.

On 6 October 1769 a cabin boy on James Cook's ship *The Endeavour* sighted land. It is from this voyage onwards that we have European accounts of the construction practices of the Maori. Cook's journal from February 9, 1770 notes the following:

> "The Houses of these People are better calculated for a Cold than a Hot Climate; they are built low, and in the form of an oblong square. The framing is of wood or small sticks, and the sides and Covering of thatch made of long Grass. The door is generally at one end, and no bigger than to admit of a man to Creep in and out; just within the door is the fire place, and over the door, or on one side, is a small hole to let out the Smoke. These houses are 20 or 30 feet long, others not above half as long; this depends upon the largeness of the Family they are to contain, for I believe few families are without such a house as these, although they do not always live in them, especially in the summer season, when many of them live dispersed up and down in little temporary huts, that are not sufficient to shelter them from the weather."

Chapter 2 – 19th and early 20th Century Maori Architecture

Traditional Building

Maori society was traditionally based on family lineage, with the *whanau*/immediate family, extending to the *hapu*/sub-tribe which positions itself as part of a broader *iwi*/tribe. The marae was the centre of this community. The marae settlement is usually located at the heart of tribal areas, in the rural regions of New Zealand, and was the centre of the Maori community, where people lived, worked and gathered. The marae is an entire architectural complex, usually incorporating various built elements as well as the landscape surrounding it. Some of the most common architectural forms that are part of the marae and extended Maori built environment are summarised below, with more detail later given to the key architectural types still in existence today, and the priorities for preservation focus.

The Canoe

Prior to the 19th century developments in the decoration of carved meeting houses the primary means of expression of craftsmanship was through the decoration of the waka (canoe). The *waka taua* (canoe for war parties) was the most ornately adorned and carved, as well as the largest form of canoe, ranging from 9-30 metres long. *Waka taua* holding up to 100 people were observed by James Cook during his voyages, and *waka* of this size were also seen well into the 19th century. This type of canoe was also sometimes referred to as *waka pītau*, which describes the perforated, spiral carving that supports the carved figurehead in the *tauihu*/prow (Hoturoa Barclay-Kerr 2007).

The Carved Meeting House

The central focus of a marae in modern times is usually the carved meeting house. The house may be referred to under various appellations, such as wharenui (large or main house), *whare whakairo* (carved house), *wharehui* (meeting house), or *wharepuni* or *wharemoe* (sleeping house). The carved house (referred to as wharenui from now on) will be discussed in more detail in the next section.

The Dining Hall

Food or eating is often not permitted within a carved meeting house, and a separate building known as the *wharekai* (food/eating house) is often located near the *wharenui*, where food preparation, eating, and other large-scale celebrations take place. The *wharekai* is generally less ornately decorated than the wharenui, but often contains decoration such as large-scale murals. The *wharekai* is often much larger in scale than the *wharenui*, and many provide seated dining space for many hundreds of guests.

The Storehouse

The traditional food storehouse was the *pataka*. This was once a common architectural form, however there are very few remaining *pataka* around the country. Early accounts of *pataka* found great variability in size, from less than one metre in length and supported on one post, to large storehouses upwards of 7 metres in length supported by a number of heavy posts. Pataka were often the most ornately carved building within a marae complex, although on carved on the exterior.

Other Food Store Platforms

The *whata* is a variation to the pataka, and was usually an open, elevated platform, again with the primary function of storing food. The following descriptions or food storage methods comes from the 1902 Transactions and Proceedings of the Royal Society of New Zealand:

> "The *whata-ā-rangi* is a stage or platform erected in a tree, and is used for storing foods on. The *whata poto* is a stage built on high posts, and used for stacking food-supplies on. It has no house on it, or permanent roof, merely a thatched roof to protect the stores from the rain. The *whata pu kiore* is a stage built on two, four, or six posts, and on which a

wooden building of neat and close construction is built. These stores were reached by means of rude ladders *(ara-whata)*, usually a log with a series of notches cut therein for steps." (RSNZ 1902:88)

Churches

Churches are the product of the early post-colonial impact of missionaries in New Zealand. Known as *wharekarakia* (prayer houses), many churches were built in marae settlements, or within close proximity to an affiliated marae. Some *wharekarakia* are not within the immediate vicinity of a marae, and are built on land that may have been given to the religious organisation that was dominant in the community in order to build a church and establish a congregation. Some Maori churches have highly decorated interiors that display a fusion of traditional Maori and religious motifs, and are amongst the most important architectural innovations in New Zealand history.

Flagpoles

Flagpoles, flagstaffs, or *pouhaki,* are common at many marae. They are often carved, sometimes painted, and at times are used to fly the flag of the marae. On many marae the flagpole is an important focus of an annual gathering associated with the *kingitanga* (king movement) called a *poukai.*

Memorials and Commemorative Structures

Often referred to as *tohu whakmaharatanga*, carved memorial structures can range from a single carved post, or *pou*, to a more elaborate structure. Structures with a primarily memorial or commemorative purpose are recorded from the earliest stages of European contact.

The Carved Meeting House

"The carved house ... has emerged out of the traditional past with some new functions and architectural features, and with the scale of the building increased"

Hirini Moko Mead
(Mead 1986:186)

The traditional Maori dwelling form is a one room gabled timber structure, often with a front porch. Its central ridge – usually constructed of one solid piece (an entire tree trunk) is supported by poles, and the interior remains one open area with one or more support posts. As mentioned previously, buildings tend to be for specific functions such as meeting (*wharenui*), sleeping (*wharemoe* or *wharepuni*), eating (*wharekai*), cooking (*whareumu*, or *wharekai*) and storage (pataka). The main changes seen with initial European contact are an increase in the size of the dwellings, and an increase

in the decorative embellishment on the wooden areas, due in no small part to the introduction of metal tools for working the wood.

The *wharenui* is often described as a symbolic representation of an important ancestor to the community. The wharenui can be seen as an anthropomorphic representation of an eponymous ancestor of a tribe. As well as being a physical manifestation of the body of an ancestor, the wharenui also traces a lineage of time through decorated representations throughout the structure.

The *tekoteko* at the apex of the façade is often described as the face. The porch is the brain and barge-boards the arms. The inside is the chest (*poho*) and the rafters/*heke* are ribs. Most of the structural parts of the wharenui are described using words which are also part of the human body. To be inside the *wharenui* is to be in the traditional heart of the *hapu*.

Within the interior of the *wharenui* we have more representations of ancestors of the past. The eponymous ancestor represented in the whare itself is usually of the most distant past, whereas ancestors of the more recent past are represented on the *poupou* along the walls of the interior. These are usually people associated with the establishment of either the *iwi* or the *hapu*, and may show the tribes affiliations with other Iwi. The *poupou* are often used as assisting tools when delivering a *whakapapa*, having a visual representation of your heritage around you can act as a family-tree for reference. On the wall opposite the door (referred to as the front wall) we have photographs of recently deceased members of the tribe. Within the whole structural space of the wharenui we have a progression from the largest, and most distant ancestor down to the most recently deceased.

With this timeline of ancestry established inside the whare, we still have two more concepts of time and space to add to the equation. As mentioned, the front of the meeting house is usually the wall opposite the door – what we would usually regard as the rear. This makes the head of the eponymous ancestor at the rear, the more recent ancestors of the iwi running through the interior to the front, concluding with the most recent past on the front wall. Rather than a timeless, static environment, we have a progression through time articulated within the structure of the *wharenui*. The second related concept pertains to the concept of passage through time, which differs from the western model. In the Maori language the phrase used to denote future is *kei muri* and past is *nga ra o mua*, at the same time however the word *muri* literally translates to behind and *mua* to in front. To understand what seems to be a contradiction here where we have the future described as the days behind us and the past literally 'the days in front' one needs to grasp that the way past and future are understood in these terms. The past is known, and the future is the unknown, therefore this is physically embodied by the fact you would have your back to the future looking towards the past – which you know, moving backwards toward the future as far as traditional western concepts go. The

front wall of the whare - with the most recent ancestors - points towards the future, which is beyond the wall with traditionally no door or window so is unseen.

The *mahau* (with the *pare* above the door as its boundary marker) is the crucial point of transition from exterior to interior, it is neither wholly external nor internal, although it is often regarded as more a part of the *marae aatea* than the inside of the whare. What the *mahau* more accurately expresses is not the transition from the linear time of the outside world to the timeless interior, but the transition of the myth and tradition of the exterior, in particular the *marae aatea* where rituals such as the *powhiri* are played out, through to the history rich interior, not static but progressing, with the constant spiritual presence of the ancestors.

Imported and Appropriated Forms

When the Treaty of Waitangi was signed in 1840 between the British Crown and many of the Maori tribes, the British population exploded, bringing with it new building materials, tools, and methods for construction. The decoration of the carved meeting house flourished after European contact. We can attribute this development to the increased availability of metal working tools provided by these newcomers, and evidence to support this assertion comes from the fact that the earliest developments in large-scale carved meeting houses are found in the Bay of Islands, the most popular early port for visitors to New Zealand in the 18th and 19th centuries (Belich 1996:Ch5).

In addition to the changes seen in the design and decoration of buildings on the marae, there are a number of new building types that entered the Maori architectural corpus.

The development of Maori Churches has been discussed earlier in this report as an important architectural innovation of the early European contact period. The flagpoles that are mentioned earlier are also regarded as a post-contact development. Both of these structures have their origins outside of Maori society, but evolve and undertake design innovations in order to make the forms more appropriate to their new cultural and geographical environment.

Influential Maori Figures

A number of key figures in 19th and 20th century Maori history have used architecture as a vehicle for championing Maori tradition and cultural rights within the rapidly changing landscape.

Te Kooti Rikirangi Te Turuki

From the 1850s onwards there was encouragement from many Maori chiefs to build on the land as additional claim staking to the area (Salmond 1975:80). It is at this time we see the emergent influence of Te Kooti on marae, and in particular whare design. In recent times, there has been a shift in the views of the architectural and academic community of the influence of Te Kooti: Roger Neich sees the period from the 1870s to 80s under the influence of Te Kooti as the time of greatest innovation in the meeting house (Neich 1994:28) - in contrast, this same period was regarded by Barrow (writing 25 years earlier) as the period of "... greatest disintegration of traditional culture, with the progressive integration of the Maori people with Pakeha society"

Te Kooti championed the continuation of architecture, carving, *tukutuku* (panelled latticework), and *kowhaiwhai* (painted rafter decorations) in Maori society. Te Kooti organised the construction of a number of highly decorated and carved meeting houses mainly concentrated in the east of the North Island. These examples of 'Te Kooti Houses' showed a contrasting use of deep relief on exterior carving, and very flat, low relief with polychromatic use of paint (MacLean 1979: 167-175). One of the earliest and most renowned of these endeavours is the meeting house at Te Kuiti called Te Tokanganui a noho. Major artistic innovations were seen in this whare, particularly in regards to the transference of traditionally carved motifs into painting.

This encouragement shown by Te Kooti to erect whare was a practice also advocated by Ngata, Te Rauparaha and later Ringatu followers. To establish a meeting house on the land was a step to physically claiming the land as their own, a measure that in time was cause for concern among European settlers.

Apirana Turupa Ngata

Apirana Turupa Ngata was the MP for Eastern Maori in from 1905 until 1943, and the first Maori University graduate in New Zealand. Ngata was integral in the establishment of the Maori Arts and Crafts Act which in turn produced the Maori School of Arts in Rotorua. It was through this school that Ngata advocated the modernisation of the decorated meeting house whilst retaining levels of authenticity.

The period between the two world wars saw a reassessment of the art of Maori carving, and Apirana Ngata wrote, *"In the second decade of this century the bald position was that outside the Arawa tribe there were only two experienced carvers, one in the Urewera country, and one from Ngati Porou on the East Coast"* (Ngata 1940:321). In the years from 1890 to this point there had been a change in the way Maori interacted politically and on a cultural level with Pakeha, as Neich describes it the Maori had spent these formative years *"...selecting, rejecting, preserving, strengthening and combining elements from both cultures"* (Neich 1994:117).

Ngata's work with the Maori School of Arts in Rotorua helped to maintain and revitalise traditional architectural traditions in tribal areas where many marae were based, and was also used to promote the establishment of new marae in city centres. The meeting house was the emblem of his quest for the advancement of the Maori people.

The school was set up with basic premises to preserve Maori art, but also contextualise it in the modern world, incorporating new materials and techniques, whilst attempting to retain cultural integrity. The school was set up with funding from the Government, the Maori Purposes Fund, and the Carnegie Corporation in New York, and training was given in the form of construction projects around the country. Tutors in the school such as Pine Taiapa also travelled the country encouraging Maori to take up practice of traditional arts again (Wright 1975). Ngata helped to organise paid wages for the carvers, and advocated the shift of women into the roles involving weaving and *tukutuku* work. Ngata, as Anne Salmond asserts, was the leading proponent for the development of what we know regard as the 'contemporary marae' (Salmond 1975:81), which is what we see in the marae of the 1930s – 1950s. These marae were built with wooden floors over concrete foundations, often with stages and other modern facilities. This also paved the way for the development of what is known today as Maori Halls, gathering buildings that may aesthetically refer more directly to early community town halls, but with internal organisational layouts and functional uses that still echoed traditional Maori form.

Government Programmes

One of the key government initiative that has left a built heritage legacy with Maori is the Native Schools system. The Native Schools Act was passed in 1867, to establish a European style education system for Maori that was administered by the government. European based schooling for Maori children were seen in New Zealand from as early as 1816 (with the Church Missionary Society school at Rangihoua), and by the 1840s Maori were also setting up their own schools. Native Schools were established at the request of the communities they were to serve, and the land had to be donated to the government for the school site. Many of these schools became a strong focal point of the community and some tribal groups have had the land and school returned to their ownership. Some schools from the late 1800s still stand and are an important part of the story of Maori history.

Iwi Innovations

In addition to the elaboration and continuation of traditional architectural forms, there have also been individual examples of the fusion of introduced and local ideas in Maori architectural history. Ngaruawahia is home to two important historic places of significance to Maori architectural history.

Turangawaewae house is the first Maori Parliament building to be erected as part of the kingitanga movement, and Turangawaewae Marae is home to the two whare Mahinarangi and Turongo, The Maori royal residences. Turangawaewae house is located within the main township, and although it is European in physical design and designed by Pakeha architects, the building has strong Maori decorative elements, and references many aspects of traditional Maori architecture. The whare Turongo at Turangawaewae Marae inversely was largely designed by the Maori princess Te Puea Herangi, and incorporated some design features seen at Pakeha homes of the time, whilst modifying the design to reflect certain Maori ideas.

Chapter 3 – Construction Technology

Early building materials and methods

Maori have always worked primarily in wood and other plant-based fibres for the construction of dwellings and associated ancillary structures, buildings for gathering, canoes and various ceremonial and commemorative structures. In addition to the various types of wood used, cladding of structures was also undertaken in *raupo*, a type of reed. Fastenings were often made from *harakeke* or other types of flax or phormium, or out of Ti – a native Cordyline.

The most commonly used stone tools during pre-European contact history that are known of include flake knives, adzes, chisels, and drill points. The most commonly used ston for the production of these tools include argillite, basalt, chert, greywacke, nephrite (*pounamu*), obsidian, orthoquartzite, and porcellanite (Trotter & McCulloch 1989:42).

The building materials of 20th century New Zealand

The 20th century saw a change in the primary construction palate for traditional Maori buildings. This was in part due to the influence of Apirana Nagata and his revisions and revitalisations in Maori building, and also due to government legislation preventing the use of traditional materials. The shift was towards a palate that was more homogenous with Pakeha building practices, but there was still retention of some traditionally used materials such as the types of wood that were still grown on tribally owned land and was the most suitable for carving. Carving and decorative work in custom-woods also developed and these new materials were incorporated into the Maori body of construction knowledge.

Chapter 4 – Threats to Maori Built Heritage

Natural Hazards

New Zealand is subject to a variety of natural hazards that pose a threat to Maori built heritage. Most natural hazards that have the potential to impact on New Zealand have the ability to damage or destroy Maori built heritage. Events such as cyclones, landslides, Tsunami, and volcanic eruptions all have preparedness procedures that should be incorporated in protection planning for historic heritage, but the three most common risks to Maori built heritage are the threat of earthquake, fire (including arson attacks), and flooding.

Earthquake

Many of New Zealand's towns and cities lie within high earthquake risk areas. Because of the tendency to build in wood, many historic Maori buildings have a higher earthquake resiliency in comparison to historic buildings in earth, stone, and concrete. Building failure still occurs however due to the intensity of the seismic activity, the structural integrity and load bearing capability and proximity to epicentre. Many buildings require earthquake assessments and strengthening.

Fire

The majority of Maori built heritage is made of wood, and many historic Maori buildings are at serious risk of fire damage. This risk may be increased due to the remote location of a building, the deterioration of building fabric, the absence of fire detection or suppression mechanisms, faulty electrical wiring, or the threat of arson. On average, five marae-based fires are reported to the New Zealand Fire Service each year, and most of these fires occur in buildings that are more than 50 years old. More than half of all
fires in marae buildings are the result of arson.

Flood

Damage to Maori built heritage through the effects of flooding has become increasingly prominent in many regions of the country. Marae buildings, churches, native schools and other historic buildings associated with Maori history are affected on a regular basis by the impact of torrential rain and flooding.

Decline of Native Species

Many of the plants that have been traditionally used as construction materials in Maori architecture are now endangered species, or substantially declined in population numbers. The introduction of similar exotic species also impacts on the distribution and availability of these plants as building resources. An example of such an instance is the native toetoe *(Cortaderia toetoe)* which has suffered from habitat invasion by the introduced *(Cortaderia. selloana or Cortaderia. jubata)* which

is unusable as a building material, unlike the native toetoe which is structurally stronger in its stem (the *kakaho*) and has been used traditionally as a lining for walls and ceilings of buildings.

Socio-Cultural Threats

In addition to the various natural hazards that threaten the safety of Maori built heritage, there is also the potential for loss of building due to associated socio-cultural factors such as neglect through either financial or physical inability to maintain historic structures, threats associated with the preference to demolish an historic building and replace with new buildings rather than protect and restore older fabric, and the continued loss of traditional knowledge associated with the construction and care of Maori built heritage

Neglect

Building deterioration due to neglect can be caused either intentionally or unintentionally. Buildings are at times left to deteriorate to the point at which demolition is the only perceivably viable option, but deterioration by neglect may also at times be due to a lack of funding to carry out required maintenance, absence of skills-base required to undertake restoration, protection, or maintenance work, or through inability to manage the long-term maintenance required in an historic building or other structure

Demolition

Many of the traditional architectural forms of Maori are no longer in use, or the knowledge of how to construct them has now been lost. It is possible that more physical examples of building forms will be lost (for instance, the *pataka*), and subsequently the knowledge associated with their construction. In addition to this there is the potential for the loss of examples of 20th century Maori built heritage such as native schools, halls, decorated Maori churches and other building types due to a lack of maintenance, demolition to allow for new buildings, and the prevalence of arson in remote areas where many of these important buildings are often located.

There are still many examples of buildings of significance to Maori heritage that are regarded as unimportant and the threat of demolition looms. Although there is a general positive approach taken around the country toward carved meeting houses and churches, many other building forms such as halls, native schools and other marae buildings are demolished before adequate assessment of the heritage values is undertaken.

Loss of Traditional Knowledge

With the increase in urbanisation, and the shift in Maori society from traditional settlement within the vicinity of the marae out to cities and more distant towns, the ability to transmit knowledge between the community is strained. There is also the decline in inter-generational transmission of traditional knowledge.

As with many indigenous communities around the world, one of the greatest threats to the continuation of traditional Maori architecture as a form is the loss of the knowledge of production, process, and materials. Maori built heritage is the sum of an extensive range of constituent parts that includes a variety of indigenous plants, the growth, harvesting, processing, and refinement of these plants into construction materials, which include structural components, cladding materials, bindings and fixtures, soft fibre linings and decorative elements; the physical construction methods themselves, the maintenance and replacement of components over their varying life-spans, and protective treatments to ensure longevity. Government legislation in the past that either prohibited or highly restrained the use of traditional materials has caused substantial loss to the body of knowledge that is available to traditional Maori construction practitioners, and the oriinal materials have often been replaced with introduced (and often inferior) materials, rather than dedicating funds to research and technology to enhance the potential of locally grown materials as contemporary building products.

Public apathy

Maori built heritage is one of the most unique aspects of New Zealand's architectural landscape, and treasured by many as one of the most important components of our cultural landscape. However, many New Zealanders feel disassociated from the buildings, of feel it is not a priority of the wider public to ensure their endurance. There is a lack of knowledge within the architectural community about the finer details of Maori architectural history and construction methods, and within the Maori community the need to care for and preserve the built heritage of their immediate community is often such a large task, that broadening the scope to a national level for preservation of Maori built heritage can not be feasibly achieved. There is also often a lack of appreciation of older buildings and the important contribution they make to the fabric of the community.

Remoteness

The remote location of many buildings of significant Maori heritage value often holds its own challenges, as the buildings are at times difficult to access in order to provide conservation assistance, and also a remote location means the building at times has a less visible profile within communities, which can leave it vulnerable to degradation, neglect, and even fire hazards.

Infrastructure and Training-related Issues

Skills Shortage

The professional fields of conservation architects, skilled architectural heritage consultants and buildings conservators is very small in New Zealand, and the number of practitioners who specialise in Maori heritage is even smaller. The maintenance of Maori built heritage usually rests upon the services of an individual from among the following fields:

- A conservation architect or architectural conservator. There is currently no New Zealand based qualification available to recognised competency in Architectural conservation and all practitioners with this recognition have trained overseas. This in turn means that experience with traditional Maori architectural methods and materials are seldom within the scope of a conservation architect and the advice that is given is generally informed by European methods rather than perpetuating traditional indigenous maintenance and repair processes.

- A carver trained in the art of *whakairo* – or traditional Maori carving. A carver will often be able to work on restoration and new work associated with Maori built heritage but will not be able to provide the expertise needed in the general assessment of the conservation needs of the building, and the conservation of extant wooden built and carved heritage.

- Architects, and in particular, architects of Maori descent or who work closely with Maori communities are often employed to undertake work on buildings of significant Maori heritage value. These architects can often provide innovative solutions to the continued use of historic places, but are often not trained to be able to offer services to ensure the continued survival of historic buildings, or the conservation thereof. At times demolition is seen as the only viable option for the sustainable use of a location, and in some instances the importance of place is paramount over the built heritage itself. Conservation of buildings may however have been a possibility with the inclusion of consultation of a conservator or other specialist in Maori built heritage.

- The Maori Built Heritage Team of the New Zealand Historic Places Trust, which includes a conservator of Maori built heritage, and a Maori traditional arts specialist. With only two people in this team, and an extremely extensive range of services and expertise provided this puts pressure on the workload of the team, as they provide advice and services to marae communities across the entire country.

- Local members of the community who are builders by trade are also often involved in the maintenance, repair, and at time restoration of historic buildings. They often have an intimate knowledge of the building itself, but no background in building conservation, and have the potential to damage or remove historic fabric which might otherwise be repairable or able to be re-used. These people are important assets to the community associated with Maori built heritage, and more opportunities for collaboration and knowledge sharing with conservation practitioners is necessary as these are the people that will endure a sustained relationship with the building itself.

Funding Constraints

There is a finite financial resource available to Maori communities for the preservation of their built heritage, and within the funding realm there are also difficulties encountered when land is owned collectively, rather than by an individual, or by a trust or company. The work that needs to go into a funding application is substantial, and often the priorities for funding are often based around repair and rebuild rather than initial planning for sustainable management of Maori built heritage.

Differing Views of "Best Practice"

With such a broad range of skills that operate in the field of Maori built heritage protection and restoration, there is also a variety of opinions as to what the most positive heritage or community outcome for a building is, and also how to go about achieving these outcomes.

Documentation Methods

The current methods of documenting, assessing and planning the management and maintenance of historic buildings in New Zealand relies heavily on processes and literature produced for the European architectural community. The standards for the production of conservation plans in New Zealand come directly from James Semple Kerr's *The Conservation Plan - A Guide to the Preparation of Conservation Plans for Places of European Cultural Significance.* Using a plan process that is aimed to address issues primarily associated with European building practices does not take into account the needs and requirements for the adequate documentation and assessment of the various contributing factors that underlie traditional Maori architectural processes.

Chapter 5 - Protection and Advocacy Mechanisms

Protection and advocacy for Maori built heritage comes from various individual crown and non-governmental agencies, as well as local territorial authorities, community trusts and societies, and Iwi, Hapu, Runanga and other Maori organisations. The protection of Maori heritage is also managed under at least 15 different Acts of Parliament.

Statutory Protection

The Resource Management Act 1991 (RMA)

The primary purpose of the RMA is 'to promote the sustainable management of natural and physical resources'. This is defined in section 5(2) as meaning:

> managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and

(c) Avoiding, remedying or mitigating any adverse effects on the environment.

In 2003 historic heritage was listed in section 6 as a matter of national importance and is defined as follows:

(a) means those natural and physical resources that contribute to an understanding and appreciation of New Zealand history and cultures, deriving from any of the following qualities:

- archaeological;
- architectural;
- cultural;
- historic;
- scientific;
- technological; and

(b) includes –

- historic sites, structures, places and areas; and
- archaeological sites; and
- sites of significance to Maori, including wāhi tapu; and
- surroundings associated with the natural and physical resources.

Key sections in the RMA that are relevant to Maori built heritage include:

Section 6(e): *'The relationship of Maori and their culture and traditions with their ancestral land, water, sites, wahi tapu, and other taonga'* is a matter of national importance which must be recognised and provided for by decision makers

Section 6(f): *'The protection of historic heritage'* which includes *'sites of significance to Maori'* from inappropriate subdivision, use, and development is a matter of national importance which must be recognised and provided for by decision makers.

Section 6(g): The protection of recognized customary activities is a matter of national importance which must be recognised and provided for by decision makers. This has the potential to include the customary gathering of traditional building materials for the restoration or repair of historic Maori built heritage.

Section 7(a): 'Kaitiakitanga' is a matter which decision makers must have particular regard to. It is defined in section 2 as meaning *'the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Mari in relation to natural and physical resources; and includes the ethic of stewardship'.*

Section 35A: Local authorities are required to keep and maintain for each iwi and hapu within their area, a record of their contact details, the planning documents recognised by each iwi authority and lodged with the local authority, and any area over which one or more iwi or hapu exercise kaitiakitanga.

Sections 61(2A), 66(2A) and 74 (2A): When preparing a regional policy statement, regional plan or district plan, regional councils and territorial authorities are required to take into account any relevant planning document recognised by an iwi authority and lodged with the council, to the extent that its content has a bearing on resource management issues of the region

The Historic Places Act 1993 (HPA)

The HPA is administered by the NZ Historic Places Trust, and empowers the Trust to operate a national Register of historic places, historic areas, wahi tapu and wahi tapu areas. The NZ Historic Places Trust is also the consenting authority for activities that may destroy, damage, or modify an archaeological site. A building may be considered an archaeological site as the definition includes any place in New Zealand that was associated with pre-1900 human activity.

The HPA also establishes the provision for the Maori Heritage Council. The core functions of this council are as follows:

(a) To ensure that, in the protection of wahi tapu, wahi tapu areas, and historic places and historic areas of Maori interest, the Trust meets the needs of Maori in a culturally sensitive manner;

(b) To develop Maori programmes for the identification and conservation of wahi tapu, wahi tapu areas, and historic places and historic areas of Maori interest, and to inform the Board of all activities, needs and developments relating to Maori interests in such areas and places;

(c) To assist the Trust to develop and reflect a bicultural view in the exercise of its powers and functions;

(d) To develop its own iwi and other consultative and reporting processes and to recommend such processes for adoption by the Board, branches, and staff of the Trust when dealing with matters of Maori interest;

(e) To make recommendations to the Trust on applications referred by the Trust under section 14(3) of this Act that relate to archaeological sites of Maori interest;

(f) To consider and determine proposals for the registration of wahi tapu and wahi tapu areas;

(g) To propose the registration of historic places and historic areas of Maori interest;

(h) To make recommendations to the Trust on applications for resource consents referred by the Trust under section 33 of this Act;

(i) To perform such functions as are delegated to the Council by the Board;

(j) To perform such other functions as are imposed on the Council by this Act or any other Act;

(k) To advocate the interests of the Trust and the Council so far as they relate to matters of Maori heritage at any public or Maori forum.

Building Act 2004

The Building Act makes provisions for positive advocacy in the protection of Maori built heritage through consultation required with the NZ Historic Places Trust when seeking building consent for alterations of structures that are registered with NZHPT.

The local authority must advise the NZHPT of receipt of an application for a PIM where the application affects any registered historic place, historic area, wahi tapu, or wahi tapu area.

There are implications under the Building Act for heritage places, and provisions for discretion under s47 (refer to Historic Places Trust guidelines (2000) regarding Earthquake Strengthening, Fire Safety, and Accessibility).

Reserves Act 1977

Reserves may be classified as historic reserves, and can include Maori built heritage components.

Historic reserves may be vested in or managed by local authorities, the NZ Historic Places Trust, or other organisations such as iwi groups. An example of this is the Takiroa and Maerewhenua Reserves that were previously administered by the NZHPT, but are vested with Ngai Tahu iwi under their Deed of Settlement. A reserve management plan can be prepared under the Act, and protection and maintenance of Maori historic built heritage can be incorporated into these plans.

Te Ture Whenua Maori Act 1993

This Act promotes the retention of land by Maori and is administered by Te Puni Kokiri. It provides for land to be set aside as a Maori reserve. This may include places of historic or cultural interest, and may be areas of land with retained Maori built heritage.

Local Government Act 2002

This act enables local government to develop its own provisions to address local issues. Heritage planning, funding and management are able to be considered through the long term community planning process. Important Maori built heritage may be listed in district plans with restrictions on modification or destruction, with the requirement for consultation with the relevant council and affected Maori groups.

Regional/Local Level Advocacy

Iwi Management Plans

An Iwi Management Plan is a written statement regarding iwi knowledge on resource management issues. Iwi Management Plans can also address economic, social, political and cultural issues. The Plans provide a framework and guidelines to facilitate the process of building resource management strategies for the sustainable development of natural and physical resources, especially in relation to changes made to a district or regional plan, and in resource consent applications. The cultural resources and historic sites of the iwi are often outlined in a management plan, however individual elements of Maori historic built heritage are usually inventoried, rather than given extensive planning consideration to in regards to these documents.

Conservation Plans

A conservation plan is a document that sets out the heritage value of a place and develops policies to guide its conservation, future use and development. As mentioned previously, there are major deficiencies in the way conservation plans assess and document the heritage values associated with Maori built heritage, but they can form the basis of forward heritage planning for a group advocacy for the long term protection and maintenance of historic Maori buildings.

Conservation Workshops

The *Maori Buildings Conservation Programme* of the New Zealand Historic Places Trust actively assists whanau, hapu, and iwi initiatives to preserve their historic heritage. The Built Heritage Team assist in the protection and conservation of Maori built heritage using both traditional and modern preservation techniques. As well as co-ordinating the preparation of conservation plans for Maori built heritage, the Maori Built Heritage Team provides technical conservation advice and training in workshops provided on-site to iwi. The workshops cover conservation techniques, materials, safety, and ongoing maintenance work.

Funding

There is a variety of local and national funding agencies that are available for works associated with the protection and restoration of Maori built heritage. Organisations such as the New Zealand Lottery Grants Board are able to offer funding, and some local authorities have incentive funds for the conservation of historic buildings in general. The New Zealand Historic Places Trust administers a national heritage preservation incentive fund for the conservation of nationally significant heritage in private ownership.

Chapter 6 – Towards a Maori Built Heritage Protection and Preservation Strategy

Reviewing Current Approaches

Conservation Plans

This paper has touched on the strengths and weaknesses of the conservation plan in regards to the protection and effective management of Maori built heritage. A review of the current conservation plan process and its outcomes is needed to fully identify the ways in which a more specifically tailored conservation plan could benefit Maori communities in their management of historic built heritage. A conservation plan that addresses the wider implications of building materials resource management, the transmission of technical knowledge and construction processes, and the extended environmental framework that is part of the historic place would find itself to be indespensible in the long term planning associated with historic heritage management.

Iwi Management Plans

The ability to include a Maori built heritage-focussed conservation plan into the broader scope of an iwi management plan would provide greater levels of recognition of the built heritage of an iwi, and also incorporate the active management of the place by iwi into the statutory framework that pays regard to iwi management plans in their planning and consent processes.

Architectural Advice

With the development of new approaches to the management of Maori built heritage it is envisioned that an increase in expertise would develop, and the potential for incorporating newly developed processes and methods could be incorporated into professional development programmes for practicing architects, and the tertiary education sector.

Long term Maintenance

A long term maintenance plan is an important part of the continued conservation and protection of any historic building, and the development of tailored management plans for Maori built heritage would be extremely beneficial.

Risk Preparedness/Natural Hazard Management

In addition to the long term management, and the conservation and protection of precious Maori heritage, consideration must also be given to the planning for potential impact from natural hazards. As well as planning for management of the impact and subsequent effects, the post-disaster management and mitigation must also be taken into consideration.

Action Points

So in summary, the key areas of focus to address the needs for developing more effective infrastructure for the protection and restoration of Maori built heritage are as follows:

Training, education, and knowledge sharing

- University-level education programmes
- Post-professional development for architectural practitioners
- Workshop-based and in-the-field training for those who will work on and manage Maori heritage buildings
- A specifically tailored training institution for the dissemination of knowledge associated with the conservation of Maori built heritage
- A documentation and research repository for archiving information on Maori built heritage and making reference material available to the public
- Emphasis needs to be placed on developing expertise in conservation of Maori architecture rather than just architecture in general.

Government acknowledgement of the importance of Maori built heritage

- Funding initiatives for maintenance and conservation

- Provide incentives for the retention of historic buildings

Ensuring continued use of buildings

- Management plans
- Review of the conservation plan as it applies to Maori Architecture
- Natural Hazard preparedness plans/ disaster management plans
- Incentive funds for traditional building revitalisationand knowledge exchange
- Incentive funds for Maori built heritage conservation

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Pakistan

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PRESERVATION AND RESTORATION OF WOODEN STRUCTURES IN PAKISTAN

Though Pakistan emerged on the world map on August 14, 1947, it actually is one of the most ancient lands in the world, home to different ancient cultures including one of the world's earliest civilizations known as the "Indus Valley Civilization." The Stone Age in Pakistan is documented by findings from the Soan Valley in the form of stone implements which may go back about 5 million years from the present. The Neolithic period of Pakistan is also one of the most ancient, having dawned in the 8th millennium BC in the Sibbi Plains of Bolan Valley, in Balochistan Province bordering Iran and Afghanistan. It was the period when man started settling in, after going through the transformation from wanderer and hunter, to a settled life in permanent mud structures with thatched roofs, and started raising animals and cultivating different crops.

The most significant period in our history is the evolution and development of the Indus Valley Civilization in the Indus Plains, which is beyond all doubt one of the most ancient and developed civilizations, where people lived in metropolitan cities and had developed systems for all the basic amenities and facilities. The people of this civilization interacted with people of the near and far-off lands, and developed excellent modes of communication through both land and sea routes according to the time and their own needs. However, despite being one of the most developed civilizations, its ancient pictographc language, i.e. the Indus script, has not been deciphered as yet, leaving behind numerous questions yet to be answered. Scholars from different walks of life and nationalities are attempting to find a key to the mystery, but so far there is little visible progress.
Just like its mysterious language that remains undecipherable, since this civilization was discovered in the early 20th century, its rise and downfall are both shrouded in thick layers mystery. The key to all such vital questions is certainly hidden in unlocking the secrets of the pictographic language. We hope to know about this civilization more and more, through attempts by scholars to decipher the script.

The arrival of the Aryans in the land sometime in the 2nd millennium BC was of course another event in the historical chronology. They brought with them their own culture, traditions, and faith, and spread these the length and breadth of the region. They also brought with them the caste system and the Vedic and Brahmanic teachings. Then the Achaemenians of Persia came on the scene and

dominated the land for quite some time. Gandhara was one of the provinces of the Achaemenians during the 6th century BC. The ancient city of Bhir Mound at Taxila is stated to have belonged to this period. Alexander the Great of Macedonia – with the mission to conquer the entire world – landed in our rich land in the 4th century BC and captured a vast territory before his death. He brought with him another rich culture whose traditions greatly influenced not only the life and customs of the local people, but contributed beyond that. The Kallasha people, who settled in the valleys of Chitral in NWFP, are stated to be the offspring of the soldiers of Alexander's army, who preferred to remain there and married local women.

With the departure of Alexander from the scene, his successors could not resist the onslaught of the powerful Mauryans, and were completed uprooted from the region and driven away in the closing decade of the 4th century BC. The waves of foreign invaders continued over the region, with intermittent intervals. The Greeks settled in different parts after leaving their land of origin, and continued their victorious journey to this land. The Mauryans were followed by the Indo-Greeks, the Scythians, and the Parthians over the next three centuries, who ruled different parts of the region and left their imprints.

Buddhism, which failed to take deep root in the land of its birth, had nevertheless reached the region very early, most probably in the lifetime of the Lord Buddha or soon after his demise, and it emerged as the most popular and dominant faith in the region under imperial patronage of different dynasties and rulers. Ashoka the Great of the Mauryan dynasty, who was a staunch Hindu and had slaughtered thousands of opponents in war, after converting to Buddhism not only faithfully followed the teachings of his new religion, but also sent missionaries to different parts of his own dynasty and neighboring countries to spread the new faith. He not only spread Buddhism in this manner the length and breadth of his own domain, but also to other countries, where he sent great scholars or imperial emissaries. It was the Kushans, however, who came to this land in the 1st century AD, who are credited with having fully supported the transformed form of Buddhism known as Mahayana Buddhism, which spread to China and Japan amongst other countries. During this period and many Chinese pilgrims visited the second birth place of Buddhism, known as Gandhara, in search of scriptures and knowledge. They not only took this knowledge and scriptures with them, but also spread them to other countries such Korea and Japan.

Mahayana Buddhism and Gandhara art developed from the 1st to 5th centuries AD, and spilled over the boundaries of Gandhara to neighboring areas and lands. Great monasteries and stupas were erected by the thousands in the region, while Buddha was for the first time venerated in human form and his statues were carved in large numbers. The concept of Bodhisattva (Buddha to be) evolved and a large number of deities were carved and venerated. Scenes from the life of the Buddha were also carved, which are popularly known as Jataka stories. Gandhara art and artifacts are sought after by

people from the world over. It is their demand throughout the world that resulted in destruction of large number of stupas and monasteries in the homeland of Gandhara.

Though the land saw the Sassanians of Iran, the most destructive and ferocious of all were the While Huns, who are charged with destruction of Buddhist sanctuaries and killing of Buddhists in the 5th century. Whatever was built by the Great and Little Kushans was destroyed by this ferocious people. The Hindus, who were looking for an opportunity to wipe out Buddhism from the earth in revenge for dominance of this faith over Brahmanism, ultimately found their golden opportunity when Buddhists were killed in large numbers by the While Huns, and those who survived were neither true followers of the faith nor strong enough to defend their religious sites and their faith. The 9th century saw the rise to power of a new Hindu dynasty, which was overpowered by Mehmood of Ghazna in the early 11th century. The invasion of Muslims from Afghanistan opened the doors of the subcontinent for Muslim entry from the west, and the region gradually came under Muslim influence. The Slave Dynasty established under Qutbuddin Aibak followed by others including the Khiljis, the Tughlaqs, the Lodhis, the Mughals, the Suris, and again the Mughals. These intrigues ultimately led to dismemberment of the huge empire and the Sikh followed by the British ultimately controlled and ruled the region for well over 100 years up to 1947.

Known world-wide for its rich cultural heritage, Pakistan possesses many fascinating historic buildings, rich archaeological sites, high mountains, enchanting valleys, and diverse human cultures, native tribes and folklore that are the products of its rich traditional history, deriving their source and strength from the forces that actively controlled the region and successfully ruled here from time to time, enhanced by the natural beauty of the varied landscapes. Our country is blessed with a rich cultural heritage which has no parallel in the world. Like the variety in its landscape, the variety in the heritage is so rich and unprecedented that not a single example could match it from any other region. As such, preservation of this rich and diversified cultural heritage is not only a gigantic task for us, but also a challenge for all of humanity.

It is evident that Pakistan has tremendous wealth in terms of the built heritage, and its long history is richly illustrated with archaeological sites and imposing monuments scattered across the length and breadth of the country. Brick cities from the Indus Civilization, which flourished between 2500–1500 BC, stand beside Buddhist secular and religious buildings erected between the 3rd century BC and the 7th century AD. Magnificent Muslim tombs from the 12th century with palaces, mosques and forts of the Mughal emperors of the 16th and 17th centuries. The country's main cities reflect the many influences, both historical and modern, that have made Pakistan what it is today. Many cities, including Lahore and Peshawar, are the cultural centers of the country, with elegant cores of Mughal architecture embellished by the flowery exuberance of the colonial period. The tangible cultural property of the country comprises both moveable and immoveable heritage. The diversity of the built

heritage, depicting different phases of our long past and the variety of materials used for construction, has hardly a parallel in the rest of the world. Similarly, the problems faced by our unique built heritage are also exceptional. The prized urban center of the Indus Valley Civilization of Moenjodaro is the one example, where problems of salinity responsible for eating the fabric of the built structures cannot be addressed as yet despite the efforts of national authorities and the international community. The Shish Mahal (Mirrored Palace) of Shah Jahan of the Mughal dynasty is similarly faced with challenging problems, which are now being addressed through the financial and technical assistance of UNESCO.

For preservation, conservation and maintenance of the rich tangible cultural heritage of the country, the Government of Pakistan has established the Department of Archaeology and Museums under the Ministry of Culture. As custodian of the nation's cultural heritage, this Department is solely responsible for the protection, preservation and development of the ancient sites and monuments spreading over the whole country. With limited available resources and manpower we are doing our best to cope with this huge task, but we certainly need both financial and technical assistance for the preservation of the large amount of tangible movable and immovable heritage. Since the training course to which I am a participant is primarily related to conservation of wooden heritage, I shall only refer to the rich wooden architecture of our country.

WOODEN ARCHITECTURE

Pakistan strategically falls in South Asia, overlapping with the greater Middle East having a thousand-kilometer coastline along the Arabian Sea in the south, and bordering Afghanistan and Iran to its west, India to its east and the People's Republic of China in its far northeast. It was established as a modern state in 1947, but has a long history of settlements and civilisation. The region was invaded by Persians, Greets, Arabs, Turks, Mongols, Afghans, and was incorporated into the British Raj in the nineteenth century. Due to its strategic location and amalgam of people hailing from different cultures and religions, it developed a mixed and pleasant blend of various cultures, and a variety of arts and crafts.

Pakistan is a blessed country, home to one of the greatest ancient civilizations of the world, and to diversified cultures. The building materials used from the earliest time to the colonial era include stone (of different varieties, including granite, marble, quartz, *kanjoor* and other varieties), bricks (both sun-baked and kiln-fired), mud, wood, terracotta, etc. Wooden buildings and structures are found in almost all parts of the country. In most colonial period buildings of the 19th and 20th centuries, the upper stories are greatly adorned with wood work and the balconies and facades are largely of wood. Similarly, wooden structures survive to this day in another important and historic city of Sindh, namely Thatta, representing the colonial era. In the old walled city of Lahore, such buildings are still visible in the narrow streets, but they are mostly dangerous and are being demolished. The most

interesting and well preserved wooden buildings and structures are seen in the walled city of Peshawar. The elegant buildings are so richly carved with varieties of motifs and adorned in such a manner that visitors cannot help but feel appreciation toward the builders.

The valley of Swat is known as the land of romance and beauty, and celebrated throughout the world as the holy land of Buddhist learning, piety, and as a sacred Buddhist destination. Buddhist tradition holds that the Buddha himself came to Swat during his last reincarnation as the Guatama Buddha and preached to the people here. Swat is said to have fourteen hundred imposing and beautiful stupas and monasteries, housing as many as 6,000 gold images of the Buddhist pantheon for worship and education. So far, more than 400 Buddhist sites have been identified covering an area of 160 km^2 in Swat valley alone. Among the important Buddhist excavations conducted by Italian scholars, Butkarha-I, which contained the original relics of the Buddha, is the most significant. This beautiful valley with rich forests encouraged artisans to make use of the abundant wood available here, and as a result many wooden buildings are seen through the valley's length and breadth. Apart from residential buildings, mosques are the most important structures made in wood. The situation is similar in the Kohistan, Chitral and parts of the Northern Areas of Pakistan, where large numbers of wooden buildings are seen everywhere.

WOODEN HOUSES IN PESHAWAR

Almost all wooden houses in Peshawar are located in the heart of the old walled city. These typical wooden structures include wooden rooms, verandas with graceful wooden façades, supported by wooden columns and beams in floral designs, etc. Some of the beautiful and elegantly raised wooden houses are lined on both sides of a narrow street making a complete residential colony, popularly known as Sethi Mohallah, or Sethi Houses, after an influential business family of the city. These houses are owned by Sethi family while the *mohallah* (neighborhood) housing them is famously known as "Sethian Mohallah." I have tried to catch a glimpse of these elegantly built houses, which are now mostly in a poor state of preservation and maintenance. The structures, designs and especially carved works of art dating back more than one hundred years all give a very pleasant look and attract visitors.

Keeping in view the elegant wooden artistic work, the Department of Archaeology and Museums has already declared one of the most complete and best preserved houses as a Protected Antiquity under the Antiquities Act, 1975.

Wooden Mosque Sahibzadgano Jumat at Shamizai, Swat Region

Although there are a large number of wooden structures, the most important one worthy of interest is the mosque at Shamizai in Swat known as Sahibzadgano Jumaat, believed to have been built by a

local saint known as Baba Jee some 200 years ago, which is comprised of a prayer hall, main and side verandas, and an ablution chamber. Most of the wooden columns are carved with floral designs topped with capitals carved in floral motifs. A column in the main veranda has the design of a necklace with "Kalima Tayyiba" (a verse from the Holy Book of Muslims).

Wooden Mosque in Bahrain, Kohistan District

This mosque is said to have been constructed by a local elder more than two hundred years ago. The wooden columns supporting the beams are topped with beautifully carved capitals. Of particular interest is the central column in the veranda which is round in shape and profusely adorned with floral scrolls. The door of the mosque is itself an object of attraction. Its jambs are worked in floral and geometrical patterns, and its posts and fanlight are carved with floral and vegetal motifs.

PROBLEMS CONCERNING PRESERVATION, RESTORATION AND CONSERVATION

The built heritage of Pakistan is comprised of a variety of materials – granite, marble, sandstone, kiln-fired and sun-baked bricks, mud, wood, etc. – all having different problems of preservation and maintenance. Similarly, the decorative elements, including plaster, paintings, carved and engraved motifs and designs, are faced with many problems. In addition, the external and internal parts of buildings have their particular types of problems. All of these problems need to be scientifically analyzed, and specific remedies found.

Similarly, the moveable cultural objects found in Pakistan are not only unique, but the materials used include stone, stucco, terracotta, metals (including copper, bronze, iron, wood, etc.), beads, shells, bones, etc., all having their own problems. Also, the objects on display in museum collections, and those *in situ* have altogether different kinds of problems, which need to be analyzed in their own environments and particular situations. The famous Gandharan sculptures found in a variety of media, i.e. soft stone known as schist, marble, stucco, terracotta, etc., are threatened by different problems.

The conservation of our built heritage is not an integral part of urban planning and development in Pakistan, as it is in many countries of the world, though efforts are being made in some historic cities to introduce it as an element of urban development. The restoration of historic areas not only adds variety, but also modulates the scale of the urban fabric, creating visual contrast and excitement within the city while protecting the important reminders and representations of the past. In addition, it adds to the distinctive character and identity, giving a sense of history and memory of the place. Buildings which are selected for conservation are chosen based on their historical and architectural significance, rarity in terms of building types and styles, and their contribution to the overall environment.

The following are problems we currently face regarding the preservation, restoration, and conservation of wooden buildings and structures.

- The identification and recommendation of buildings of historical, architectural and cultural merit for conservation. Since almost all the wooden buildings are privately owned, it is not readily possible to identify any building and recommend it for conservation.
- Private owners do not like government interference regarding their private buildings and are not cooperating with the conservation of these buildings. At times they even do not cooperate in the study of problems being faced by these buildings.
- Environmental pollution and related problems are major causes of damage to wooden buildings.
- Lack of coordination between public and private sectors for conservation and preservation of wooden buildings, which are for the most part privately owned.
- Lack of experts in wood conservation is one of the major problems being faced by custodians of the built heritage.
- Wooden buildings and structures within big cities such as Karachi, Thatta, Lahore and Peshawar are located mostly in areas which have been overpopulated for centuries, and the new generation thinks that the maintenance of these wooden buildings is no longer possible because of the high cost. Furthermore, demand for commercial buildings in order to make money is another matter of concern. This has resulted in the people's demolishing wooden buildings so as to build new reinforced concrete structures for both residential and commercial use, which not only fetch more in terms of rent, but are more market oriented.
- Wooden structures located in narrow and congested areas, with oozing water from water supply lines and sewerage systems, are the most adversely affected ones. The owners are unable to maintain these buildings due to such problems and prefer to replace them with concrete buildings.
- Buildings located in isolated valleys are suffering from neglect. Wood is now a costly commodity and the people do not find it economical to replace the damaged portions of wooden buildings with new wood matching the ancient one in all respects. They prefer rather to demolish the whole structure to rebuild a new one in concrete.
- There is no fire control system in any of the buildings or the nearby areas to control fire hazard. Fire due to electric short circuits is a common problem, and people are concerned about their safety in wooden buildings.
- Due to a lack patronage for artisans working in wood, there is a dearth of such artisans and it is often a difficult to find a carpenter or artisan to work on damaged portions of wooden buildings.

- The roofs of the wooden buildings often do not prevent leakage of rain water. Accordingly, the ceilings are the most vulnerable parts of wooden buildings and need to be replaced after a number of years, which is a costly business.
- The termite problem cannot be easily controlled in wooden buildings, resulting in bad damage to the wood.

REMEDIES FOR OVERCOMING THE PROBLEMS

While there indeed may be a greater variety of remedies worthy of consideration for addressing the above problems, let me note those I consider to be of prime importance, as follows.

1. Specialized training for conservators of the heritage of wooden buildings and structures.
2. Provision of financial and technical support for conservation and preservation of at least some selected buildings made of wood.
3. Incentives to owners of privately owned wooden buildings for their proper upkeep and maintenance.
4. Elimination of environmental hazards and improvement of fire safety measures in such buildings.
5. Water proofing from the top down for such buildings, and periodical fumigation for the eradication of termites and other insects.
6. Establishment of an institute for training craftsmen in wood carving, and the provision of proper jobs to them for taking care of such buildings.
7. Periodical visits by experts from abroad to exchange views and give technical advice on the preservation and maintenance of wooden buildings.
8. Importing technology from Japan for the consolidation of fragile wooden members of the buildings *in situ*.

EXPECTATIONS

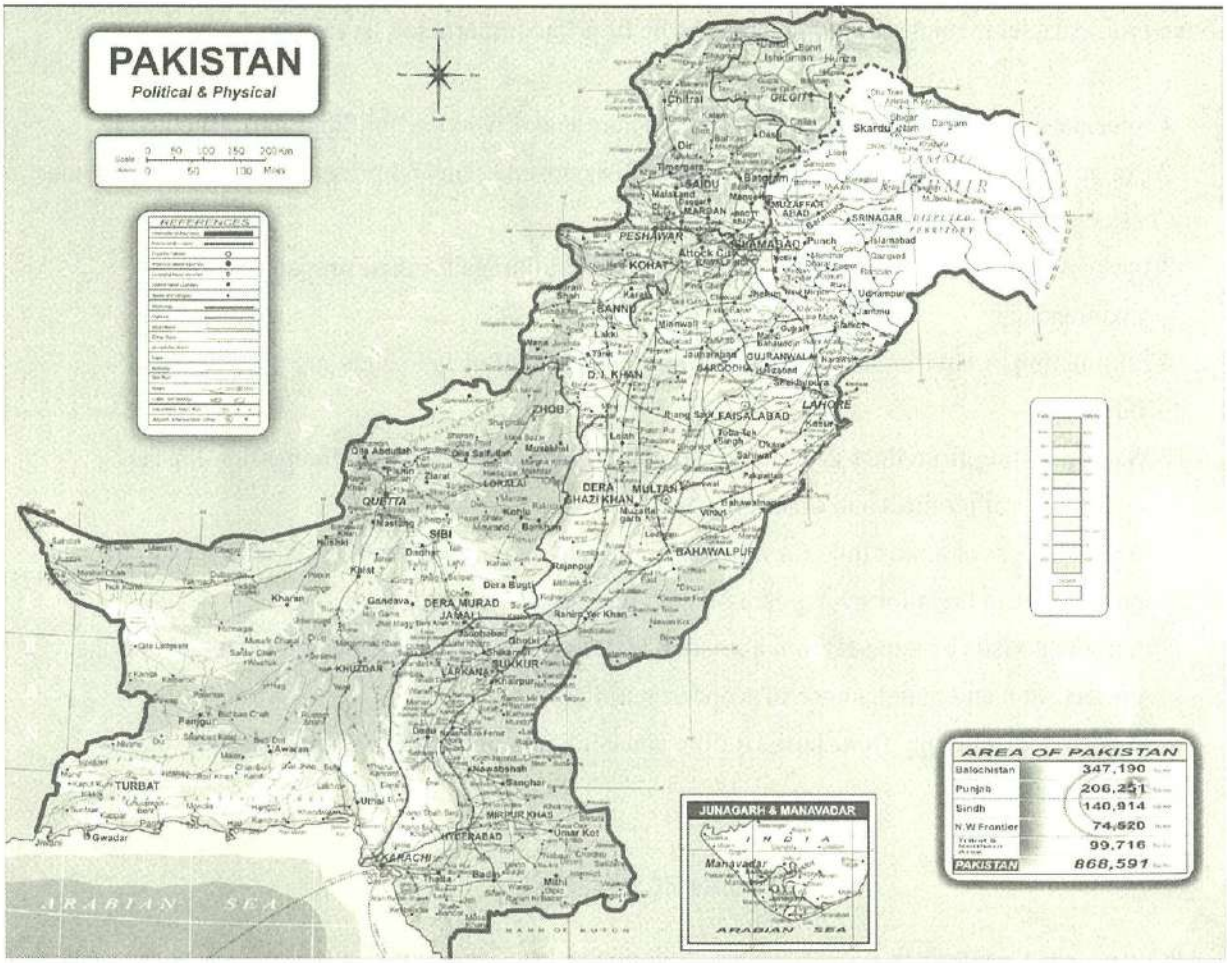
I have great expectations for my visit to the great country of Japan, known to us all as the rising sun of the East. The expertise available here for the conservation of traditional wooden buildings, and the technology developed for the purpose, are quite unfamiliar to us. I am hopeful that during my stay in Japan and through my interaction with the experts, I shall be better equipped to return to my home to serve the proud cause of preservation of our wooden architectural heritage along modern lines.

Though the greater challenges and the problems identified by me are enormous and not easily solvable, I at the same time expect that our Japanese friends, who have always come to our help whenever we needed them, will also extend a helping hand in overcoming the challenges ahead of us.

I take this opportunity to thank the Government of Japan and the organizers of this highly important and useful training course for those involved in the actual conservation of the heritage in developing countries. I wish to assure all that I will live up to the expectations of the organizers, and will try to deliver my best on completion of this training course.

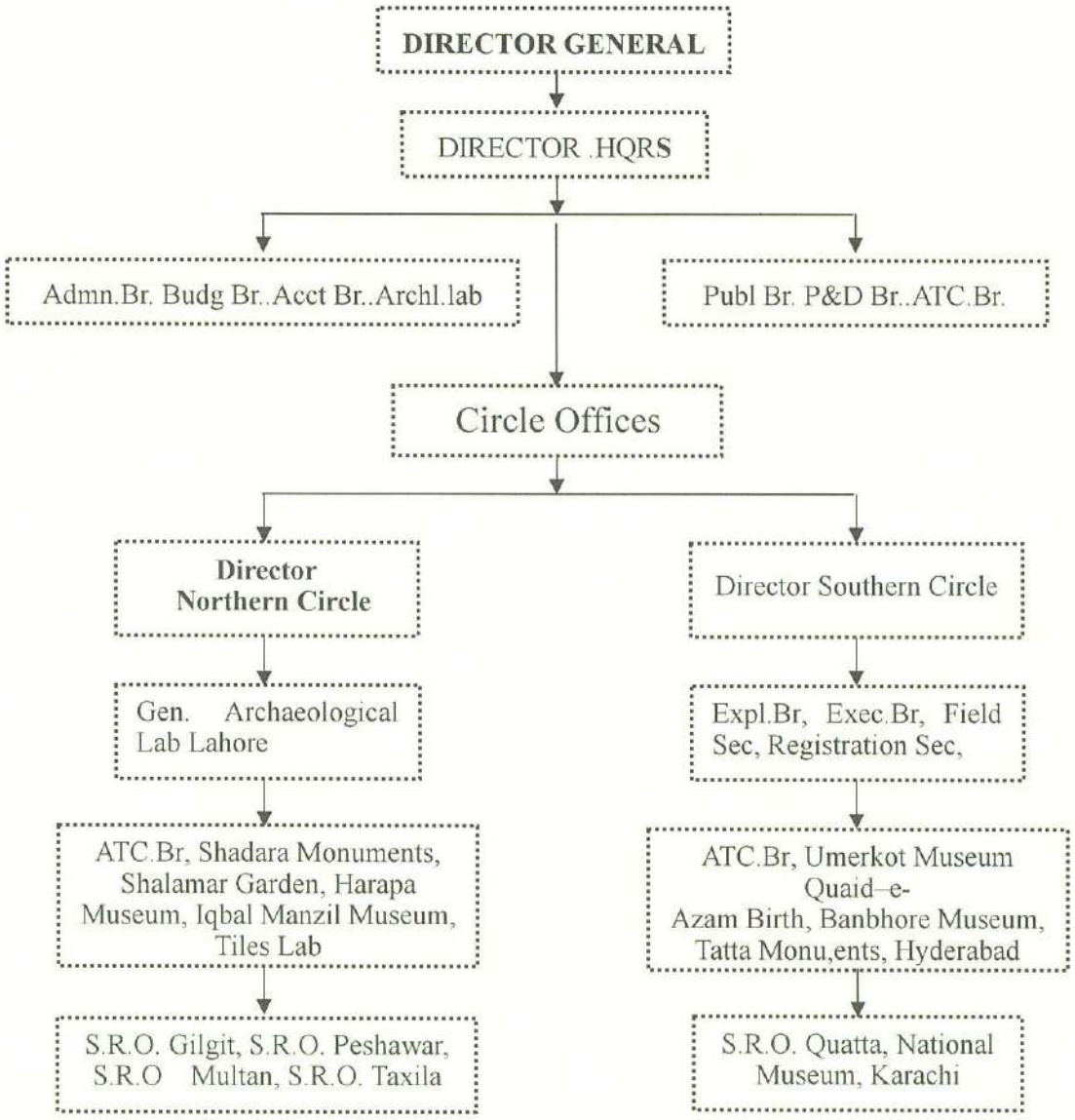
Appendix A

MAP OF PAKIATAN



Appendix B

ORGANIZATION CHART



Appendix C

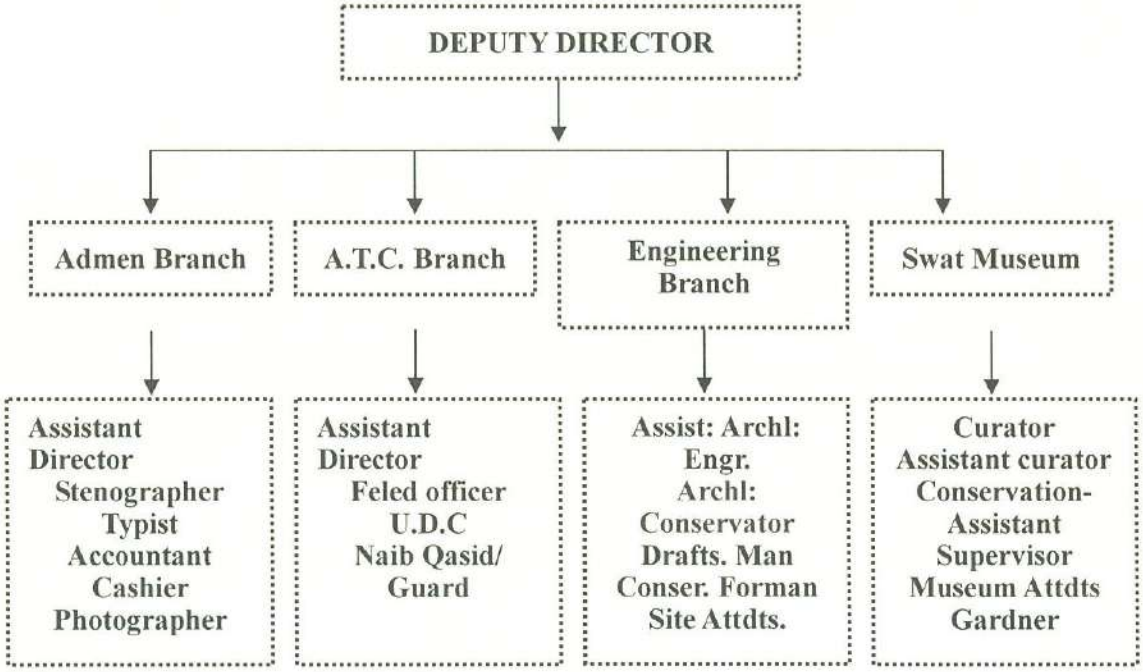
ORGNIZATION CHART

Department of Archaeology and Museums

Sub-Regional Office

Peshawar

Pakistan



Philippines

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WOOD CONSERVATION PRACTICE IN THE PHILIPPINES

Most heritage buildings in the Philippines, both of the traditional and colonial type, employ wood as a building material. From the southernmost part of the Philippine archipelago where the *torogan* or the monumental house of a Lanao Sultan is to be found, to the hacienda colonial houses and the monumental churches of the Philippine Visayan islands, to the northern colonial *bahay na bato* and churches of the province of Ilocos and Cagayan, and to the traditional *bales* or *fales* of the Philippine Cordilleras, wood has been used as the primary building material, comprising as much as 60%, or in many cases nearly 100% of a Filipino's home.

During olden times, good quality wood suitable for building was in abundance. In pre-colonial to colonial period Philippines, most houses employed the hardest type of wood materials. Such local species as *narra*, *baticuling*, *lawaan*, *tindalo*, *yacal*, *apitong*, *molave*, *ipil*, *kamagong*, *dungon* (ironwood), *supa*, etc., were used in building construction.

Wood was used for posts, walls, doors and window panels, balustrades, floor planks, trusses and rafters, floor systems, wall and ceiling joists, etc. In the vernacular and in colonial terminology, specific names were used to refer to wooden parts of the house: *armazon del techo* and *tirante* (bottom chord, joist), *viga* or *llave* (beam), *armadura* (framing), *boveda* (vault), *escalera*, balustrades (*balustradas*), *calado* (screens), *pillaretes* or *pilastras* (decorative piers). Religious interior components were similarly named, like the fronticepiece (*retablo*), doors and windows (*puertas y ventanas, ventanillas*), walls (*tablas de madera que se usa para hacer pared de madera*), floors and floor framing (*suelo, soleras* – floor boards, floor joists) and posts (*harique* or *haligue*). Even the *tabique pampango*, a traditional wall system mostly seen in colonial churches and in the colonial *bahay na bato* (stone house) found in different parts of the Philippine archipelago, which is similar to the wattle and daub construction found in European countries, employed wood that is combined with lime.

The word *tabique* is a Spanish term that refers to a partition wall. The word *pampango* is a term that means anything or something coming from the province of Pampanga, a province in the central part of the island of Luzon, Philippines. This construction system is similar to the wattle and daub system but uses lime based plaster instead of mud, as against the one found in its European counterpart. Woven

bamboo, wood, vines, reeds or similar materials act as the main wall framing system, and these are all plastered with lime.

In the Philippines, the earliest documentary evidence for this type of wall construction is found in a report about Ilocos province, in the island of Luzon, that dates from 1709-1710. This wood-based type of construction is found in such churches as the Bangar, Candon, Bantay and Cabugao churches of Ilocos. It is also found in the southern part of the Philippine archipelago in the Visayas islands, in the province of Boohoo. Seventeen out of thirty three churches of the island have walls of *tabique pampango*. In the southernmost part of the Philippine archipelago, in the island of Mindanao, this technique is similarly found and was employed in the churches of Jabonga, Agusan del Norte and Balingasag, Misamis Oriental. In these churches of Mindanao, the *tabique pampango* walls were found to be wrapped with *cabo negro* rope, while in the churches of Zamboanga and Surigao, branches of the mangrove tree *baras-baras* or *talibugsak* were used instead of bamboo.

The first author known to use the term *tabique pampango* was the Augustinian friar Joaquin Martinez de Zuniga, who visited the provisional church of Santa Rosa, Laguna in 1799. In the Earthquake Ordinance of 1880 declared by the Philippine government, *tabique pampango* was forbidden for use in future construction, and new partitions were required to utilize metal sheets or wooden planks. This is because of the susceptibility of this type of wood-lime based wall construction to fire.

In present times, the majority of the colonial and traditional heritage in the Philippines that was constructed centuries and decades ago is found to have wooden building parts in a state of deterioration. This is because wood conservation methods that ensure the preservation of heritage buildings and their wooden parts for generations came to our country's knowledge only in the 20th century and had not been practiced in the Philippines in early times. There is no detailed information to show that wooden members of historical and vernacular houses in the Philippines were ever subjected to wood conservation in those periods starting from historical times in the 1500s to the mid 1900s. However, historical documents about architecture during the Spanish period show the different types of wood found in the Philippines and their uses in building construction. These documents advise on what kind of wood is hardest, and what kinds are of medium hardness and of the soft variety. Information on the wood's respective hardness and capability to withstand weathering and the harsh climatic conditions in the Philippine islands guided Spanish and local builders in choosing the right kinds for building construction.

Likewise, information from oral histories tells how the early Filipinos chose the right time to gather wood from the forest, and start building. Oral tradition advises the harvesting of wood or plant products only during the dry season and after a full moon. This is because wood during the rainy season, or during a full moon when the tide is high, is sure to contain a lot of moisture which would

cause the rotting of its wood fabric. Similarly, it has been the practice to store wood to dry for months or years prior to using it in building construction.

Wood conservation during the Spanish period and up to the early 20th century in the Philippines was limited to the application of beeswax on wood surfaces, or the use of certain plaints to achieve polish on wood surfaces. There were no known preservation methods. Damaged wooden house members would be replaced with new wood, as wood during those olden times was extensively available.

In recent years, wood conservation has been localized to employing a combination of the traditional methods and modern approaches. Traditional methods have been employed only in the Philippine provinces and in remote areas. The traditional practice of wood harvesting has ceased to be employed in urbanized areas, as wood logging concessions developed after WWII deliberately harvested wood anytime it was desired. This modern method of wood gathering easily provided timber to those who needed it, disregarding the best periods for harvesting wood, as practiced in Philippine building traditions.

On the other hand, wood conservation using modern methods has likewise been limited to the use of specific chemicals that are considered safe for use in wood preservation. Lack of information on the right kinds of methods and chemicals, and the reliance on the limited information coming from available chemical suppliers, thereby limit wood conservation in the country. Also, because of recent concerns for environmental protection, espoused by governments world wide to address the continuous depletion of our forests, wood products and timber for use as replacement of damaged and deteriorated wooden house parts have become scarce and expensive. The best method that has been realized in the Philippines for wood conservation is the continuous application of the simplest maintenance procedures that prevent wood from deteriorating.

It is this lack of information on wood conservation techniques, and the unavailability of materials for use in wood conservation, that have greatly encouraged the conduct of training programs and workshops in this field. Wood conservation is a primary need for our country, most especially as our wooden heritage structures continuously deteriorate because of their constant exposure to the elements.

My knowledge in heritage conservation formally started when I took my Masters Degree in Architecture, specializing in the Restoration of Historical Monuments at the Escuela Nacional de Conservacion, Restauracion y Museografia in DF, Mexico, in 2000. It was enhanced when I continued in 2002 with a course on Materials and Techniques in Restoration at the Universidad Nacional Autonoma de Mexico in C.U., D.F., Mexico.

As in any Masters and post-graduate degree program that is geared towards the restoration of heritage structures, I was exposed to wood conservation with lectures on the pathology of wood as a building material, and the various conservation measures that address the deterioration of wood. However, studying in Mexico entailed studies conducted in the Spanish language and in the American context. Materials thereby advised in Mexico for use in wood conservation are not commonly used and are unavailable in the Philippines.

The National Cultural Treasures

As a specialist in heritage conservation, my present work revolves around the conservation, preservation, restoration and maintenance of heritage structures and sites in general. Dissemination of information on conservation also plays an important part of my job as a heritage specialist.

Projects that have been under my care that need information on wood conservation are those of the heritage churches and buildings in the Philippines that are under the management of the Heritage Sites Office of the National Commission for Culture and the Arts (NCCA). In 2004, I became the Heritage Conservation Officer of this government institution and head of the Heritage Sites Office. The list of heritage buildings entrusted to this office for safeguarding and monitoring and includes the twenty-six churches declared as National Cultural Treasures, and the four Philippine baroque churches in the UNESCO World Heritage List.

These churches have some wood parts that are, at present, in a state of deterioration. They employ wood for roof trusses and as floor framing members. Wood was used as floor planks and was employed in handrails, in *retablos* or altars, in choir loft parts like its floor and railings, and in decorations that made use of cut out or carved wooden members. Likewise, most convents and accessoria buildings located directly adjacent or beside these churches employ wood for the uppermost part of the structure. In Philippine convents, the lower part is normally constructed of thick lime-consolidated stone walls, and the upper parts of the wall are solely made of wood. In these structures, wood is mostly employed in interior partition walls, and in windows, in *ventanillas* (small transoms windows), in floor beams, in framing and joints, in floor planks, and even in the intricately cut-out transom partitions of rooms, in doors, and in the exquisitely carved stair railings.

As most of these churches were constructed during the Philippines' Spanish period (ranging from the early 1600s to the late 1800s), most problems occur as the wooden members deteriorate because of age and due to a variety of factors. In some of these religious structures, neglect and lack of maintenance, apart from attacks by organisms, have been observed to be some of the inherent problems. Wood infestation by boring insects like the termites and the local *bok-bok* is a prevalent problem observed in wooden members. Infestation by micro and macro flora such as algae, moss,

lichens (for those buildings found in the provinces), and the presence of higher plants – mostly of the *fichus* type that penetrates its roots deep into rotten wood members – has likewise been commonly observed. Similarly, the constant exposure of the wooden members to the elements such as water and humidity cause wooden parts to soften and later to disintegrate. This happens when the church or its accessory religious structures are not subjected to regular maintenance. Lastly, the constant exposure to sunlight subjects the wooden parts to thermal degradation and ultra violet oxidation.

At present, these churches are under the direct the care of parish priests. Simple methods are employed in their maintenance, and these are mostly dedicated to interior wood parts. Wood members located on the buildings' exteriors are constantly deteriorating as they are forever being exposed to the elements. Maintenance practices are limited to the use of varnish, or the application of beeswax to maintain polish in wood interior surfaces. No conservation measures have been identified to address deteriorating wood found in the exterior parts of the structures.

The overall monitoring for conservation work on these churches is under the National Commission for Culture and the Arts and its Heritage Sites Office. Their declaration as National Cultural Treasures, however, also subjects them to the care of the National Museum, the government institution that grants such recognition. Likewise, some of them that have been doubly identified as National Historical Landmarks are equally subjected to the care of the National Historical Institute. Under these government institutions are employed heritage conservation specialists in the fields of architecture, archeology, anthropology, history and chemistry. Most of these specialists have received training in other countries, as there are no schools or universities in the Philippines that specifically teach wood conservation.

The restoration work of the twenty-six National Cultural Treasures and the four baroque UNESCO declared churches is commissioned to architectural and engineering companies that have experience in restoration or conservation work. However, lack of knowledge on the part of people working under these companies in conservation measures ultimately subject the church and its parts to experimental work. This is mostly observed as these companies ultimately rely on heritage experts to help them in their work, most especially in dealing with such highly sensitive building parts as the building's wood and stone elements. In this regard, specialists working under the National Museum and the National Historical Institute are called upon to provide expert advise. As mentioned, people working under these two institutions are trained abroad in other countries where information is available. However, again due to lack of the right materials and technology for use in conservation work, there are limits on the conservation approach and work is ultimately focused on simple, time-tested methods that do not employ high or the latest technology in wood conservation.

The Ifugao House at the National Museum

Prior to joining the NCCA in 2003, I was entrusted by the National Commission for Culture and the Arts to assist the National Museum in making an evaluation report to assess the state of conservation/deterioration of some Ifugao houses under the care of the National Museum. Ifugao houses are Philippine traditional houses found in the northern part of the archipelago in the Cordillera Mountains. These houses are one-room structures that are found to be centuries old. The house employs wood for as much as 90% of its building fabric. At the time of examination, the houses that were being evaluated were constantly exposed to the elements as well as to neglect, and were in a dismal state of deterioration.

Diagnosing the structures showed several problems of deterioration in the Ifugao houses. These were: the attack on wood by organisms such as termites and the local *bok-bok*, and the presence of algae and micro flora due constant exposure to moisture and humidity. I also observed thermal degradation, greying of the wood fabric caused by ultra violet oxidation, and physical degradation and the disintegration of its wood parts. The most apparent problem encountered during that time of diagnosis and prognosis was the lack of information on the most appropriate kind of conservation measures to apply to the deteriorated wooden members of these vernacular houses. As mentioned, there is a dearth of information in the Philippines on the type of conservation measures appropriate for local buildings and their wooden members. Particularly, there is a limited number of known and permitted chemicals that could be applied to the deteriorated wood to address or mitigate problems of deterioration.

In this case, recommendations were made to replace ultimately the most badly deteriorated wooden parts. The less damaged and undamaged parts were retained in their original places, with minimal intervention done. Recommendations and advice on the use of appropriate chemicals available in the Philippine market that could address insect infestation of the wooden members was also carried out. The limited supply of chemicals ultimately ended in recommendations to use Solignum, a wood treatment product produced by Jardine Davies Co., that kills wood boring insects and ultimately preserves the wood for a given period of time. While the lack of information on the negative effects of this chemical on wood was a source of doubt, this did not deter us from recommending its use, knowing it was the only material constantly available on the market to architects in modern and contemporary architecture projects. There were companies, however, which employed much harsher chemical treatments to address termite attacks in residences that are considered heritage structures. Again, due to a lack of information on the specifications of these chemicals, the recommendations focused solely on the use of Solignum, which seemed to be the safest material for this work.

For exposed wooden members, varnish was recommended for protecting the surfaces from greying and drying. However, this treatment is known to be temporary, so that regular application would have

to be performed for long-term wood protection. Later on, because of the state of deterioration of the wooden members of the Ifugao houses, the National Museum ultimately recommended the dismantling of the houses and their parts.

The very important lesson learned in this case is that because of limited information, recommendations undertaken were also very limited. This ultimately resulted to the use of whatever material was available on the market, even if such material was not the best and most appropriate one for use in conservation work.

The Batanes Cultural Landscapes Nomination

Similarly in 2003, I was also involved in the conservation of one of our heritage properties, which we are nominating to the UNESCO World Heritage List: the Batanes Cultural Landscapes. Part of the nomination work entailed the documentation of Ivatan houses, which are considered to be one of the most important tangible representations of Ivatan material culture.

The houses have been developed through a fusion of knowledge in building that comes from indigenous Ivatan culture and Spanish influences. The houses were constructed from the 1800s to the mid-1900s, and employ the use of thick stone walls, with a wooden roof system. The documentation of the houses involved the identification of its wooden members and their respective local names, and the uses and functions of each wooden member. The documentation process has been very tedious, as information had to be validated with members of the local communities, and we later learned that people use different terminology for each kind of wooden part found in the houses on each island of the Batanes archipelago.

Work for the nomination of the Batanes Cultural Landscapes related to wood conservation did not include a detailed identification of wood preservation and conservation techniques and solutions, as these were proposed to be undertaken by the management office identified to conduct conservation and maintenance work for the property. Therefore the initial stages of conservation work, from the start of the nomination process to the present, focus solely on the documentation of house parts, and with particular interest to this training, the documentation of its wooden members.

Ifugao House and Culture Research

At present, I work on the conservation of traditional houses, such as that of the Ifugao in one of our World Heritage Sites, the Rice Terraces and Culture of the Philippine Cordilleras, found in the northernmost part of the island of Luzon, in the Philippine archipelago. My work on this site commenced in the early 1990s, with research on the history of the place and on the traditional

practices of the people. This interest ultimately led to the gathering of information on traditional building practices and architecture.

As mentioned, ninety percent of the Ifugao house is made of wooden members. Other parts of the house employ the use of thatch (cogon) and reeds. Almost none of the members of the house shell are made of stone or concrete. The posts are made of tree trunks that are chosen from the thickest and hardest wood in the forest, to ensure long-term preservation, as this is the part that directly touches the ground. The posts are used as stilts to elevate the upper shell of the house from the ground. There are almost no enclosures on the lowest part of the house, as these are open and used for storage. On the posts are found flat wooden disks that are designed to prevent rats from entering the house. They are placed on the upper parts of the wooden posts and are called *lidi*. The main wooden beams are called *kuling* and the secondary wooden beams are the *mungilid/mundilig/munchilig*. Like in Batanes, some of the terminology in Ifugao varies slightly depending on the location. The walls, called *gaob*, are similarly made of timber panels that are laid vertically, with their edges inserted into rails cut-out in secondary floor and roof beams. The upper level and floor members are similarly made of wood. Roof rafters are also made of wood. The only different material used in the house is the ceiling material, which is made of reeds, and the roof cover, made of cogon thatch.

Because the Ifugao cooks his food inside his one-room house, the wooden members become blackened and covered with soot in time. However, even soot and the constant exposure to heat from cooking does not prevent attacks by insects on the wooden members. Like the Ifugao house located at the National Museum in Kiangan, Ifugao, most Ifugao houses are subjected to attacks from wood-boring insects such as termites and the *bok-bok*. These are normally found in all wooden house parts, from the floorboards to the walls, and up to the roof-framing members. The posts of the Ifugao house are normally made of hardwood, and even these are attacked by wood-boring insects. Despite these infestations, however, the resiliency of the houses has made them withstand time. However, lack of archeological studies prevent exact dating of the oldest houses. It could be surmised, however, that some of them are more that a century old.

Maintenance and conservation of the Ifugao house, from the natives' point of view, is limited to the replacement of damaged house parts. Even this is also very limited, as the Ifugao who lives in his native abode sometimes does not care if his house is already deteriorating. For instance, due to lack of care, some of those houses found in the heritage cluster site of Bangaan, Batad and Mayoyao that have lasted decades and/or maybe centuries, are found to be almost at the verge of disintegration. When interviewed, the elders living in these structures complain of the difficulty of living in old structures. They point to the lack of available materials to repair the damaged parts of their houses.

It is because of this that the repair of certain fallen parts is the most that these houses ever experience that could be regarded as conservation. So long as the house still stands and can still be used, the native Ifugao continues to use these livable homes.

In more recent years, and with greater recognition of the cultural value of these native abodes, primarily due to the influence of tourism and from the recognition of the area as a World Heritage site, the Ifugao have learned to conserve their houses. In the heritage cluster sites of Bangaan, Batad and Mayoyao in Ifugao, for example, modest conservation approaches to protect these houses are undertaken out of respect and constant appreciation based on pride. This has resulted in the people's conscious prevention of the structures' dismantling or demolition, even while the construction of new concrete houses is going on in surrounding neighborhoods.

Bohol Tourism Master Plan Project

I am also presently involved as a consultant in heritage conservation, and one particular project that I am currently undertaking is related to the identification and the conservation of heritage structures to be proposed for opening for tourism purposes. The heritage structures identified under this project include religious edifices such as churches and their accompanying convents, and historic houses that are found in the island of Bohol in the Philippine Visayas islands. Most of these structures are of the colonial type, and employ wood as a building material.

In the religious edifices of Bohol such as their churches, masonry walls extend up to the bottom of the roof trusses. Wood is normally used only for the roof systems and in adornments, such as the *retablos,* that are the main and side altars of the nave. Bohol churches constructed in the Spanish Colonial Period show off a graceful yet magnificent quality that is primarily attributed to their large proportions and to the materials used in its construction.

Convents constructed directly adjacent to these churches, on the other hand, are seen as huge *bahay na batos* (stone houses), with their lower floors using the same materials, coralline limestone, and systems of construction applied in the church walls. As in traditional *bahay na bato* or the houses of the elite in the Spanish Colonial Period, the upper walls of the convents are made of wood and employ a special type of partition wall, earlier mentioned as the *tabique pampango*. This type of wall comes in a thickness of 0.5 cm or 2 1/2 inches.

Domestic architecture of Bohol in the Spanish Colonial Period is of two types. The *bahay na bato* and the *bahay na tabla*. The *bahay na bato* resembles a convent, but is found in smaller dimensions. The lower part of this house is of coralline limestone masonry while the upper part is of wood panels. The *bahay na tabla*, on the other hand, is constructed with both its lower and upper floors purely of wood

panels, or *tabla* in the vernacular. Most houses in this province are entered through a main door that leads to a stairway. The stairway, in most cases, is enclosed and on the second floor landing is found a small space called the *caida* (*caer*, a Spanish term that means 'to fall') that is also seen in the larger houses of the northern part of the Philippine Archipelago. In some parts of the Bohol house, the *caida* forms part of a small porch. From this area is found the entrance to the main quarters of the house: the *sala* (living room), the *comedor* (dining room) and the *cuartos* (rooms). Found inside the houses are parts like the kitchen with the *bangerahan* (washing area), the *aljibe* (cistern), the *bano* (toilet) and the *azotea* (balcony). And if there is a bit of extra space, a small garden may be found at the side of the house or at its back. The lower quarters (*silong*) is in most cases used as storage (*tambakan*) for various things.

Like in other important buildings constructed during the Spanish period, Bohol's houses and religious buildings use the hardest types of wood, such as *molave*, *narra*, *tindalo*, *kamagong*, and even ironwood (*dungon*).

Again, due to various factors such as the lack of economic resources and technological know how, some wooden parts of these heritage structures are presently deteriorating. Deterioration problems mentioned earlier in other heritage structures, and in wooden parts found in other parts of the Philippines, are similarly observed in the heritage structures of Bohol. The government and the private sector, being fully aware of the significance of the heritage of Bohol, have been working hand in hand for the conservation of these structures. This task, however, is difficult, as the resources to ensure the preservation of heritage are scarce. One of the things that government has attempted in addressing this problem is the identification of heritage as a potential tourism resource. Some Boholanos, however, fear that negative consequences which could result from tourism would even be more detrimental and cause further deterioration of their precious heritage.

To address this, the Province and its people are working hand in hand to spearhead the development of culture, arts, and heritage programs. It is their hope that financial returns from eco-tourism would consequently support heritage conservation.

Makati Heritage and the Documentation of Spanish and American Period Architecture

In 2006, I was involved in another heritage project, the documentation and cultural mapping of a heritage district in metro Manila, in the city of Makati. In this site are found historic buildings, mostly of the late 1800s and early 1900s. The place is called Brgy. Poblacion, Makati, and it used to be a summer place for the Manila elite of the period, as the place was located beside the Pasig river. It has a church made of stone and wood that is located on a hill, overlooking a settlement of houses.

The houses of the place are found to be of a combination of the Neoclassic, Art Deco, Art Nouveau

and traditional *bahay na bato* styles. One of them, the Tolentino house, was built between 1935 and 1936. Like most of the houses located along the river bank of the Pasig, the rear part of this house is constructed with a balcony made of wood. This house has features representing the architectural movements of the era and these are reflected in the geometric forms of wooden elements found in the façade and the interior spaces. The stair *barandillas* or railings are of wood, and so are the wood cutouts of the transom window. In the interior, wooden panels grace the archway of the living room. Some elements are in the Art Deco style and very reminiscent of its features are the geometric patterned decorations made of wood found in certain elements that grace the interior and exterior parts of the house.

Neoclassic wood elements are similarly found in the house features. These are seen in the window shaft and balustrades, in the wood mouldings, cornices and baseboards of very classic lines and design, and in the extended beams forming the brackets. This style is also seen in the arched gateway of reinforced concrete, in the wooden brackets of the eaves, in its furniture and even in the porch balustrades and flooring of terrazzo tiles.

The Tolentino house, preserved in its original design despite minor modifications, and a major reconstruction work undertaken in the house in the mid-20th century, could be evaluated as in a poor state of conservation. This is primarily because its occupants have maintained the house only marginally. At present, the house still retains its original function as a residence, but deterioration is evident in most its parts. For example, the paint of the exterior wooden wall planks on the second floor has faded, and the wall has fallen into a state of deterioration. Because of the lack of paint to protect the surface, it has been exposed to thermal degradation and weathering, which has caused greying of its surfaces.

The rest of the wooden parts in the interior spaces, however, have been protected and conserved, and were observed to have the patina of very old wood preserved through time. The upper staircase, made of hardwood, is preserved in its pristine old condition, showing signs of age as the patina caused by constant rubbing on its dark varnish glimmer with use.

The original paneling of the walls has been retained and preserved, but the interior wall paint, retaining its original mint green color, had almost disappeared. The dark varnish of some interior features has also been retained and preserved, creating a gloomy ambience in the interior of the house. The plywood ceiling put in place in the 1970s was subsequently replaced after a strong typhoon, but was never repainted afterwards. Holes and cracks were found in many of the wood partitions in the kitchen.

Another house found in Brgy. Poblacion of typical Spanish Colonial Period design is the Brillantes

house. The structural elements of the house, such as the posts, floor joists, and beams, are made of *narra* wood. These house parts have been treated for termite protection.

The Brilliantes house has windows large enough for air circulation. Its *ventanillas* help in bringing in good ventilation. Window panels of wood are laid with *capiz* shells. Signs of deterioration are evident in the windows and exterior walls. Wall paint in sea green color has faded and peeled over time, showing off the greying of the wood surfaces.

The interior parts have also deteriorated. Walls and ceiling surfaces show peeling of its paint material. Wood panels have deteriorated and fallen off the ceiling, probably caused by a leaking roof. Similarly, wooden floor panels manifest signs of old age. Constant wear and tear have caused bumps and scratches on the painted wood, exposing the aged-old patina of the material.

A lack of financial resources on the part of the owners of these houses prevents conservation of the house shell and the accompanying wooden parts. Through documentation and cultural mapping, the city government of Makati has been able to identify the houses and their significant aesthetic and architectural elements, thereby increasing their historic and architectural importance. These heritage buildings have recently been designated as part of a heritage district. A program of conservation is being developed, and through this, the government hopes to work on the allocation of resources to carry out conservation and restoration work.

Conclusions

As presented above, wood conservation practice in the Philippines currently encompasses structures that are considered as vernacular and historic. Wood conservation is limited to the documentation, mapping, and identification of wooden heritage structures and their wooden parts. It also covers wood pathology and the diagnosis of wood deterioration problems.

There are a limited number of specialists working on wood conservation. They are mostly found in government institutions like the National Commission for Culture and the Arts, the National Museum, the National Historical Institute and the Department of Energy and Natural Resources. Only the three institutions that deal with culture and conservation are the ones that actually apply knowledge in wood conservation to heritage structures. Specialists in the Philippines who are knowledgeable in the field of wood conservation have been trained abroad, and have closely studied the pathology of wood and its deterioration.

To a limited extent, actual conservation related to the wooden heritage is carried out using methods that are traditionally known, and are considered time-tested approaches by heritage specialists.

Materials available in the country for use in wood conservation are very limited. Specifically, chemical substances that could be used for this purpose are limited. Whatever chemicals are available in the market are those that are commonly used by architects in their regular practice of architecture, for the protection of wood in contemporary buildings. Highly specialized chemicals for use in wood conservation in heritage structures are not widely recognized by specialists and architects alike, primarily because of their unavailability on the market.

Government efforts to address this deficiency in the knowledge of wood conservation are focused solely on recommendations for heritage specialists to attend seminars, workshops and training programs abroad. To address the dearth of specialists and experts in the field, foreign wood conservation specialists are sometimes invited to the Philippines to conduct wood conservation seminars, but these are only undertaken in very rare occasions. And when these specialists come to the Philippines and introduce highly specialized methods of wood conservation, heritage conservationists simply stare in awe and admiration at the technology and materials that other countries have available. Ultimately, we in the Philippines come to realize that these modern methods are not available in our country, thereby resulting to our use of the old time-tested methods in wood conservation.

As I teach heritage conservation at the university, in a course on building materials and techniques for historic preservation, I realize the difficulty of identifying appropriate methods of wood conservation. It is for this reason that I strive hard to further my knowledge of wood conservation through my involvement in heritage projects, and through research to enhance my teaching.

With my participation in the ACCU/NARA training program on wood conservation, I hope to further enhance my knowledge and apply this in the conservation of our wooden structures in the Philippines.

Samoa

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Problems and Needs for Cultural Heritage Protection and Restoration Activities in Samoa (Museum and Archives)

INTRODUCTION

The Independent State of Samoa covers nine islands and lies 2,600 miles southeast of Hawaii, 1,800 miles from New Zealand, and 2,700 miles from Sydney, Australia. The total land area is 2,842 square kilometers. The population is estimated to have exceeded 180,000 people. Additionally, over 100,000 Samoans live and work overseas (New Zealand, Australia, USA) and contribute with their remittances to Samoa's economy.

There are two large islands, Upolu and Savaii. Upolu is the most developed and densely populated island with an estimated population of 120,000. The capital Apia is located in Upolu. Savaii is the largest island and next most populated (est. 45,000).

Samoa's governance incorporates some aspects of its traditional chiefdom structure. Village life is regulated by the village chief councils, who also have the legal right to impose fines and bans on villagers. The chief as head of an extended family also manages the family customary land; customary land ownership covers 80% of Samoan land. Other traditional groups with strong influence in the village are the Women's Committee and the untitled men.

Despite the nine different islands, a single dialect and culture are held in common.

Samoan culture is unique in terms of the connection of its people to the land, and to chiefly titles. When it comes to genealogies it is important that you understand about your connection, because it determines whether or not you are the rightful owner of the land or title you claim to be yours.

People in Samoa do not often speak about their genealogies or the genealogies of others. It is feared that telling other people about your connection may give them opportunity to manipulate your story, and may cause you to lose your land and title to others.

Speaking about the genealogies of other families can also be threatening, as different versions of

stories and may lead the two families to quarrel, and may likely end up in court.

The elderly consider the subject of genealogy as sacred and forbidden.

The way of living in Samoa has changed as the years have passed. The people of Samoa have adapted to the European way of living in almost every aspect of life. However, the islands of Manono and Apolima had preserved Samoan lifestyle and society, with its special dependence on the sea. There are no cars on either island. Dispersed over the islands are several renown graves and monuments, reminders of the past when the Manono fleets played a great role in Samoan politics and warfare. Many legends and oral histories are connected to the islands. Large, mostly uninvestigated ancient structures, including a star mound, are situated inland on the island of Manono.

HOUSING IN SAMOA

The interdisciplinary approach to vernacular houses offers new possibilities for understanding this subject. Some construction details which seem of no practical use make sense if the rituals and symbolic life of the society is understood. Understanding the people's customs and behavior can give a new view on the value of architecture in the lives of the people.

The traditional Samoan house is constructed with strong wood from the forest, and it is always round or oval in shape. The roof is covered with thatch, the floor is covered with white clean pebbles from the sea, and the blinds are woven from dried coconut leaves. Today, houses of this kind are few, but in rural areas traditional houses are still a common sight as they accommodate visitors and are used as meeting places for families.

Types of houses and their usage

The large house (*faletele*), is shown in the black and white photos below. It is traditionally used as a meeting place for the family or the village. The elders usually occupy such structures, and they are also used during meal times because of their size, as a whole family can enjoy lunch and dinner together. Large logs are obtained from the forest for the beams and posts of such buildings. Preparations of the sennit to use for such large buildings take months.

Anther type of house traditionally owned by an extended family in Samoa is the guest house (*fale talimalo*) or meeting house (*fale fono*), where the chiefs convene. Size and lavishness are determined by the power and position of the family.

The rock foundations of guest houses are usually elevated sometimes as high as 1.5-2.4 m (5-8 ft). In Samoan culture the higher the foundation, the more important the chiefly title and rank of the family. The height of the foundation symbolizes dignity and respect.

Guest houses are constructed in typical Samoan architectural style, with a domed roof and evenly spaced posts supporting beams in the center. Traditionally no nails were used; instead coconut fibers are braided into *afa* or sennit rope to lash the beams and joints together. Preparations of sennit takes time because for one guest house sixty to eighty yards of sennit is needed.

The floor of a guest house is typically covered with smooth, round shaped river stones, or tiny white pebbles from the sea. This method is ideal for balancing the temperature of the building. On hot humid days the stones cool the building. On cooler days they retain the sun's heat to keep the building warm and comfortable. Rough mats woven from coconut leaves are then placed on the floor, and topped with finer woven *laufala* mats made from dried pandanus leaves.

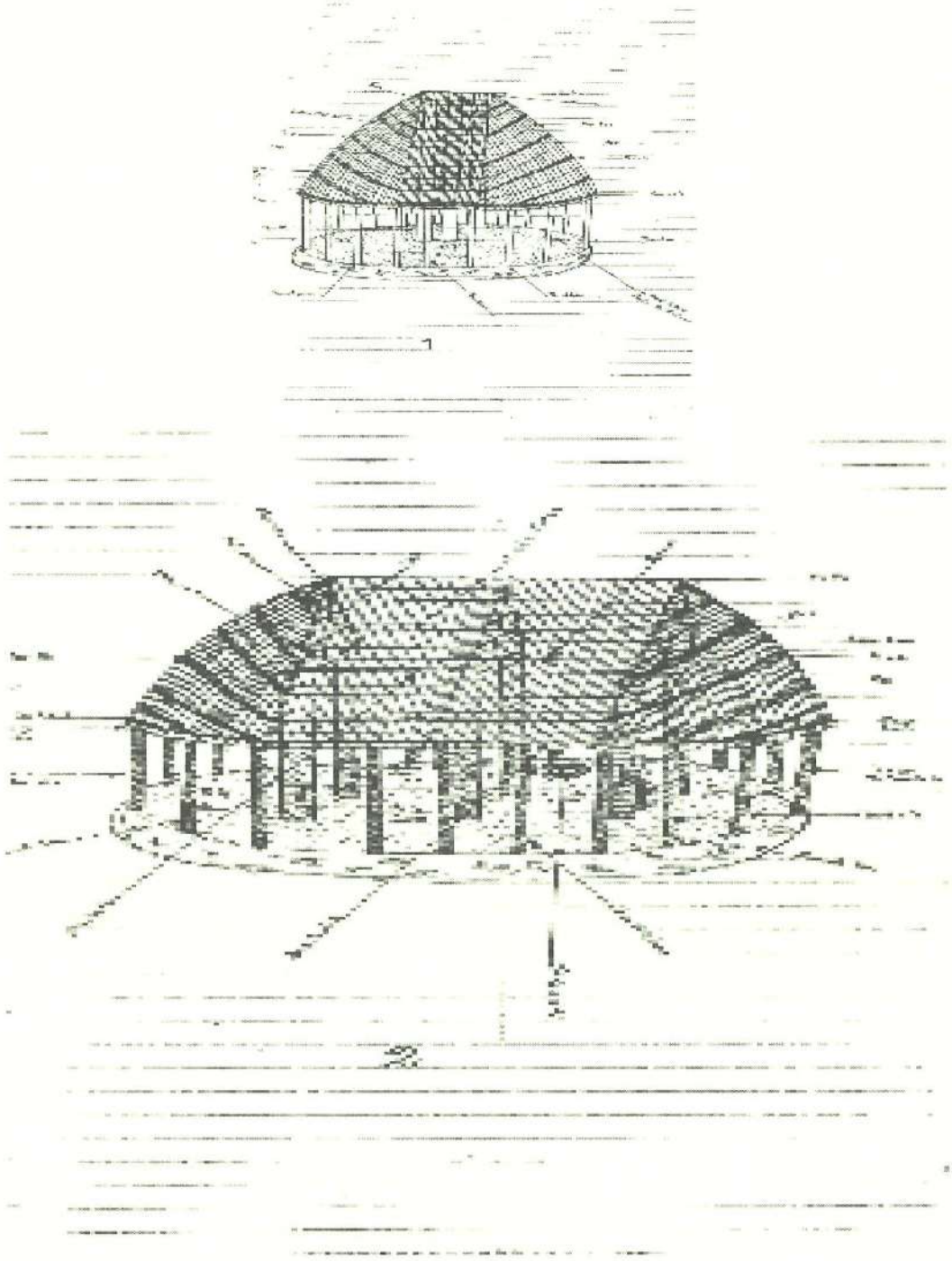
The many posts which encircle the interior of this building have much greater significance than holding up the roof. When meetings are held in the building, certain participants always sit with their backs to a post. The exact post is rigidly determined by the person's rank, family, and home village. Other minor participants sit on mats spread around the outside rim.

The post on the far end of the left side of the entrance is for the highest ranking chief from the visiting party. The post opposite is for the highest ranking chief of the home village. The very next posts to the entrance are for the chiefs' representatives or orators, known as their talking chiefs.

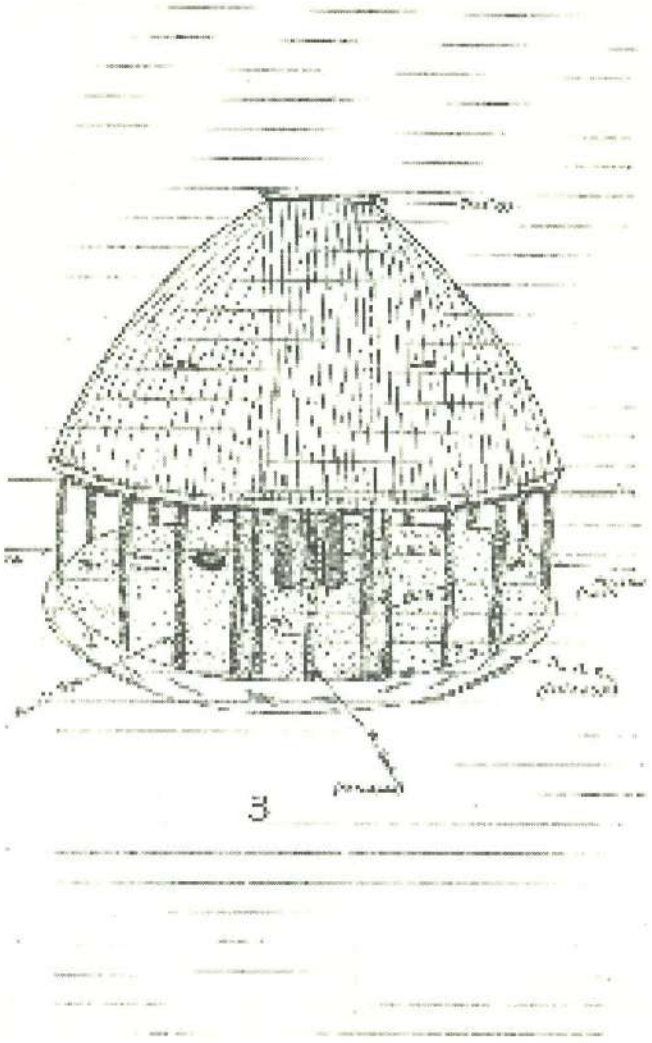
An equally significant post is the fourth post on the left side, or the "strangers post." Someone who comes unannounced to a meeting can summarily walk up to that particular post and demand that it be surrendered to him. Three large posts in the middle are also important, as from there any food to be served during the meeting is dispensed.

The roof is traditionally thatched with sugarcane leaves, and will last at least 8-10 years. The cone-shaped roof allows rain to fall easily to the ground without moisture permeating the leaves and causing leaks inside. During sunny days the high dome allows the heat to rise and seep through the thatching, cooling the house.

Coconut blinds can be lowered when it rains or when privacy is required.



The front of a Samoan house is that part which faces the highway through the village as a rule. The floor of the *fale* is quartered into four parts, and each section is named: *tala luma* is the front side section, *tala tua* the back side section, and the two end sections are simply *tala*. In meeting houses, he two end posts at the sides named *matua tala* are the positions occupied by the chiefs, and the *pou o le pepe* are those of the orators. The positions or posts at the back of the house are occupied by the servants of the chiefs, ava makers etc.



When a building is used as the chiefs' meeting house (*fale fono*), discussions are held which include the monitoring of the performance of individual families who are expected to abide under the rules and regulations approved and passed by the council of chiefs. All families are required to participate as a village unit, and cooperate in such things such as securing public safety, beautifying yards and homes, keeping curfews in the evening, planting taro patches to encourage self reliance, growing food crops as well as raising pigs and chickens.

Regardless of the names given to the same house, however, any house can be used in different cultural manners as it can accommodate visitors if visitors arrive, and it also used as meeting house for village chiefs (*matai*).

In back of the large house, as a shelter for younger family members or to house couples and all their belongings, a small house (*faleoo*) may be built of simple pieces of wood, which can be renewed regularly.

The *tunoa* is a house made especially for the preparation of food. All cooking utensils are kept in here. Simple pieces of wood are obtained for the building of such houses, which require no blinds.
In the past, a typical Samoan family was always an extended family, consisting of grandparents, uncles and aunts, and their children. However every couple had their own small vernacular house, or *faleoo*. Young ones who were fifteen years and downwards would sleep with their grandparents in the family's big house, or *faletele*. Maidens of each family in the village haved a special house for sleeping and to accompany the *taupou*, or the daughter of the highest chief in the village. The young men of the village, not including the married untitled men, also had a special house for sleeping.

Every family had a house for cooking called *umukuka*. Families always assembled in the main house in times of meals.

In the past, to own a *faletele* or a big house meant being rich. This is because hiring an architect to build the house was very expensive and the process required a very long period of time.

Architects

Architects are highly respected in our traditions. It is said in our oral history that the children of Ilu and Mamao were all appointed by the god Tagaloa to be architects and to come down from the heavens to this earth. Perhaps there were ten thousand of them, and they all had the same name Tagaloa. They all worked in building houses for the god Tagaloa.

#87. A long house under construction

The oval shaped Samoan house under construction, being thatched with leaves of the cane tree. Curved woods are mainly used and the process of curving is not easy because it requires a lot of time and strength.

Houses complete with the floor covered with pebbles, and the blinds already done and being put up when the weather is hot.

Reason behind the shape of our structures

Our oral history tells how all these builders built all shapes and kinds of houses, and then one day came together in a meeting as called by the god Tagaloa. The meeting was to select the best style that could be used by the people that would uniform for every structure in the islands. However, they did not reached any decision because everyone thought his style to be the best. At last they asked Tagaloa his desire for the style of structure that he would prefer. Tagaloa pointed to the heaven and said "domed as the heaven and flat as the earth." And that is why the style of our houses became as it is.

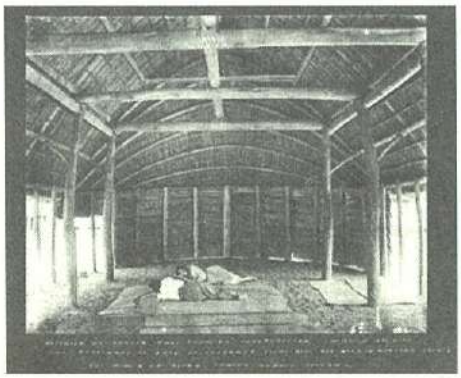
Causes of change to the Samoan vernacular houses

The changing style of shelters in Samoa is partly due to the frequent visits of tropical cyclones which the traditional Samoan *fale* could not withstand. The weakest part of a vernacular Samoan house is the roof. This was observed after every cyclone, when most of these houses' roofs would be damaged, although complete destruction rarely occurred. The plant used for thatch is also disappearing from the islands. The wood and sennit used in houses are destroyed by termites, often requiring the renewal of the house. This is why nowadays paint is applied to lessen the damage caused by termites.

Maintenance of a traditional Samoan vernacular house could be very difficult in terms of the short term materials which are used for the thatch and the blinds. The thatch had to be renewed every three to four years, while the blinds were renewed in one to two years. To maintain the neatness and beautiful appearance of the house, pebbles were also collected from the sea every year.

The special species of coconut used to make sennit has become extinct. In addition, the producers themselves, who were always the elders, are now under the influence of technologies which draw their attention and provide entertainment, and television has become the substitute of the usual sennit braiding. This prevents them from braiding sennit, and passing down their knowledge and understanding to young generation.

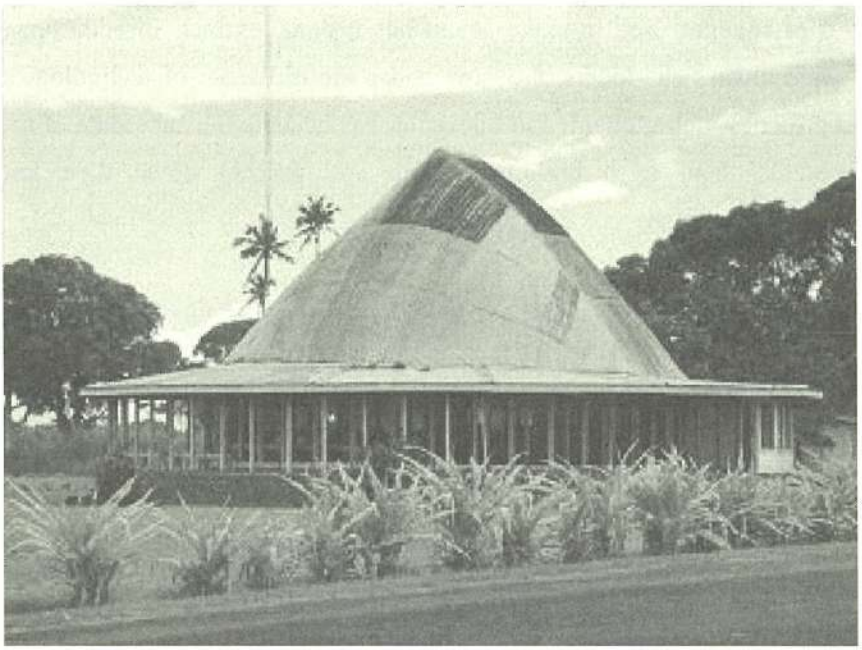
The way of life in urban areas is also a major cause in the changing architecture styles of building. As mentioned earlier Samoan houses are open structures, however in the towns most families have adapted the western style of housing, which has closed walls and is very private. In some cases within urban areas, houses are constructed traditionally, but walls are added and room partitions made to maintain privacy.



The interior of a Samoan house with the side blinds down and the mats spread on the pebbles for sleeping.

#63. Looking into a large house (Taletele)

The center of the house is used to place sleeping mats and head rests, and on the ground is a hole for a fire that will light the elders' smokes and burn continuously, and will be used to light a fire for the next morning's meal.



The modern Samoan house commonly used today is a mixture of European and Samoan styles, with a tin roof and cement floor.

Today the Cultural Affairs Division is encouraging the replanting of the particular sugar cane plant which is used for the roof thatch.

The Ministry of Education, Sports and Culture in Samoa is strongly emphasizing ways of maintaining cultural values as well as preserving Samoan culture in all forms. This includes the research and collection of myths, legends, and old songs containing rich Samoan vocabulary that is most likely to be forgotten in everyday conversation due to some traditions and customs not being practiced anymore. In the Ministry's legend research, when elders and orators of a village are interviewed on specific oral histories from their area, the identified legendary sites are filmed and photographed, and the findings are published. Through its Cultural Affairs Division, the Ministry has documented in this manner a series of sites in which traditional folklore and cultural activities have taken place. The documents are compiled in a series on the research of legends, started in 1997 and now going from Volume 1 to 5, and still continuing. The project is funded by UNESCO. The inventory of cultural sites identified in this series also covers those sites considered priority areas for conservation. This series was produced to record and preserve oral traditions and legends of the Samoan islands, which form part of Samoan cultural identity.

In addition to these researches, old traditional songs are collected from different districts in the hope of recording and preserving them. This research is ongoing, and it has helped us greatly by providing new cultural information that we were not aware of.

Before the Europeans introduced written methods, most of our history was conveyed through word of mouth (myths, legends, old songs).

MUSEUMS AND HISTORIC BUILDINGS IN SAMOA

Robert Louis Stevenson Museum

The former residence of Robert Louis Stevenson in Samoa has been set up in the original style of his era to depict his lifestyle, and is run by a non profit organization based in Utah, USA, as one of two museums in Samoa.

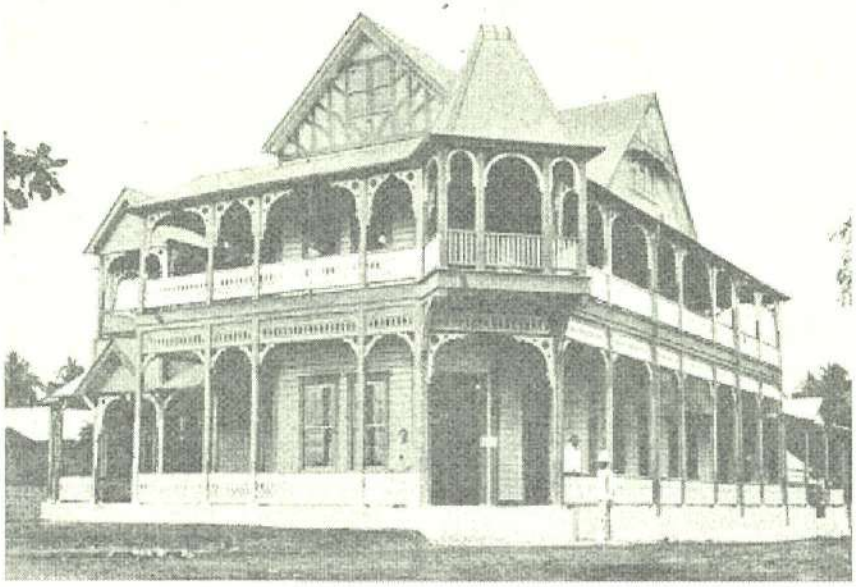
The world famous author Stevenson lived the last years of his life in this Villa at Vailima. The place was later the seat of the German Governor, and the official residence of the Head of State of Western Samoa. Now, the residence has been set up as a museum depicting the colonial lifestyle. The mountain behind this villa is a natural reserve, with botanical gardens and includes the path up to Stevenson's grave.

Falemataaga / Museum of Samoa

The Museum of Samoa, disaplaying the history, culture and environment of Samoa, is run by two staff members of the Culture Section of the Ministry of Education, Sports and Culture.

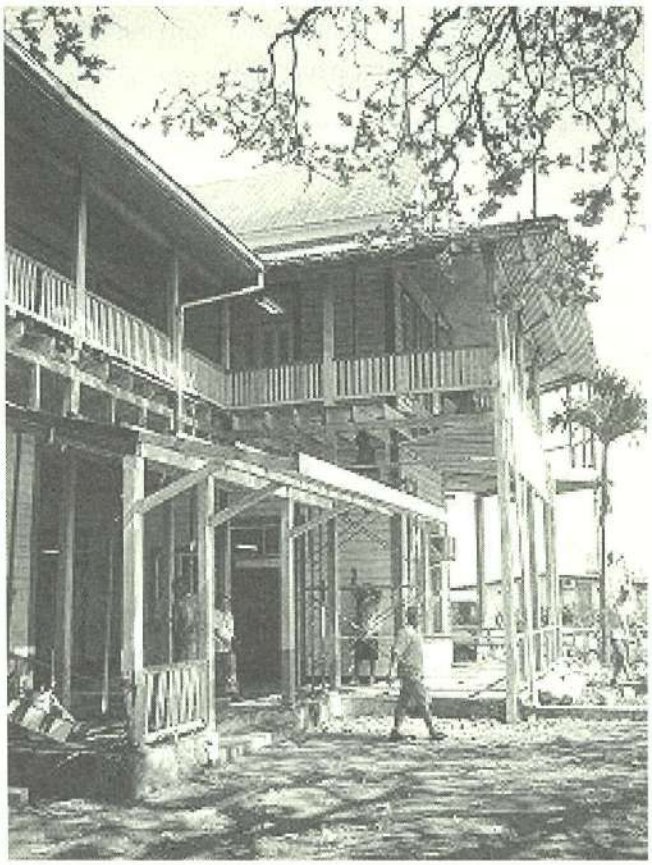
The Museum of Samoa is one of the historical wooden structures that survive today. This particular building was built in 1906 during the German colonial period (1900 – 1914). It was used as a central office for the German government. The British New Zealand Administration occupied the same building during the time of their colonial rule. When Samoa gained her independence in 1962, the first

Samoan Prime Minister and his cabinet occupied the building until 1993, when they shifted to the new government building.



The Museum of Samoa was established on May 27, 1999 with the mission of preserving the country's heritage through collecting and displaying artifacts that depict Samoa's way of life, environment, history, and culture, as well as providing information for visitors, students and Samoans who visit daily.

Work of extension for the court house which housed the museum has been carried out. Records of the exact dates in which the constructions for extensions took place have not been documented except for recent renovation and repaired work done to the building.



The Museum consists of three small rooms, one of which is devoted to the display of artifacts donated by participating Pacific Islands at the 6th Pacific Festival of Arts in 1996.

Local and overseas people have also kindly donated a large number of artifacts as well as historical photographs for display in the museum. The process of donating is increasing every year and two additional rooms are now occupied by the museum; however, as the process of donation is ongoing, further extension of the museum is likely needed to provide more space for storage, display, study, treatment, and conservation.

A conceptual plan has been devised for the conversion of the existing wooden historical building, to expand the mission of, and further develop, the Museum of Samoa. It is advised that before the conversion plan commences, the staff implementing this plan must be aware if there is any legislation protecting this building. The plan will begin with a structural assessment of the building, to be conducted by a team of professional and qualified practitioners, such as a structural engineer, an architect, electrician, plumber, historian, archivist and the museum staff. The assessment should focus on the structural stability of the building, the electrical wiring, the plumbing.

The museum also features the magnificent Cabinet Meeting Table, which has played a long role in Samoan Cabinet history. The material was a gift from the Portlach timber mill to the people and

government of Samoa. Seventeen different species of wood from our native rainforests were used for this table. Due to recent deforestation and cyclone damage, some of these species have now become very rare and are in danger of becoming extinct.

The table was built and assembled by the Public Works Department in 1973. Because of its giant size and weight, a crane had to be used to lift the table in pieces to its present site over the balcony. The pieces were then reassembled. The floor of this room also had to be reinforced in order to hold the weight of the table.

From this very table most of our former leaders and their Cabinet members have made decisions for the government and people of Samoa, until moving to the present Government Building in the reclaimed area in 1993.

Wooden buildings from colonial times

In Samoa, a few historical wooden structures still exist, due to damage caused by natural disasters such as tropical cyclones which often hit our island. In April 2000, an inventory of all colonial and historical buildings was conducted by the Ministry of Natural Resources and Environment.

The Heritage Conservation Project for all existing colonial and historical buildings in Samoa became the first government priority area to be considered under the World Heritage Conservation because of the need to protect historical assets, which form a significant part of Samoa's identity from the colonial period.

Buildings from the colonial period in Samoa, which were first known as the DHPG store. This was later named by New Zealand as the Estate Building, followed by WSTEC when Samoa won her independence.

NATIONAL ARCHIVES OF SAMOA

The keeping of records is fundamental to the functioning of any organisation. Good public records management enables a government to conduct its programs efficiently, effectively, and in an accountable and transparent way. Institutional strengthening programs undertaken in by the Samoan government recognize the importance of public records management for good governance. However, most previous projects focused more on improving workflow processes than on strategies needed to ensure that public records are properly created, captured, and preserved for the future. Previously, there were no retention schedules, no guidelines for records management for entire government, and no public records legislation. There was a need to develop systems and procedures to ensure that records of value as evidence in all formats are identified and preserved, including electronic records which are increasingly being created throughout the government. The preservation of electronic records is one of the most difficult challenges faced by records managers.

The government of Samoa did not have a national archives institution. Public archives, the oldest being over 150 years old, were stored in various government agencies, at times under very poor conditions. The aim of the National Archives Project, co-ordinated by the Ministry of Education, Sports and Culture, is the safeguarding of all Samoan public archives, which includes records presently being created to become the archives of the future. One crucial requirement for this endeavour is the development of well functioning records management practices throughout the government, the focus of this proposal.

The need for the National Archives of Samoa

An action plan to establish the National Archives of Samoa was approved by the Cabinet Development Committee on 13th February 2001. The project has been included in the Corporate Plan of the Ministry of Education, Sports and Culture 2003-2007. Three staff members of the Ministry's Cultural Affairs Division are assigned to this task, however due to the resignation of our principal/museum officer, which leaves only two staff members, it is rather difficult to cope with two projects at the same time with such limited staff.

Record keeping is essential for all aspects of development and management for good governance, which is one of the key goals. In order for good recordkeeping to be practiced, carefully planned systems and procedures need to be developed and implemented. This involves more than speeding up processes and facilitating services; it is about safeguarding the memory of a nation.

The National Archives Project is a project of the entire government. It is administered by the Ministry of Education, Sports and Culture, however all Ministries are actively involved in the project through

their participation in the Records Task Force and the Archives Task Force.

The National Archives Project is responsible for the safekeeping of public sector records. This proposal focuses on strengthening public records management within all Ministries. This will be beneficial not only to the public sector but to all of civil society, as it will improve the way government information is recorded, managed and preserved for the future. The guidelines and skills developed through this project will be essential tools for strengthening records management of all government bodies. It will raise the general awareness and skills in recordkeeping, which will also assist private and NGO institutions with their records management needs.

Progress of the National Archives Project in Samoa

The Public Sector Improvement Facility in charge of funding the National Archives Project has already made payment for archives emergency preparedness materials which have been ordered by all ministries involved in this project. Each ministry was allowed to order goods with the total value of four thousand *tala* with the exception of larger ministries.

The "Code of Best Practice" is a document that contains 15 guidelines with the purpose of assisting all records managers throughout Samoa in their field of work. The document was translated by the archives staff and later discussed by the Records Task Force before it was passed over to the Samoan language committee for their final check. It is now with the chief executive officer of our ministry, ready to be endorsed and handed over to the government for official approval before it is given out to government ministries for guidance. The Common Administration Retention Schedule is also in the same process.

While the two documents are on hold, members of the task force have been discussing the dates of training as well as distributing the 15 guidelines among themselves. Each member would present on the particular guideline assigned to him/her. Public servants from government ministries would be called to participate in these trainings.

This training will strengthen recordkeeping practices across the government, thus improving transparency, accountability, and information flow in public service. It will develop the skills and knowledge of local staff in records management procedures and equip them with the resources to do their work.

Plans for capacity building

a. Training Code of Best Practice in Records Management training courses are to be held for records

management staff and for Chief Executive Officers and senior management in all Ministries. Training and presentation materials will include course handbooks, translated into Samoan. Apart from the publication and printing needs, the presentations will require as equipment (to be also used for all other training and consultation presentations of the project) laptops, projector, and screen.

b. Technical Assistance – Records Retention Schedules A Technical Advisor will be hired to draft specific records retention schedules for six pilot government ministries. Estimated time to complete the task is 2 weeks (14 days) per schedule, for 12 weeks (84 days) total. It is envisaged that this activity will be undertaken in 2 phases, that the first phase (6 weeks) will be a consultation and information gathering period, and the second phase will involve the drafting of the schedules (6 weeks). This timing is based on the TA working in collaboration with the local counterparts. The estimated cost will include roundtrip airfare from Aus/NZ, a per diem of SAT$300 per day for 84 days, and professional fee of SAT $900 per day for 84 days.

c. Technical Assistance – Classification Schemes

A Technical Advisor will develop classification schemes for the six pilot government ministries. Estimated time to complete the task is 2 weeks (14 days) per schedule, for 12 weeks (84 days) total. It is envisaged the activity will be undertaken in 2 phases as described above. This timing is based on the TA working in collaboration with the local counterparts. The TA for the Retention Schedules may be the same TA hired to develop Classification Schemes. Otherwise the estimated cost for a second TA would be the same as for the first.

Electronic records management

A Technical Adviser will also be needed to develop the functional and technical specifications for an electronic record and document management system and its implementation that could be used by the whole government. The adviser would also review the recordkeeping capacities of major information technology systems presently used in government, and provide an assessment with recommendations. This TA would need to be experienced in records management and in drafting technical design briefs for electronic record and document management systems. Estimated time to complete the task is 2 weeks. The estimated cost will include roundtrip airfare from Aus/NZ, a per diem of SAT$300 per day for 14 days, and professional fee of SAT $900 per day for 14 days.

All plans for the archives project are now on hold, awaiting the approval of the Code of Best Practice. The release of funds is also frozen until the official approval of the Code of Best Practice.

CONCLUSION

In our field of preservation and restoration of the cultural heritage of our country, it is sometimes very difficult to stress the idea of preserving and restoring such important aspects of our culture due to the fact that in some ways such cultural heritage is sacred and forbidden in some villages or extended families. Due to our unique culture, the people believe that to make traditional knowledge open to strangers or other villagers may give them the opportunity to distort and to manipulate this knowledge, and they may lose their right of custodianship over their cultural heritage.

Despite these difficulties the Ministry of Education, Sports and Culture, through its Cultural Affairs Division, still urges that all cultural heritage be protected in some way.

One way of preserving our cultural heritage is through our National Museum, which is also under the supervision of the Cultural Affairs Division. Since its establishment in 1999 the Museum is progressing well, receiving approximately more than five thousand visitors a year. We hope to extend the museum once the Justice Department relocates to the new government building.

In addition, work is progressing well on the archives, which are believed to be very important in safekeeping historical and valuable confidential information of the country, and the Cultural Affairs Division hopes the objectives of these projects will reach their goals in the near future.

Sri Lanka

Sujeeva Kaushalyani PEIRIS DERANIYAGALA
Conservation Supervisor
Central Cultural Fund

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

(With Special Reference to Wooden Architectural Heritage)

Sri Lanka

Sri Lanka is a tear-shaped tropical island in the Indian Ocean sitting between 5° – 10° north latitude, and 79° – 82° east longitude. Palk Straights, which is some 40 km wide, separates the island from the Indian mainland. It has only 65, 332 km^2 of land, but the diversity of climate and vegetation is itself a marvel. Sunny, sandy coastal areas of the island gradually gain height when one goes inland, and the intermediate zone has a low country wet climate. In the Eastern and Northern provinces, these plains become dry and arid. The great North Central plains have tropical dry mixed deciduous forests. The cool central hills rise above 2500 meters, and have pleasant mountain climates. Ancient travelers also marveled at the vast diversity that occurs in such a small land mass. As the island sits close to ancient ship routes and the famous silk route, it has attracted many philosophers and travelers from East and West. Marco Polo declared that "Ceylon is undoubtedly the finest island of its size in all the world."

HISTORY / INTRODUCTION

Sri Lanka has a recorded history of over 2,500 years, which dates back to the 4th century BC. It is believed that the first Aryans came with Prince Vijaya from the Indian mainland, and settled around Malvatu Oya, a major watercourse in the North Western province.

Anuradhapura was the first capital of Sri Lanka, built by King Pandukabhaya (B.C. 437 – 367) around the 4th century BC. It had a well laid out plan, including palace complex, outer buildings, roads, moat and ramparts.

The most significant single factor that shaped the island's civilization and culture is the advent of Buddhism during the period. Arahat Mahinda brought the great philosophy to the country in the 3rd century BC, and from that moment, the islanders were ardent Buddhists. The impact of Buddhism was evident in the country's architecture, art, customs, social values and attitudes. As a result, great stupas, monasteries, cities, and gardens were built. Stupas such as Abhayagiri, Jetavana, and Ruvanveli, etc., dominated the city landscape, and many other smaller Buddhist establishments dotted the scene. The Jetavana stupa is the world's highest brick built monument even today. Although art and architecture of the island initially came from India, they have developed and evolved independently mainly because Sri Lanka is an island. Stone sculpture became refined in the Anuradhapura period, and there were intricately carved guard stones, handrails, and moonstones at many religious and public buildings.

The rock fortress Sigiriya was made a kingdom by the patricide Prince Kassapa (AD 479 – 497) in the 5th century AD. It was a Buddhist monastery and the fleeing prince turned it to a fascinatingly landscaped fortress with water gardens, moats, ramparts, and terraced gardens, and built a palace complex on top of the rock, which is over 200 m above the surrounding plains. Frescos and the graffiti on the Mirror Wall of Sigiri rock are world famous, and still draw large numbers of local and foreign tourists annually.

Polonnaruva became capital of the island around the 9th century. During that period, there were number of invasions from the Indian mainland, and several times kings of Indian origin ruled the country. As a result, the art and architecture of the period received Hindu and Dravidian influences. Earliest evidence for the use of timber in buildings other than for the roof can be seen at Polonnaruva. At the Palace of

King Parakramabahu I (1164 – 1197), there is evidence for large timber beams being used to support the upper levels.

Subsequent kingdoms of the island, Dambadeniya, Yapahuwa, Kurunegala and Gampola, saw the ruling seat being shifted towards the wet zone, and importantly, the increasing use of timbers in buildings. This change in materials may have been caused due to the lack of craftsmen and time. Stone buildings required fairly long periods of time to build, and the abundant timber in the wet zone easily made it the most sought out building material.

Kandy became the island's hill capital in the 15th century. There were three other kingdoms in the low country at the time, namely Raigama, Kotte, and Sitawaka. These were more or less subject to invasions from the West, mainly the Portuguese and the Dutch. As a result, Sinhalese considered Kandy as their last stronghold, and it further strengthened their allegiance as the Sacred Tooth Relic was also housed in Kandy. Timber was used extensively during the Kandy Period, and it made considerable impact to the architecture. Tile roofs supported by large, carved timber columns were characteristic of most of the religious and public buildings.

Meanwhile the coastal areas had undergone considerable change at the hands of the Europeans. The Portuguese landed first in 1505, mainly for spices, elephants, and gems. Gradually they got involved in the power struggles between low country princes. They built number of forts at strategic points and became a significant force for the native rulers. The Portuguese were ruthless, and made their opponents and subjects suffer. Then came the Dutch in the early 17th century, chasing the Portuguese out. The Dutch contributed to the development of the infrastructure of the coastal regions and to some extent they were able to secure the goodwill of the natives because they were more placid than their predecessors.

Dutch period buildings also have pleasing architecture that harmonizes with the tropical climate. They too used timber extensively in these buildings. High verandas lined with simple Doric columns, clay tiled roofs, timber doors, and windows with intricate carvings made these pleasing to the eye. The

Dutch blended Eastern and Western architectural styles and technology so successfully that even today, these buildings continue to provide influence for new building projects.

The British fought with the Dutch for supremacy in the Indian Ocean, and became the new rulers of the costal and low country regions in 1796. In 1815, the British annexed the Kandyan provinces to their expanding empire, and the last capital of the Sinhalese fell after many battles. Once the British got control of the entire island, they began to develop roads and build bridges over the rivers, whose lack they thought had been a hindrance in their annexing of the Kandyan provinces.

Because of these Western invasions which lasted over 400 years, Sri Lanka acquired their architectural trends, customs, religions, educational systems, etc., and most of these have now become part of its history and legacy.

CULTURAL HERITAGE

The cultural heritage of Sri Lanka is twofold; it is comprised of tangible heritage which includes the ancient archaeological and architectural monuments of the island, and the intangible heritage made up of its ancient customs, religious activities, rituals, and the performing arts.

As a nation proud to have a recorded history of over 2,500 years, Sri Lanka can be ranked along with countries like India, Egypt, China, Japan, and those of Latin America and Arabia, where there were great civilizations like Mohenjodharo-Harappa, Mesopotamia, and the Nile Valley, etc. Even though Sri Lanka is the smallest country among these, it has over 300,000 registered monuments throughout the country and seven World Heritage Sites. There are Buddhist religious sites, monasteries, landscaped gardens, Hindu shrines, Christian establishments, and many other ecclesiastical and public buildings.

TANGIBLE CULTURAL HERITAGE

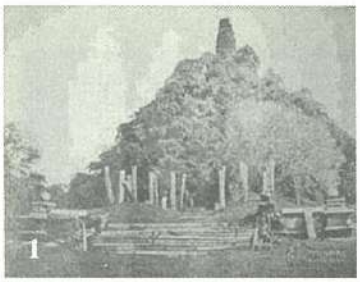
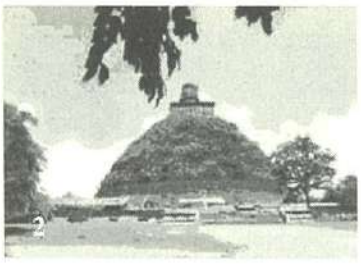
World Heritage City of Anuradhapura

Anuradhapura reigns supreme in the minds of Buddhists as their Holy City. This is further strengthened by the fact that it was the first capital of the island and the pride of its ancient glory. Another treasured heritage of the city is the presence of the Sacred Jaya Sri Maha Bodhi, the ancient Bo tree (Ficus), which the Buddhists believe to have derived from the tree that sheltered the Lord Buddha during and after the Enlightenment.

World Heritage Site boundaries have been demarcated to include the Jetavana Stupa and Monastery, the Abhayagiri Stupa and Monastery, and the immediate surroundings. In addition, other prominent stupas

such as Ruvanveli, Thuparama, and Mirisawetiya, further increase the value of this ancient city.

An ancient irrigation system comprising several tanks, lakes, and canals, built by kings to water the paddy fields, also provide strong evidence of the magnitude of the bygone civilization. These tanks and canals are still in use and continue to serve the farmers in the area.



1. Abhayagiri Stupa before conservation 2. Jetavana Stupa 3. Brazen Plalace
4. Monastery building at Abhayagiri complex 5. Moonstone 6. Twin Ponds

World Heritage City of Polonnaruva

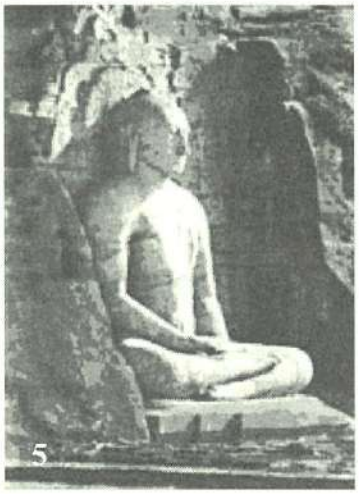
The ancient city of Polonnaruva was a medieval kingdom of the country (9th to 13th centuries). The Stone Images of Gal Vihara, Tivanka Rankoth Vehera, Kiri Vehera, Image House, Lankatilaka Image House, Thuparama, the Sacred Precinct where the Tooth Relic Temple was located, Pothgul Vihara, and the Inner City which includes the ancient palace complex of Great Parakramabahu I, are some of the major monuments within this heritage city.

The art of stone sculpture gained maximum refinement during this period, with the contributions of Chola and Hindu/Dravidian influences. The finest example consists of the Images at Gal Vihara, where Buddha images in various postures vie with each other. Another masterpiece in stone is Siva Devala No. 1, where all the components were closely fitted together without using any mortar. The outer walls of the shrine are covered with intricately sculpted deva figures and leaf patterns.

The Parakramabahu Palace Complex is the most significant site, showing the earliest authentic evidence for the use of timber as a building material. Its huge walls carry slots that were once fitted with timber beams of the upper floors. It is believed that at the famous circular image house, a two-tiered roof was supported by a timber frame and stone columns.







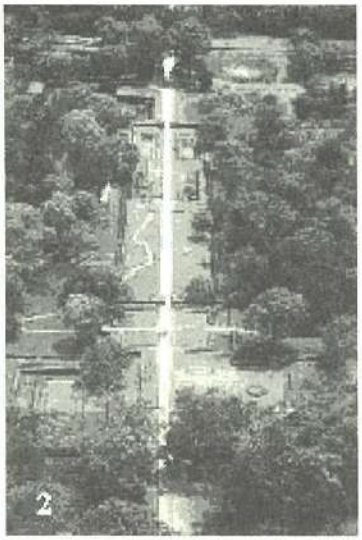
1. Recumbent Buddha Image, Gal Vihara 2. Kiri Vehera 3. Siva Devala No. 1 4. Nissankalatamandapa
5. Seated Buddha Image, Gal Vihara 6. Nataraja 7. Parakramabahu Palace

Sigiriya Rock Fortress and the Water Garden

This is considered the finest single achievement on the island, which exhibits the heights attained by the ancient engineers, town planners, architects, artists, and landscaping artists. This fortress, built on a solitary rock outcrop, was turned into a kingdom in the 5th century, a feat easily surpassing all other similar projects of its day throughout the world. Sigiriya is the ultimate example of hydraulic engineering achievement, and its ancient sprinkler system still works during the rainy season.

Considering the hardship involved in transporting materials to a height of nearly 180 m (600 ft), construction in the 5th century was in itself a considerable feat. Even today, problems of material transport have held up or hindered the conservation program innumerable times.

The architecture and shape of the palace at the summit must have been designed to withstand the strong winds which blow half of the year. Some argue that a heavy structure would not have been feasible, and it was probably a light structure supported by a timber framework.


1. Boulder Arch 2. Axial Path from Summit 3. Walls at Summit
4. Sigiri Paintings 5. Lion's Paw

World Heritage Site of Painted Caves at Dambulla

Like many other cave shrines of the island, the Dambulla Caves, inhabited by prehistoric man, were also made into a Buddhist shrine complex by King Valagamba (BC 89 -76). They are located on a medium rise of gneiss rock and are one of the largest painted cave complexes in South and Southeast Asia. There are five major caves with 18th century murals and sculptures of the Buddha, other gods, and the kings who patronized the complex from time to time. Most significantly, the Dambulla complex has been the locus of human activity from prehistoric times down to the 20th century. The Ibbankatuwa megalithic cemetery provides ample evidence for continued human activities in and around Dambulla from first millennium BC.

This complex mainly developed during the Kandyan Period, with almost all the paintings on the rock surface clearly belong to that time. Bright reds, yellows, greens, whites and blacks are used to depict murals related to Buddhist stories.

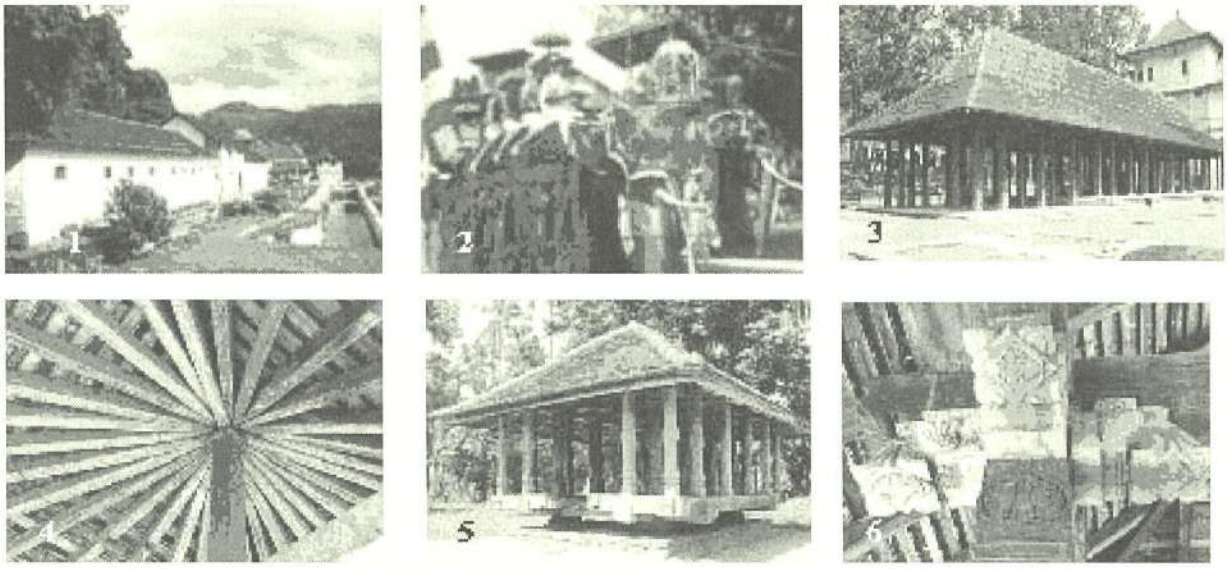
World Heritage City of Kandy

The area declared as the World Heritage Site comprises of the Temple of the Tooth Relic Complex, four Devala (shrines dedicated to four Hindu gods) Complexes, Malwatta and Asgiriya Monastery Complexes, and the lake with Udawattakele nature reserve.

The ancient city of Kandy is built in a triangular basin surrounded by high mountains with boulders and outcrops. Mahaveli River, the longest in Sri Lanka, flows around it. It was very difficult to penetrate

these natural defenses, and European armies perceived it was impossible until they bore a tunnel through one of the passes. Finally, the English succeeded after they built the Kadugannawa Pass and got through to the Kandyan Kingdom. The city of Kandy was planned with a street grid dissecting the outer city according to a set plan. With the Temple of the Tooth and the King's Palace at the apex of the setup, and natural forest as a verdant green backdrop, the city may have appeared almost divine. This was accentuated further by the white-washed masonry wall called the Cloud Wall which surrounds it, and the lake with the Ripple Wall. The beauty of the city is due to the last King of Lanka, Sri Wickrama Rajasingha. Though he is considered to be a cruel King, his contribution towards the city planning and architecture was very much commendable.

When considering timber as a building material, Kandy and Galle are forerunners. The most elaborate 17th and 18th century timber buildings were built during the Kandy Period. Almost all of the temples and Hindu shrines, plus the King's Palace and the Temple of the Tooth Relic carry elaborate timber framework and detailing. Later, the Dutch and the British also used timber extensively for buildings as it was cheap, readily available, and comfortable.



1. King's Palace 2. Kandy Perahera 3. Audience Hall
4. Radial rafters ("Kenimadala") 5. Tampita Vihara 6. Traditional column head

INTANGIBLE CULTURAL HERITAGE

Sri Lanka has a multicultural population that includes the Sinhalese majority, Tamils, Muslims and Burghers. Most of these maintain different rituals and customs for special occasions, but necessarily all of these activities are rooted in their respective religions and beliefs. These rituals have become a requisite part of all national and religious festivities.

In addition, our ancient living patterns and villages are interesting subjects for anthropological and ethnographic studies. Ancient living patterns in villages based on irrigated agriculture, in fishing villages, and in temple villages, etc. provide many interesting subjects.

As mentioned earlier, Buddhism not only influenced the art and architecture of the island, but also immensely contributed to the performing arts, social etiquette, customs and rituals. Many of these continue to be practiced, mainly at religious establishments like the Temple of the Tooth and Sri Maha Bodhi.

CENTRAL CULTURAL FUND AND CONSERVATION REVIVAL

The field of archaeology in Sri Lanka is over 100 years old now. The British government appointed various personnel to investigate and document the island's historic places and monuments. Persons like Emerson Tenant, H. C. P. Bell, and James G. Smither had visited far off places all over the island and documented them. The rediscovery of Sigiriya, the Maligawila Statues, and jungle-covered ancient cities like Anuradhapura and Polonnaruva was a result of their endeavors.

The Department of Archaeology of Sri Lanka was established in 1890, and it has become the prime legal custodian for over 300,000 monuments and sites scattered over the island. All the archaeological research on, and the conservation and management of, conserved sites comes under the purview of the Department.

To support its activities, several ordinances and acts have been established.

1. Antiquities Ordinance (introduced in 1940, final revision in 1998) – This has eight sections that deal with antiquities, excavation, monuments, reserves, exporting artifacts, archaeological commissioner's power and his duties etc. Two main categories of monuments under this act are:

   I. Archaeological reserves – Buildings or structures on a state lands that qualify under the criteria of the Antiquities Ordinance

   II. Protected monuments - Buildings, which are of archaeological importance, but located on private lands.

   In addition to these, buildings with exceptional architectural features, depicting values of a period, automatically comes under protection.

2. Central Cultural Fund Act (1980)

3. Galle Heritage Foundation Act (1992) - To form an umbrella organization to guide various development activities carried out at the Galle Fort.
4. Cultural Property Act (1998) – Deals with movable cultural property and illegal exportation of artifacts.

Until 1980 the department had to carry out the work with great difficulty. The major problem was a lack of necessary finances, labor and scientific field staff for large conservation work.

To amend the problems faced by the department, the Central Cultural Fund was established under Parliament Act No. 57 of 1980. The principal objective was to excavate, conserve, and conduct archaeological research while earning foreign exchange by promoting cultural tourism. As a government institution, the Department of Archaeology could not accept financial support directly from donors. This difficulty was removed with the CCF Act, which was drawn in such a way that it can accept financial, technical, or logistic support from international or national donors without the interference of the central government.

The CCF functions under a Board of Governors headed by the Prime Minister of Sri Lanka. The Board comprises the Ministers of Finance, Tourism and Culture, with several other appointed members. The Secretary to the Ministry of Cultural Affairs is the Chief Administrative Officer. The Director General is the head of the institution together with the directors of Development, Finance and Administration; several Assistant Directors help him in carrying out the work.

UNESCO - Sri Lanka Cultural Triangle Project earned worldwide acclaim during its implementation period. Headed by Dr. Roland Silva, the founder and Director General, the project launched in 1980 to excavate, conserve, and manage the heritage sites and monuments within the triangular area covered by Anuradhapura, Polonnaruva and Kandy, with Sigiriya at the center. This project was highly successful as it had been able to get financial and technical support of international donor agencies like UNESCO, ICCROM, Getty Foundation, ICOMOS, etc. It was the largest conservation project launched in the South Asian region.

The Cultural Triangle of Sri Lanka generated around 3,000 direct employment opportunities and the most successful story is that it has been able to revive the conservation field and train many young architects and archaeologists. Even today it provides opportunities to graduates in the fields of archaeology, heritage management, and architecture. In addition, the labor force of the CCF received rare opportunities to get involved in major conservation works like Abhayagiri, and the Jetavana Stupas, and they are now very competent to carry out work of any magnitude. Machinery and other equipment, vehicles and complete laboratory facilities were made a reality mainly because of the large amount of money generated through cultural tourism – a new phenomenon in the region. Unlike most projects, the

income generated through the sale of tourist tickets is piped back to the excavation, conservation, management, and presentation of sites. The Project concluded in 1998, and one person needs a special mention for its success – Dr . Roland Silva, who served admirably as the project leader.

There are ten major Projects at present; namely, Abhayagiriya, Jetavana, Maha Vihara projects at Anuradhapura World Heritage Site, Polonnaruva World Heritage Site, World Heritage Site of Sigiriya Rock and Water Gardens , Dambulla World Heritage Site, Kandy World Heritage Site, Ramba Vihara, Tissamaharama and World Heritage Site of Galle Fort. The approximate annual budget of the institution is Rs. 700 Million, which is earned through the sale of tourist tickets. There are nearly 2,500 employed in the labor force, and another 500 engaged in scientific and managerial work.

Central Cultural Fund is carrying out various infrastructure development projects with the assistance of Japanese institutions like JICA and JBIC (Japan Bank for International Cooperation) at the Sigiriya Project.

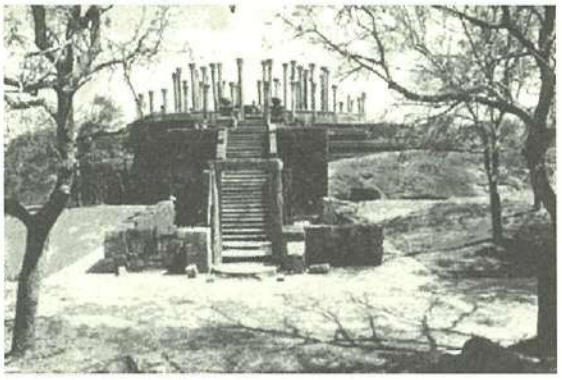
With JBIC aid, the CCF has proposed to develop machinery to transport materials up to the rock summit, conserve the Eastern slope of the Lion's Paw, and provide tourist facilities at Lion's Paw Terrace, make repairs to the northern section of the fresco gallery, construct a protective canopy to the Mirror Wall, etc.

Sigiriya is the most visited heritage site in Sri Lanka. Approximately 25,000 foreign and local visitors view the rock fortress daily during the season. A fully equipped modern information centre and a museum were a long felt need, for exhibiting artifacts and providing scientific information to research personnel the world over. Due to high costs involved, the CCF had not been able to launch this project and JICA has agreed to provide necessary assistance. Construction work commenced in September 2006, and is in progress. Up to July 2007, the completed work program cost around Rs. 48.5 million.

At present the Department of Archaeology and the Central Cultural Fund are the principal institutions involved in conservation of tangible cultural heritage in Sri Lanka. Other institutions, such as the Department of Museums, and the National Archives, mainly look after conserved artifacts and literary works.

The vast subject of intangible cultural heritage will not be considered here because it is not directly involved in the theme of wooden architectural heritage.

WOODEN ARCHITECTURAL HERITAGE OF SRI LANKA



Wood has been used as a building material in the island from ancient times, mainly to form the frame work for the roof. As a tropical island, the roof is the most essential part of any building.

There are many examples of buildings with timber-framed roofs even from the Anuradhapura period, such as Brazen Palace and Mahasen Pavilion. The concrete evidence for earliest use of timber as floor beams can be found in the Parakramabahu Palace at Polonnaruva (12^{th} century), where the beams were made square or eight sided. At Sigiriya as well, there are holes bored in rock face believed to have received timber beams of a stairway. The Polonnaruva Vatadage, or Circular Image House, which has a small stupa located within, had a circular wooden roof with radial rafters held at the pinnacle called *kenimadala*, or timber boss.

The use of timber as a major building material expanded when the kingdoms shifted to the wet zone. Also stone sculptors, who mainly came from India, became scarce as the Hindu and Dravidian power began to fade in the island. Another reason to use timber in buildings may be that it is not as time consuming to work as stone, and easier to handle.

When considering wooden buildings, the Kandyan Period (16^{th}–19^{th} centuries) is very important. There are lot of religious, public and residential buildings with simple structures, but displaying excellent carpentry work and wood carving. These include timber framed roofs, carved columns, heavy doors and windows and decorative timber panels. Even at the Inner Shrine of the Temple of the Tooth Relic, timber panels were used in the wattle and daub wall structure.

There was another very special type of wooden building, supported on heavy timber beams, called *tampita vihara*. These are image houses built atop a series of timber columns, which may be as high as above the eye level, or much lower as short stumps.

Other prominent buildings in Kandy with extensive timber use are the Audience Hall, King's Palace, Embekke Devale, the drumming halls of the main Devale around the sacred precinct, Malwatta and Asgiriya Monastery Complex buildings.

The Dutch had also been using timber on a large scale for their buildings. Religious and public buildings within Galle Fort are very good examples. The Dutch mainly used timber as roof members, doors and windows. The Dutch Warehouse, perhaps the longest standing building of over 100 years in Sri Lanka, is one fine example. Its giant roof beams, typical Dutch windows and sashes, heavy timber doors, simple timber handrails, and stairways exude 16th century Dutch architecture, and when one goes along its lofty corridors it inevitably takes us back in time.

TIMBER AS A BUILDING COMPONENT

Floor supporting beams - *tampita vihara* (temples on pillars)

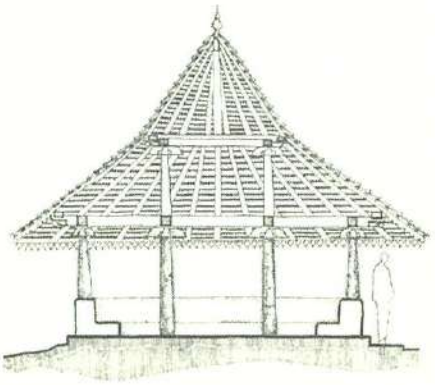
Minigamuwa tampita vihara during conservation

Another tampita vihara in Kandy

These small image houses were built on huge timber beams, which are supported on stone columns to avoid moisture and termites, a severe problem in the Kandyan region. Generally, six or eight stone columns of about 60 – 90 cm (2 – 3 ft) were positioned on the ground and timber beams nearly 60 cm (2 ft) in cross-section were placed on them. Upon those timber beams wattle and daub walls were built, normally with walls on the interior and a verandah running around the whole structure. The roof frame, also of elaborate timber members and covered with flat clay tiles, is characteristic of the region. Some examples are the image houses at Muwapitiya, Medawala, Dorabavila and Kongahagedara temples.

Roofs

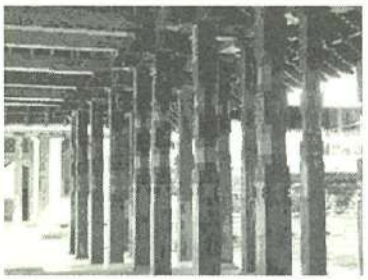
Most Kandyan period buildings have double pitched roofs. They are identified as Kandyan roof and used for important religious buildings. The most common type is the hip roof, but with an interesting radial rafter detail called *tal atta*. All the ends of the rafters were elaborately carved. In addition, a traditional balance board called *vadimbu lella* is essentially an elaborate timber panel.



Typical timber framework of Kandyan roof

Timber columns

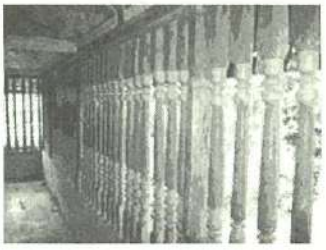
Embekke Devale (14th century) exhibits the finest wood carvings and craftsmanship in Sri Lanka. This shrine, dedicated to the God Kataragama, is located at the apex of a long avenue. The long drumming hall that extends substantially to the front has exquisitely carved timber columns positioned in two rows at each side. The four faces of each column carry different patterns or motifs, and none of them are repeated onn any of the 64 columns. Column heads are formed by the cross beams resting on them, and again these bear intricate designs of period motifs. Rafters of the extended eaves of the roof also carry intricate carvings.



Rows of columns in a temple building

The Audience Hall at Kandy is another building with rows of timber columns similar to Embekke Devale, but it is on a much larger scale. The king of Kandy used this building to receive state guests and to address his aides and subjects. There are two rows of columns with elaborately carved column heads depicting lotus flowers. The Audience Hall was burnt down in the early 19th century and the British rulers were sympathetic enough to restore it along the original design.

Stairs and handrails and as shielding



Lacquered timber railing and details of a stairway

All the stairways of the Kandyan Period and after that during the Dutch and the English occupation were made out of timber. At the Temple of the Tooth Relic there are number of elaborate timber handrails called *beeralu veta*. These are brightly colored in yellows, reds, blues, greens and black and white using traditional lacquer technique.

Timber panels or grillwork had been used as a mask/shield to cover personal areas in elite houses and royal palaces. During the Dutch period, timber trelliswork was used extensively to keep away harsh sunlight.

Bridges

The Bogoda Bridge

Two bridges need special mentioning. One was built in 16th century, during the Kandyan Period, and the other by the British.

The famous 16th century Bogoda Bridge built across Gallanda Oya, a watercourse that leads to a temple with 1st century *Brahmi* inscriptions at Badulla, is unique as the only bridge with a roof, and is believed to be the oldest surviving wooden bridge in the world. The large wooden beams span the two cliffs on either side, and there is only one support at mid span. Eleven pairs of carved pillars, and a railing of banisters, rest on the wooden beams. The approximate width of the bridge is 1.8 m (6 ft), while the length is 15 m (50ft). The roof is 2.4 m (8 ft) high.

The British also built a unique satinwood bridge at Peradeniya over the longest river, the Mahaveli, in the early 19th century, but it was later destroyed.

Painted timber panels

Most of these also occur in the Kandyan Period temples. Apart from few painted rock temples like Dambulla and Degaldoruwa, all others have painted timber panels. The ceiling and wall paneling of the Inner shrine at the Temple of the Tooth Relic is heavily painted with Buddhist "Jataka Stories," gods, symbols and flower patterns. During the bomb attack by the LTTE terrorists in 1998, some of these panels were destroyed. However, the Central Cultural Fund painting conservators were able to restore them to their original condition.

Other temples, like Gallengolla, Sellavalie Raja Maha Vihara, Diyakelinawala Vihara, and Natha Devala, which are all in and around Kandy, also have ancient painted panels, presently being restored by CCF painting conservators.

Doors and Windows

Even today, timber is the preferred material for doors and windows. However, before introducing glass for doors and windows, solid timber was used for sashes. Large wooden door and window frames of the Kandyan temples were carved, and some fitted with patterned ivory or bronze.

In contrast, the Dutch period doors and windows are heavy with simple battened patterns and large nails. During the British period, glass sashes were introduced for windows, but the heavy timber frames were retained.

Furniture

Timber furniture used by the Kandyan kings and the elite is exhibited at the King's Palace, and the regional National Museums and Colombo National Museum. These include old sofas (*kavitchchi*), palanquins, beds, tables etc.

Dutch period furniture is very elaborate and made out of valuable timbers like teak, mahogany, ebony and other imported varieties. These are still in use at old hotels, Dutch occupied public buildings, and private houses.

The Central Cultural Fund has been involved in the restoration of Dutch period furniture at the Dutch Reformed Church (presently Christian Reformed Church) in Galle in 2003 and 2004. The items were in a pathetic condition and stored in a backyard of the church. Now this unique collection of furniture is back in its former position.

PROBLEMS AND NEEDS FOR CULTURAL HERITAGE PROTECTION AND RESTORATION

We need to conserve and protect our cultural heritage, because it provides concrete evidence of the society, lifestyles, culture, technology, and attitudes of the people who created them. It forms various chapters of the country's history, and offers links to a bygone era.

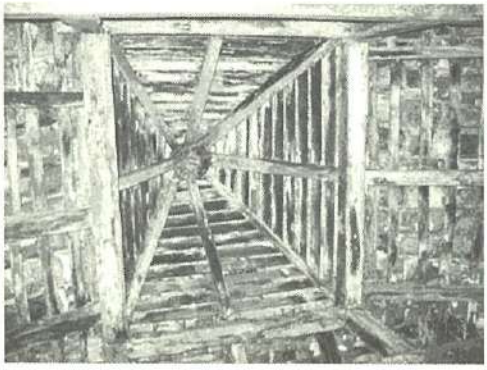
Protecting this diverse cultural heritage presents problems unique to each individual instance. Sri Lanka has a vast number of ancient sites, monuments and artifacts that belong to a period starting from the 3rd century BC. They range from architectural monuments, sites, artifacts, giant statues, irrigation systems, etc., made of a range of materials like bricks and mortar, stones, clay, wood, ceramics, beads, ivory, bronze, metal and many more.

The wooden heritage of Sri Lanka is also considerable. Most of it belongs to the 17th century or later. Ancient temples in Kandy and the suburbs, and isolated ones in adjacent districts, have ancient timber-work and detailing still intact. These structural and roof timbers are of very high quality and large sectional area, thus they have survived the test of time admirably. Mostly damaged are decorative panels and carvings.

There are large numbers of Dutch and British period buildings, both residential and public, scattered throughout Sri Lanka. There are some elaborate buildings carrying timber details in all coastal towns and nodes like Colombo, Kandy, Galle, Matara, and war-torn areas of Jaffna and Batticaloa. Unfortunately, all these ancient buildings were built along major roads and as a result, due to development activities like road widening, etc., most of them or at least their beautiful facades have been destroyed.

As a developing country, Sri Lanka faces various difficulties in protecting its rich cultural heritage. The most prominent of these are discussed below.

1. Natural causes of decay and micro-organisms



At present, most elaborate timbers are found in old buildings, which have leaking roofs. Water penetration aggravates the problem. Conversely, in the dry season all the water in the timbers rapidly evaporates, causing warp of the timber members. This sequence of alternating dry and wet seasons weakens the timbers.

The tropical climate of the South Asian region is quite harmful to the timber buildings. Timber members deteriorate fast due to dry rot or wet rot – a fungus, in these hot humid climates. Growth of fungi, algae and mosses are also the cause of considerable damage, especially during the wet season.

2. Insects and animals

Boring insects like the carpenter beetle (Hymenoptera sp.) and termites harm the timber by eating and weakening it. Termites in particular cause the most acute problems to timber buildings in the Asian region. Beetles eat mostly the rafters and roof beams of old buildings. Some insects like wasps and bees build their nests on ancient timbers. Although this is not directly a cause harm, it helps to collect moisture and other degenerating agents around the nest.

In addition, monkeys pose a threat to many buildings in the Kandy and Dambulla regions. They run and

jump on the roofs of these buildings, breaking ancient timbers and displacing roof tiles. During the wet season, these roofs begin to leak, further damaging the interior members.

3. Lack of skilled craftsmen and labor

Restoration and conservation of ancient timber work need specialized skills and sometimes, extensive labor. The essence of timber carving and detailing, which achieved its height during the Kandyan and colonial periods, has faded with the passage of time. At present, finding skilled persons to do restoration work, or even for new work, is difficult. Carpenters trained in the vocational or tertiary educational institutes sorely lack the necessary skills required for sensitive work like conservation. Most of these younger people use electric machinery, and they do not like time-consuming restoration work.

4. Difficulty in finding suitable timber

Ancient timbers used as structural members are very large and have massive cross sections, designed to carry heavy loads. When there is a need to replace such timbers, the task of finding matching materials is daunting. Restoration work in most Kandyan period buildings has come to a standstill because suppliers cannot find suitable timbers. This problem is further aggravated due to government restrictions on transporting timber in order to preserve forest areas.

5. High costs

Timber is among the costliest building material in Sri Lanka. Class 1 timber like mahogany, peony, pterocarpus, or teak, once the most popular timber species, has become too costly for use by the masses. Even for government buildings, imported varieties are being used. However, for conservation work, timbers that match the old ones must be used even if it is difficult to find the exact species. This is causing severe problems for the conservation work of timber buildings.

6. Modern trends and lack of appreciation

Sri Lanka became an independent country in 1948 after 400 years of European occupation. The post-independence era, spanning nearly two decades, saw a revival of attitudes in every sphere, including art and architecture. This period can be called Sri Lankan Renaissance, when patriotic ideas influenced even the building industry. With the advent of concrete and glass in buildings world over, this renaissance style had been able to mute its severity by using traditional motifs, moldings and decorative elements in concrete.

Giragama Walwwa, Kandy

Perished wooden beam

However, during the latter part of the 1970s, the open economy became the deciding factor for many trades. Architectural styles also could not escape this trend. Buildings needed to be built fast to cater to the demand. Increasing use of glass and concrete in featureless cubic buildings was the result.

Most people destroyed ancient buildings in order to build new ones with modern facilities. This was gravely evident during preparation of the Master Plan for the World Heritage City of Kandy. There were over 400 such buildings along major streets in the city, but before notification freezing

unauthorized changes was made, the number dwindled to half. Everyone wanted buildings equipped with modern amenities, which is understandable in the present day. But the problem is they did not perceive the value of their inheritance when they sought to dismantle the old façade. When they understand the mistake of destroying their heritage, and the history of the whole nation, it will be too late.

7. Management and aftercare difficulties

Most of the architectural monuments, sites and artifacts of the island are very old and need constant attention and restoration. Previously, the Department of Archaeology alone had to carry out restoration and conservation work for them. The Department lacked the necessary finances to conserve such a large number of monuments at one time. After the establishment of the Central Cultural Fund, that burden was cut down to some extent, but the activities of the Central Cultural Fund are limited to certain areas. There are many temples, public buildings, monuments and private residential buildings scattered all over the country, which could not be attend to by the Department or the CCF alone. Lack of plans to manage already conserved buildings, and care for those ones yet to be conserved, is another severe problem.

Most private dwellings having timber members and decorations, which face negligence and mismanagement on the part of their owners. Many buildings are left without any form of restoration or even cleaning. Most probably this may be due to the high cost involved, but it is pathetic to leave such elegant buildings to perish.

Lack of coordination between concerned government institutions, like the Departments of Archaeology, National Museums, Town Planning, Archives, Urban Development Authority, and the Central Cultural Fund, is also another problem.

8. Vandalism

After a bomb blast at the Temple of the Tooth

This is another major problem, especially in developing countries. People get pleasure from writing their names and addresses on valuable historic monuments, or on artifacts. Sometimes, acting on sudden impulses, they will break parts off, or as happened in Sigiriya in late 1960s, distort them. Some people want the parts as souvenirs. All these definitely harm the totality of the monument.

Due to present war situation of the country, valuable monuments are being destroyed. In the year 1998, LTTE terrorists blasted a powerful bomb in front of the Temple of the Tooth, resulting in serious damage to other buildings within the sacred precinct.

CONCLUSION

The cultural heritage of a country portrays its culture, achievements, society, and values. Therefore safeguarding the heritage should be of prime concern for the government. However, the involvement of the public, and their contribution, are deciding factors as well, because the government cannot conserve or restore such a large number of monuments.

One of the prime reasons for difficulty in restoring these invaluable monuments is the lack of public awareness and proper attitude towards them. The high costs involved in the restoration also contribute to the problem.

Proper management plans, and a system to monitor their changes over time, are needed for previously conserved sites. Although the island has a rich collection of historic sites and monuments, there is no proper database for them. Ownership of these varies from the government to private persons. It is essential that a database be prepared, and a scientific monitoring system be devised to suit our conditions. Regardless, it is essential to restore these beautiful historic edifices, as they are a part of our inheritance and we are their only guardians.

> "Bring out the nature of wood, for they by nature are both friendly and beautiful. No work of art could be a matter of fine art, if these truly natural characteristics are either ignored or neglected."
>
> - Frank Lloyd Wright

Thailand

Naruporn SAOWANIT
Architect
Department of Fine Arts, Ministry of Culture

Problems and Needs for Wooden Architectural Heritage Protection and Restoration Activities in Thailand

INTRODUCTION

Thailand is one of several nations in the Southeast Asia region known as Indo-China. The geographical landscape consists of mountain ranges interspersed with plains in the north, a large plateau in the northeast, a wide flood plain in the center and long mountain range along the peninsula in the south, with all areas having a tropical rain forest climatic condition. The borders connect with Myanmar in the north and west, Laos and Cambodia in the east, and Malaysia in the south.

Archeological evidence shows the union of people in many localities that developed as time progressed into large communities whose history can be dated back approximately 3,500 – 4,000 years ago. These ancient agricultural communities often depended on surrounding rivers and plains for their livelihood, cultivation, communication and natural fortifications.

A BRIEF HISTORY OF THAI ARCHITECTURE

The historical age began when Hindu and Buddhist religious culture from India became widespread in Southeast Asia. These religions founded a cultural network which linked many communities in this region and became dominant. The history of Thailand, as recording the locations of various chief towns, can be divided into two parts, the age of old city-state kingdoms before the 14th century, and the age of kingdoms after the 14th century.

Before the 14th century

Through overseas commerce, groups of port towns and riverine states located near the seashore, and along many great rivers and their tributaries, received religious culture perhaps from Indian merchants and adventurers prior to the arrival of priests or monks. The transfer of holy language in religious scriptures began approximately in the 7th century at the latest, although it circulated only within religious circles. But the artistic and the architectural knowledge was learned from works of art and through practice. Buddhism and Hinduism had different ways of dissemination. However, there was

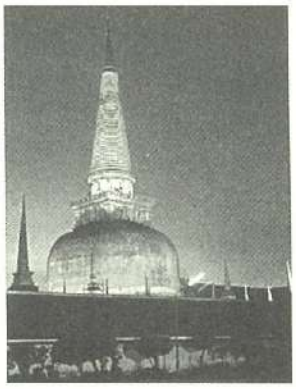
the blending of both artistic cultures, and the border between them was not conspicuous.

Dwarawati arts (7^{th} – 11^{st} centuries). The port towns from the central region to the eastern side of the southern region of Thailand received Hinayana, or Theravada Buddhism, a tradition which believes in an original doctrine from the Buddha. The Buddha images and Buddhist architecture that were favored as symbols of the new faith were created wherever it spread. Influenced by the same culture, the Dwarawati kingdom was a group of city states. The chief towns of the kingdom were located both in the central and the southern region.

Its capital in the central region was Nakarachaisri, or Nakaraprathom in the present, a town on the basin of Thajeen River, the tributary from Chaowpraya River, and it covered ancient states such as U-Thong and Khoobua. Besides that, Dwarawadi culture was also related to Srithep, the state in possession of Khmer Kingdom, and Jaiya, the capital of city states in the southern region which was known as Srivichai kingdom. Extant ancient remains of the Srivichaiya era include the decayed ruins of ditches, walls, and foundations of stupas which were found under hillocks. Most of the ruins were built with clay bricks and thin mortar, using special techniques.

Characteristics of Dwarawadi architecture can be seen in the antique base-relief sculptures and ruined foundations that show round-shaped stupas topped with spires on a high pedestal. Another style is the stupa which has Buddhist images in niches on the walls of stepped terraces with a square-shaped plan.

Srivichaiya arts (8^{th} – 13^{rd} centuries). The port towns stretching from the lower southern peninsula along to Sumatra and Java received the Mahayana sect, another school of thought from Buddhism which believes in the Bodhisattva, or future Buddha. Srivichaiya arts and architecture in Thailand are closely related to Dwarawadi arts and the arts of Middle Java in Indonesia, which were inspired from Late-Kuptha and Pala arts from India.



Srivichaiya towns in Thailand were located in the area from Surattanee to Songkla in present, especially in Jaiya. The most well known ancient architecture of Srivichaiya is the great Stupa of Jaiya. Even though some architectural elements were changed in Ratakosin Period, this ancient monument still shows the architectural characteristics of Srivichaiya, three stepped terraces or stories on a square plan with one porch in every side of each storey, and a spire on top of the narrow-necked bell-shaped storey.

Khmer influence or Lopburee arts (7th -14th centuries). Hindu culture became established in the coastal center, located in the region of Mekong river delta, known as Funan Kingdom, which became the Khmer kingdom in the following era. However, Buddhism was also received respectfully, and alternated with Hinduism in some reigns. Khmer culture spread into the northeastern and eastern regions of Thailand from the 7th century, contemporaneous with Tawaravadi in central and southern Thailand. Afterward, it spread to the central region across the Chaopraya River, and to the western region in the 11st century, then deteriorated in the 13rd century after the death of King Jayavarman VII, the last great king of the Khmer Kingdom.

The center of Khmer influence in Thailand was in Lopburee or Lawoh or Lawapura, which had connections with other areas similarly influenced, such as Srithep, Meung-Singha, Pimaya, and also Harikunchai, the ancient city in the northern region before the rising of Lanna Kingdom.

Post 14th century

By the end of the 14th century, even more accurate records were made of the locations and names of the northern kingdoms: Sukhothai, Lanna, and Ayutthaya. All three kingdoms prospered rapidly due to their strong cultural bases, as well as through political, economic, and religious interaction.

Sukhothai period. Historically, Sukhothai began under the influence of the Khmer, both politically and culturally, possibly through important towns and cities. Consequently, during the early periods Sukhothai architectures exhibited strong Khmer influences. As that influence weakened, cultural relations with Lanna and ancient Burma emerged to take the place of the Khmer.

Sukhothai was ruled by single dynasty, under a liberal monarchy. The political system primarily aimed to foster well-being for the people, with Buddhism as the core. From the mid 15th century, however, there were clashes with the invading Ayutthaya Kingdom. Eventually, the Sukhothai kingdom collapsed and was incorporated as a part of the Ayutthaya kingdom in the late 15th century.

Sukhothai architecture. Buddhism prospered in the Sukhothai kingdom, which accounts for the large number of Theravada temples that were built after the moderation of Khmer influences. Within the precincts of these temples, the construction of stupas as the main religious object was prevalent, with large a vihara located in front, mainly to accommodate religious activities. In the beginning, most of the stupas were brick or laterite, following traditional Khmer crafts. Later, it became popular to construct bell-shaped stupas in the Lanka style, which was introduced along with the spread of Buddhism from Nakorn-Pan of ancient Burma and Nakorn Srithammarat towards the south. Another popular style was the lotus-shaped stupa, which is still considered the trait of Sukhothai architectural creativity.

As for roofed structures such as temple halls, the only remains are those of foundations and laterite columns. However, it was clear that most were open-hall structures with wooden frame roofs and earthenware tiling.

Lanna period. Lanna civilization originated from the centralization of power by the kings in the Ping river delta, the main river in the north of Thailand. In the late 13th century, after the relocation of the capital from Chiang Saen to Hari Kun Chai, and then to Wieng Kum Kam, King Mung Rai decreed the construction of a new capital on the plain between the river Ping and Suthep mountain. The move was aided by the kings of Sukhothai and Pa Yao kingdom, both of whom were close allies during the time. The new capital was named Chiang Mai. Due to the cultural relation, the city plan of Chiang Mai is characterized by square shapes similar to Sukhothai, which derive from ancient Khmer culture. Furthermore, Lanna kingdom also had relations, both through its culture and through the bloodline, with ancient Lan Chang in Laos.

During the 15th century, Lanna was most fortunate both culturally and politically. After the Sukhothai weakened, the Lanna king began a campaign to conquer Sri-Satchanalai, the twin town of Sukhothai. This led to a confrontation with the Ayutthaya kingdom, a predominant power in the area. Regardless, in the mid 16th century, Chiang Mai was conquered by the ancient Burmese kingdom. With help from Ayutthaya and Ratanakhosin in later years, the Lanna kingdom retained independence for a period of time, before being incorporated into Siam during the Ratanakhosin era.

Lanna architecture. Lanna arts, sometimes referred to as Chiang Saen arts from respect to the old kingdom in ancient times, were related to many other art sects. In the beginning there were ties with Hari Kun Chai art, which had been partially influenced by the Khmer. It later developed quickly on its own, with inspiration from Pagan, Lan Chang, as well as Sukhothai art; all of these style have Buddhism as their principal religion.

Important examples of architecture, apart from palaces, mostly consist of Buddhist temples or religious structures. Roofed structures, such as temple halls, were primarily constructed with wood, considered a commonplace building material due to its availability, but which made for continual renovation, alteration, and reconstruction. As such, architectural examples with a persistent style and format, and showing litte change are often the various style of stupas – the bell-shaped form that was inherited from Lanka through Pagan, the Prasat-Yord stupas that are characteristically Lanna, and stupas that have influences from Burmese art.

Ayutthaya period. The region of the central basin, previously the source of Twarawadee civilization, had received Khmer influence ever since the 11th century. Around the late 14th century, King U-Thong decreed the construction of a new capital – Krung Sri Ayutthaya – where the rivers Chao Praya and Pa

Sak join together. The governmental system was based on the Hinduism of Khmer civilization, where the regime of a Divine King was established to create political power, and Buddhism, which places the king as a Bodhisattva who watches over the well-being of the people.

Political and cultural relations with neighboring kingdoms, along with trade relations with western and eastern nations, had created a prosperous culture, economic wealth, and a strong political presence in the central river basin. This allowed the kingdom to extend its territory north to incorporate Sukhothai into its domain, east to the weakening Khmer empire, and to the land on the southern peninsula.

However, political relations with Lanna led to a conflict with the ancient Burmese empire. Consequently, Ayutthaya fell in the fire of war in the 18th century; this effectively ended Ayutthaya's history which stretched over 400 years, 5 dynasties, and 33 kings.

Ayutthaya architecture. Ayutthaya art was influenced by both Buddhism and Hinduism; consequently, architecture under the patronage of the king or the religion received continual maintenance. The artistic style of the age can be categorized into three periods, early Ayutthaya, mid Ayutthaya, and late Ayutthaya.

Early Ayutthaya art was heavily influenced by Hinduism, portraying the king as divine, which resulted in most architectures resembling Khmer architecture. This was especially true for Prang-shaped stupas. Regardless, the particular style was devised for Buddhist stupas to enshrine religious relics in homage of the Buddha.

Mid Ayutthaya art flourished when the kingdom was stable and religious activities were greatly encouraged. Religious contacts with Lanka led its influence on art, especially architectural styles such as bell-shaped stupas, which was continually developed towards the late period. In addition, popularity also grew for construction of spire roof architecture known as *mon dop* for enshrinement of significant Buddhism objects.

Late Ayutthaya art was a period of Khmer architectural revival, owing to the change of the ruling dynasty to one that ascended from bourgeois or commoner class. Yet there were distinct developments deviating from the traditional style, and additionally, western construction technology was also incorporated. Buddhist architecture also developed further at the same time.

Despite the fall of Ayutthaya, this culture has been inherited by successive periods, up to Rattanakosin. The ancient city of Ayutthaya, as well as Sukhothai, has been declared world cultural heritage.

Rattanakosin period. After the short reign in Thonburee era of King Taksin, who assembled scattered clans from the fall of Ayutthaya Kingdom into the unity, King Rama I established a new city on the east side of Chao Praya River, known as Ratanakosin or Bangkok, opposite old Thonburee town. The Chakri dynasty has since ruled continually, until the current (ninth) reign.

The traditional and cultural patterns of Ayutthaya were the model at hand for the early Rattanakosin. But from the mid 19th century onwards, Siamese architecture became increasingly dynamic, colorful and eclectic. Religious architecture became more complex in structure and decoration. Moreover, Chinese stylistic influence resurged during the reign of King Rama III, because of extensive trade and diplomacy. King Rama III was an especially prolific builder and renovator, and most of the royal Buddhist monasteries and the Grand Palace show his influence.

Late in the reign of Rama III, through the arrival of western priests and missionaries who were not successful in spreading Christianity, knowledge about the modern world changed many old perceptions. From the reign of King Mongkut (Rama IV), Siam began to fully open itself to western culture. Particularly, in the reign of King Chulalongkorn (Rama V), western arts and architecture gained influence among the nobility, while the knowledge of royal craftsmen, which were supported by the king continually, was learned in restrict circles. From this reign, however, architecture was often built in both the Western and a hybrid style. The intent was political, to convey to the Western powers then colonizing Asia that Siam stood as an equal. Given Siam's unique success in preserving its sovereignty, this architecture has a special historical significance, as well as an enduring aesthetic appeal.

During the reign of King Vajiravuth (Rama VI) the Fine Arts Department was founded in order to protect the entire Thai cultural heritage. And in the reign of King Prajathipok (Rama VII), the first national museum was founded.

THE SIGNIFICANCE AND CATEGORIZATION OF TRADITIONAL THAI ARCHITECTURE

Traditional Thai culture emphasizes, in the order of precedence, the categorization of architecture into three levels:

1. Architecture for the King
2. Architecture for religions
3. Architectures for ordinary people

Architecture for the King

Architecture for religions

Architecture for ordinary people

This order of precedence is indicated in architecture both physically and symbolically. The physical aspect includes the size, materials, and other building elements. The symbolic aspect includes decorative patterns and architectural elements.

Architecture for ordinary people is simple and not complex, such as the house or pavilion, for both bamboo buildings for ordinary people and timber buildings for the rich. Decorative patterns and elaborate architectural elements are reserved for the architecture of the King (and the royal family) and that of religions. Even between the architecture for the King, and that for each member of the royal family having a different rank, there are differences in details of the elements: the foundations, walls, and especially the roofs, the latter being the most conspicuous element.

EXAMPLES OF TRADITIONAL THAI ARCHITECTURE

Memorial architecture, like stupas, having no interior space will not be included in this examination, which will focus on differences in roofs over functional interior space, as in the following types of structures.

- timber house or *ruen krueng sub*
- monk's house or *kuti*
- ordination hall and assembly hall or *ubosatha* and vihara
- library or *hor trai*
- sermon halls, preaching hall or *kan parean*
- spire roof buildings (*mandapa* and *prasata*)

Ruen krueng sub

Kuti

Ubosatha

Hor trai

Kan parean

Prasata

WOOD AND TRADITIONAL THAI ARCHITECTURE

Wood has been an important material in traditional Thai architecture. It could be used for every element, such as structural elements, walling and shelter elements, decorative elements, from the foundation to the roof. This is to say that most traditional Thai architecture has wood among its components. Sometimes, it was used for the whole building, and sometimes only in some parts. How much wood is used in architecture depends on the character of the building. The small and simpler structures, for example the timber house for ordinary people or the monk's house, were constructed with wood for the entire building. In some houses in the northern region, even the roof tiles are made of wood.

But for important buildings which require durability, majesty, and splendor, such as the architecture in the palace, or the *ubosoth* and vihara in the Buddhist monastery, most them have load-bearing walls as the main vertical structure. Wood may be used in parts of horizontal structures like beams and lintels, and also used in the roof structure in the same manner as ordinary houses, but the structure will be larger and more complicated. Moreover, because of the importance of each building, wood will also used to decorate many architectural elements, especially for roof elements which show many meanings of the building, for example, the roof finial or *ruay raka*, the pediment or *nah bun*, and the eave bracket or *khan tuay*.

PROBLEMS IN CONSERVATION FOR ARCHITECTURAL HERITAGE IN THAILAND

In the realm of architectural conservation in Thailand, there are many problems and needs that may be same as in other nations of the Southeast Asian region. And for every type of architectural heritage, even within Thailand, there are both ordinary problems, and some problems which are necessary and specific in the writer's opinion.

Ordinary problems

Natural decay. Every construction material has its naturally allotted age. Decay happens because of the natural effects of heat, sunlight, moisture, salt, ground subsidence, or plants.

Social. The surrounding community is a necessary factor in conservation for cultural heritage. Some local people perform the roles of conservation and vigilance more effectively than the government. These roles are not limited just to architectural conservation, but also for intangible heritage like local knowledge and traditions.

However, performance of these roles does not happened in every locality. Globalization and new lifestyles take people away from local responsibility.

Owner and overseer. Some architectural heritage is in private ownership. In Thailand, although ancient architecture is the responsibility of the Ministry of Culture, Buddhist monasteries are juristic persons. Sometimes such monuments are not maintained by the owner or the overseer. Many times the abbots want to renovate old monuments along lines that do not follow conservation methods, and sometimes they want to demolish old monuments in the area to build new one structures. These are the source of many disputes between the Department of Fine Arts and the monasteries or owners.

Law. Architectural heritage does not received enough protection from the law. The punishment and protective policies are not appropriate for the present social situation. Although monuments and their boundaries are protected and controlled by the Monument Law, the areas around them are not. Moreover, the environmental law does not discuss the cultural environment, thus there is considerable visual pollution around the monuments.

Budget. The budget for conservation is never sufficient. It is dependent on the governmental policy, and may be overlooked for other important problems. This problem is one reason for the low efficiency of conservation.

Specific problems of intangible heritage

Insufficient knowledge regarding design and conservation. In Thailand, the emphasis in architectural conservation work is on the physical aspect. The word "heritage" is often understood as meaning something tangible. But things, particularly architecture, are the products of processes, which means knowledge.

The design of traditional Thai architecture is based on individual ability, such as perceptions of proportion, line, and form, which differ from the architecture of other regions. Conservation work which discusses only repair and restoration, in order to maintain the original condition, can conserve only materials. The sustainable way is to conserve the knowledge necessary for design. At the very

least, if the conservator understands the process of design in traditional Thai architecture, conservation will being more efficient.

On the other hand, architecture which is newly built must become the old architecture of the future. In designing this architecture, the architect who has insufficient knowledge of conservation will be unable to produce architecture which can be easily maintained and restored.

Skills and knowledge as intangible heritage. In the past, Thai traditional fine arts was divided into two parts, the royal school which was supported by the king, and the folk school of the ordinary people's work. The royal school was developed systematically. It was sorted into many areas according to the practice, such as gold craft, wood craft, metalwork and glasswork. That became the section of royal artists called *chang sippa mooh*.

Even though the folk school of ordinary people was not supported by the king, it could produced works of arts and developed its practices continually, although unsystematically. The folk craftsmen saw the royal works as models, learned from them, and adapted them into folkways accordingly to local tastes.

Because of modern development from the time of Rama V, the knowledge of traditional fine arts, and especially architecture, have weakened gradually. While the royal school continued its knowledge in restricted fashion, the folk school has developed with a lack of good models. At present, the modern educational method divides traditional knowledge into two kinds, institutional and folk. Institutional does not mean the royal school, and knowledge about traditional Thai architecture is not widespread. This knowledge is not favored in the architectural realm which depends on the modern world, and is taken up only in some short courses for fine arts and architectural programs in institutes such as universities, and not according to uniform criteria. In many projects of conservation and restoration, even though the analytical and design process was perfect, the constructional process failed, because of the lack of traditional skills among workers such architects and craftsmen.

However, better movements for the conservation of traditional knowledge have emerged. Among the more than 50 universities in Thailand, there are two universities that have the major in Thai Architecture, which teach the traditional Thai architectural knowledge in the Faculty of Architecture. The section of the royal artists called *chang sippa mooh* in the Department of Fine Arts has been supported continually. Folk craftsmen in many local areas are admitted as important artists, and knowledge from folkways is coming back at the institute. This is the good sign that these knowledge and skills as intangible heritage have hope for conservation and development in the near future.

The conservation of architectural heritage in Thailand is at a vital turning point. This duty does not fall only on the government or the archeologist's hands, but is the responsibility of all Thai people.

Vietnam

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SOME THOUGHTS ON THE CONSOLIDATION AND PRESERVATION OF WOODEN STRUCTURES IN HUE

Most historic buildings in Hue are wooden structures, and are more than 100 years old. With the high humidity and heavy rain in Hue, these wooden structures are very susceptible to damage. The conservator the has responsibility to preserve and restore them. In wooden buildings in Hue, damage usually appears in certain main parts: the bottoms of columns, the centers of columns, the points of contact between columns and the rafters, beams and other surfaces, etc. These are the parts which usually rot and lose their strength, and need to be cut out and consolidated by grafting in stronger wooden parts, or filling in with composite. The new parts for consolidation are better when they have the same physical properties of the old part. We can use resin, or/and tree lacquer to make the composite for filling, and to provide support for consolidation and preservation. Although techniques for conservation in Hue are more developed now than before, some problems still remain. In this report I want to focus on three matters, on their problems and needs, in general fashion.

- Reasons for damage to wooden structures.
- Survey of conditions of wooden structures.
- Methods of preservation and consolidation for wooden structures.

I. Reasons for damage to wooden structures

In my opinion, the conservator must understand the reasons for damage to the building, to find a suitable treatment for conservation. The application of some treatment for conservation without understanding of the reason for the damage may not be effective and an unwise use of funds.

Hue wooden buildings are usually made with *Lim xanh* and *Kien kien*, two kinds of wood popular in Vietnam. They are very strong, hard, and damage resistant species. Termites and other kinds of insect cannot directly attack them, although the actual damage is usually done by termite. The process of damage from termites happens over a long period time in many steps. The first step is damage from the weather, especially the high humidity in Hue; the next step is the growth of fungi and moss in the structure. The last is the attack by insects.

The termites usually make their nest in the center of the wood, and slowly eat the inside of the wood, so the structure loses its physical strength. There are more than 10 kinds of termites in the Hue

monuments; the most common kind, *Coptotermes formosanus*, usually lives inside the building, under the foundation and internal parts of wooden structure.

Table 1 below lists the kinds of termites found in Hue monuments in 1995, and Table 2 shows some of the physical properties of the wood used in the monuments.

Table 1: List of kinds of termite found in Hue Monument in 1995

N°	Name of Termite	Place											
		Imperial City	Gia Long Tomb	Minh Mang Tomb	Thieu Tri Tomb	Tu Duc Tomb	Duc Duc Tomb	Dong Khanh Tomb	Khai Dinh Tomb	Long An Temple	Hon Chen Temple	Nam Giao	Thien Mu Pagoda
1	*Coptotermes Formosanus*	*	*		*	*	*			*	*	*	
2	*Coptotermes travianus*					*							*
3	*Coptotermes curvignathus*	*	*	*	*	*					*		*
4	*Criptotermes domesticus*	*					*						*
5	*Globitermes sulfureus*	*	*	*	*	*	*	*		*	*		*
6	*Macrotermes annandalei*	*		*		*							
7	*MicroTermes dimorphlus*	*	*	*	*	*						*	
8	*Nasutitermes bulbicens*		*		*	*		*	*			*	*
9	*Nasutitermes pavonasutus*	*	*	*	*								
10	*Odontotermes hainanesis*	*			*	*		*	*				*
11	*Odontotermes formosanus*	*			*	*		*	*			*	*

Table 2: The Physical properties of *Lim xanh* and *Kien kien*

N°	Name	Scientist name	Density (g/cm^3)	Stress (kg/cm^2)		
				Tension cross grain	Compression longitudinal grain	Static bending cross grain
1	*Lim xanh*	*Erythrophloeum fordii Oliv*	0,947	29	608	1546
2	*Kien kien*	*Hopea pierrei Hance*	0,878	27	727	1961

The main problem is first to determine the main reason for damage the wooden building. Understanding clearly this matter, the conservator can chose a suitable way to protect the building. The *Lim xanh* and *Kien kien* have name "iron wood" in English, meaning very hard. With high humidity and water from the ground, from floods, and from the roof, some wooden structures become wet, and then the moss and fungi develop, making some parts of structure softer, and finally the termite attack. Termites are the visible and most direct reason, but not the primary reason. In my opinion, the main reason for damage to the wooden structure is the attack by humidity. Accordingly,

care for the building, and anti-water, anti-fungi, and anti-moss measures, are very important for protecting the building.

With regard to the care of the building, pagodas and common houses sometimes last longer than the buildings in the Hue monuments, because they are carefully looked after. This shows that taking care of the building is most important for the building's safety, but it is also difficult work. This work needs to be done daily and carefully, so that we need more security staff who understand the importance of caring for wooden buildings.

With regard to anti-water measures, keeping buildings in Hue dry is difficult because the humidity is very high during the rainy season. We cannot use air conditioning to keep the buildings dry. Air conditioning is effectively only if the building is closed, however, the buildings are open and become wetter when visitors come in. The condition of the wooden structure may change from wet to dry, and back from dry to wet, many times in a day, which is very dangerous for the wood. Using traditional lacquer coating for wooden structures is the best technique for this problem. But if the original building did not use lacquer, this method of preservation is difficult to carry out.

With regard to anti-fungi and anti-moss measures, in the high humidity, the moss and fungi grow very easily, and while some methods using chemicals to protect the wooden structure are effective for a short time, the chemicals are only on the surface of the structure, and are easy washed away by water of floods or rain. The method impregnating the wooden structure with bo solid is effective for anti-moss, anti-fungi, and preventing insects, however, this method makes the wooden structure lose strength. We have thought about the pressure soaking treatment, but this method is only feasible for new wood.

In addition, some of the structure on the outside of building, such as the door, and parts of the house columns, are usually attached by heat and UV from the sunlight. The best treatment is to cover the surface of building. We have thought of using some chemical that can resist UV, mixing it with traditional lacquer to protect the outside surface of building, but this way is too difficult.

II. Survey of conditions of wooden structures

Damage to the surfaces of wooden structures is so difficult for the conservator to understand and check for the condition. But damage inside the wooden structure is very difficult because we cannot see the damage. Previously, we used drill equipment made in England named DDD 200 to check the inside of the structure. Initially it was very effective for checking a structure with a drill bit of about 0.2 mm. This size of drill bit did not damage the wooden structure badly, but it was not easy to drill to because of the hard property of the *Lim xanh* and *Kien kien*. After the equipment got old, it was could only be used for the softer woods such as *Mit* (the name of the wood used for common traditional house).

At present, we try to check the condition of the wooden structure based on the experience of the carpenter, knowledge of the conservation of the structure and the properties of the wood. This job

is very difficult, and we must to be careful to avoid mistakes. I hope with the development of the industry we will have some suitable equipment for this job in the future, such as ultrasonic equipment.

The second matter regarding survey is the original coating of the structure. Usually, if the original coating is red lacquer, we can easily detect it, and be certain if it is traditional lacquer or industrial lacquer. If the coating is black or brown-black, it is difficult to know with certainty whether it is lacquer or another material used to protect the building. Checking the material in the laboratory is also difficult, and so we cannot easily know the original material of the surface of wooden structures.

The survey process is usually the first step in restoration. This work gives the basis for decisions, so if the survey is not done correctly, we will likely make mistakes. If the survey is accompanied by research, this will help the conservator better understand the technique, the material, and the damage to the building. Because of this, before restoration we need to have enough time to survey and conduct research with experts. The experience of the expert is also very important for the survey, in my opinion, so that only knowledge based on research is not enough to do the survey perfectly.

III. Methods of preservation and consolidation for wooden structures

In this part of the report, I will introduce some methods for restoration used in Hue. Through these introductions, I will try to explain my own thinking.

1. Filling. Many wooden structures Hue show damage to the surface, such as cracking and rot, as a result of long exposure to causes such as storms, floods, etc. With continued exposure under these conditions, the damage will become more extensive, and become a serious matter. Some opinions accept ways to treat the surface, and some opinions find them unacceptable. I think that we need to be more flexible in order to solve this matter.

The next problem is what material to use for the filling. The traditional method for filling is to use a composite of natural lacquer mixed with wood powder. Many old buildings show that this method is very effective, however, the traditional method requires time, money, and good skill. Because of that, some people choose another method: using epoxy resin for the filling. Both methods are used in Hue, each has its advantages and weaknesses. Epoxy resin is easier to use than traditional lacquer, dries faster, but is too strong and has some physical properties that is not similar to the old wood. About 10 years after restoration, cracks may appear in some parts of the filling epoxy, and the joining becomes weak.

Accordingly we need to research both methods to look for the most sensible way of settling this problem. Currently, our condition is very difficult, but we hope that in the future we will have enough research equipment to solve this matter. And we need time to check the quality of these methods in restored building.

2. Coating. Coating the building with traditional lacquer was not only for decoration but also for preservation. Traditional lacquer was extracted from the lacquer tree; it has ability to resist water, moss and fungi. The scientific name of the lacquer tree found in Vietnam is *Rhus succedanea*; it can supply the sap after three to seven years of growth.

Coating with lacquer is a traditional job. The quality of the lacquer depends on the experience and skill of the expert and the worker. Each group has special skill, and always believes that their skill is best. Because of this, each building has its own quality of lacquer. In scientific thinking, we need to research carefully the traditional lacquer process to collect their experience, and chose the best way to do the lacquer process for the restoration.

I give an example of two ways of doing traditional lacquer, from two separate groups. One group is from Ha Tay (in the northern part of Vietnam) and one group is from Hue. Despite some differences in their lacquer preparing, both groups use traditional methods, and make the same quality of lacquer.

The first group uses calcium carbonate for mixing with raw lacquer for the background lacquer; other group uses clay for mixing. Both methods are traditional, although maybe the method using clay is older. Both make the same quality lacquer.

In preparing the preservation lacquer, the first group use Trau oil (Vernicia montana Lour) mixed with raw lacquer in 20% of the mass. Other uses only 10% Trau oil, and continues to mix in 10% colophony. Both make the same quality lacquer.

When made, the lacquers of two methods have the same quality, but after a long time later, which is better? And which is method the conservator should choose? It is difficult to answer.

3. Joining. The method for joining to repair wooden structures in Hue is the traditional method followed by the carpenter. It is well appreciated, however, it still has some troubles. The trouble comes from differences between the old part and the joining part in their physical properties.

The steps and the pictures below show the method for joining in Hue, and I want to use them to point out some troubles.

Steps 1 and 2 of are to identify the damaged parts, and the extent which needs to be cut out. It must be cut out in the joining method, although some opinions do not favor this, and want to use synthetic material for consolidation.

Step 3 includes keeping the new part drying at 12% humidity. This will make the wood very dry, and over time the new part size will continuously change in size, become smaller.

Step 1, 2, 3 for joining columns are similar to those for joining rafters.

The best way to choose the new part for joining is to use old wood, but the wood must be the same age, and the same kind of wood. Accordingly, now it is difficult for to find old wood for parts, as old structures that can be used for joining are not plentiful, and the *Lim xanh* has become rare in Vietnam.

Pictures 1 and 2 illustrate the method of joining, the old part is the *Lim xanh* wood, but the new part is *Kien kien*. (The old part is brown-black; the new part is light yellow).This will result in problems after some period of time, due to shrinkage of the new wood.

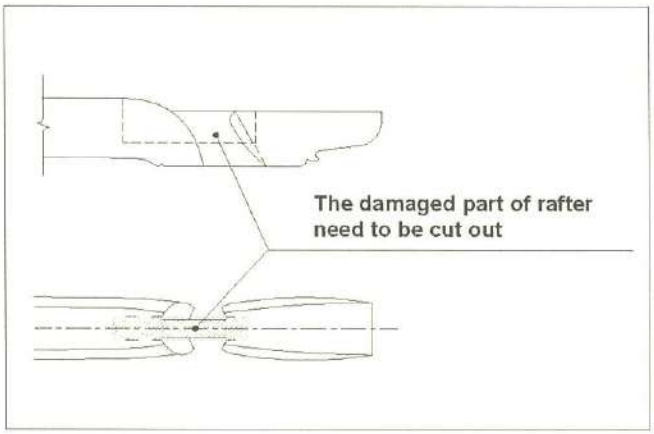
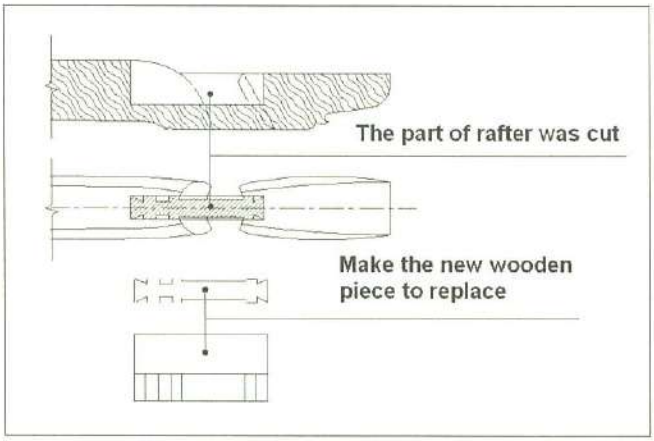
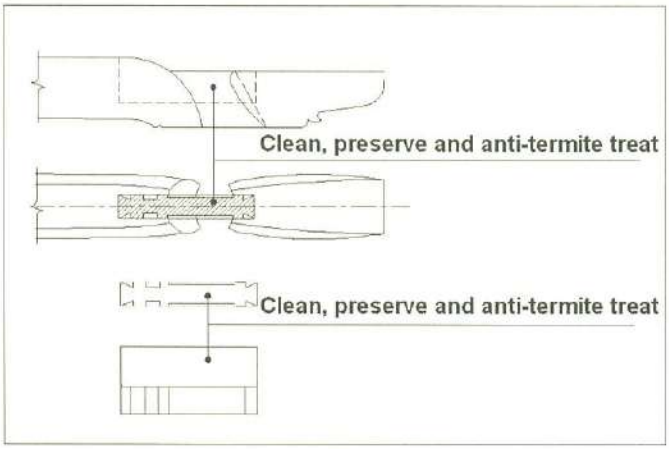
In rafters, when the new parts become smaller by shrinking, the quality of the connection suffers. The shape of structure then deforms, and the roof may be broken, and the building comes in danger of damage from rainwater.

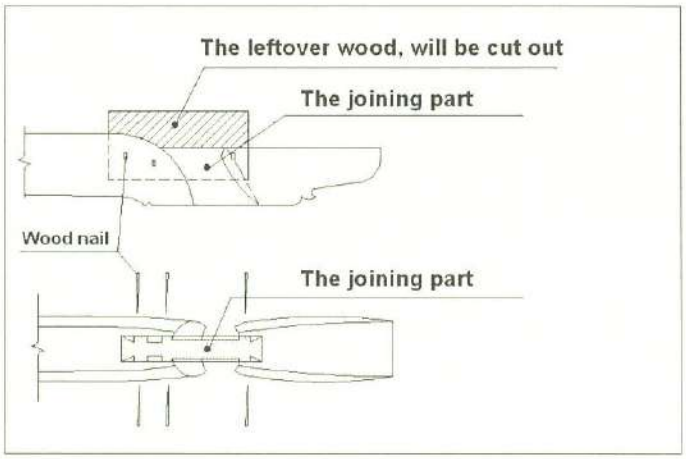
In the column, if the structure has not been coated with lacquer, we usually keep the size of new part about 1 mm bigger than the old. However, if the building has been lacquered, the new part will be cut to the same size to do the lacquer work. A long time later, when the size of the new shrinks, the lacquer will crack.

In summary, I want to state that the job of the conservator is always difficult. We must to learn more, research more, and mix scientific knowledge with the experience of experts to protect heritage better.

Some problems I take up in this report cannot be solved immediately, but will require a long time of doing conservation work. Some problems can be solved with equipment, some with money, but some problems are only solved by the responsibility and the thinking of the conservator.

1. Joining a rafter: 5 steps

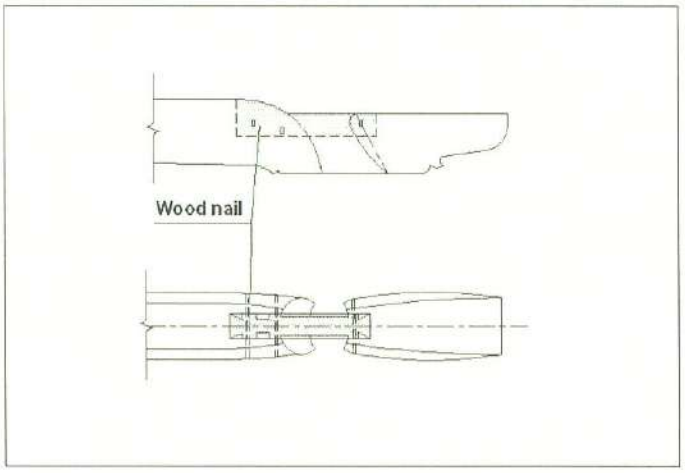
 **Step 1**	**Step 1:** - Evaluate situation of wooden structure; identify the damaged part need to be cut out.
 **Step 2**	**Step 2:** - Cut out the damaged part - Make a new wooden part for consolidation - Make the wooden nail for joining
 **Step 3**	**Step 3:** - Clean the old wooden parts - Preserve old wooden structures and new replaced structures by whether anti-termite compound or tree lacquer. - Keep new structures in dry condition (12% RH)



Step 4

Step 4:

- Joining new and old parts
- Use wooden nail for joining
- Use resin or tree lacquer for consolidation

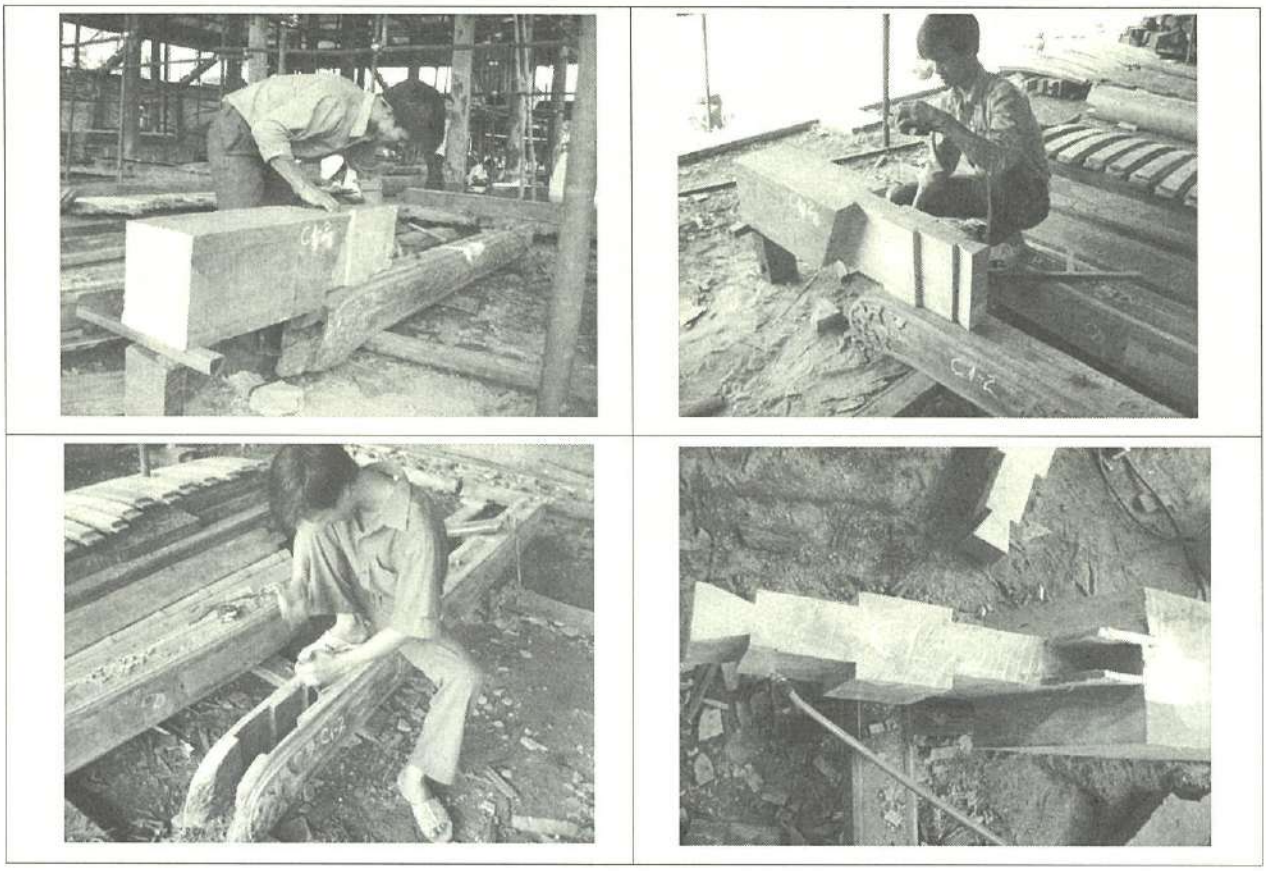


Step 5

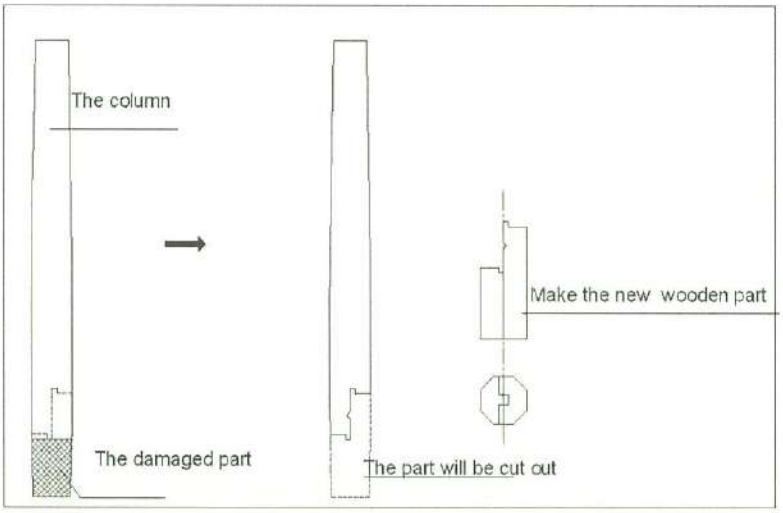
Step 5:

- Clean surface
- Finish

Picture 1. Joining a rafter



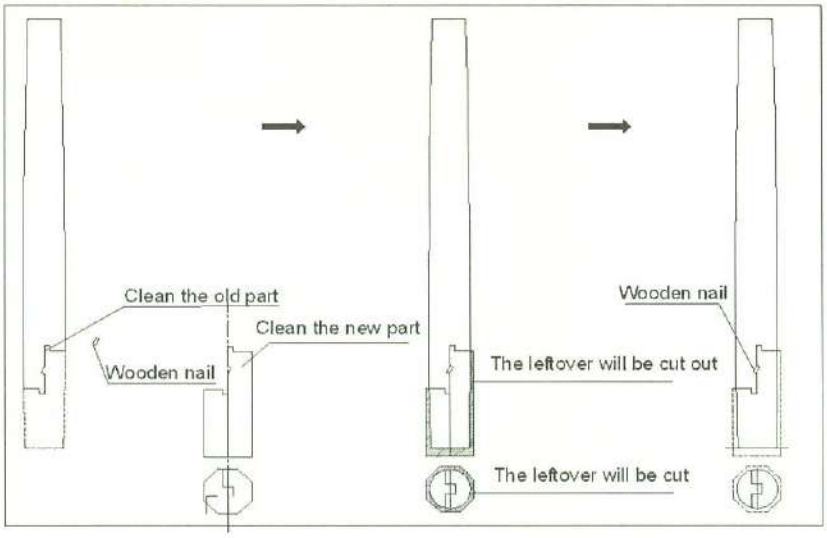
2. Joining a column: 5 steps



Step 1,2

Step1:
- Identify the damaged parts

Step 2:
- Cut out the damaged parts
- Make the joint in old columns
- Make the new parts
- Make the wooden nails



Step 3,4,5

Sep 3:

- Clean the old and new part

-Anti-termite treatment

Step 4:

- Joining

- Use wooden nail, and resin support.

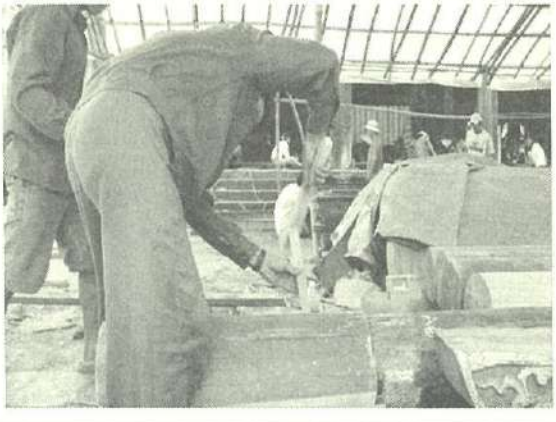
Step 5:

- Cut the leftover.

- Clean surface

- Finish

Picture 2. Joining a column



IV Final Reports by Participants

Cambodia

SY Basith

Introduction

This training course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region from 18 September to 19 October 2007 presented significant and valuable information on the conservation of wooden heritage and analytical methods in Japan and many other Asia-Pacific countries.

Cultural Heritage is an issue of great national and historical pride for every nation and for its future generations. Each nation has a cultural heritage that consists of historic buildings and ancient monuments that are exposed in ruined condition. Among the many countries in the Asia-Pacific region, Cambodia is one that is rich in cultural heritage, particularly, in the region of Angkor. The cultural heritage of the sacred land of Angkor was subscribed on the UNESCO World Heritage list in 1992. The Angkor monuments, and the origin of Khmer culture, amaze us with their magnificent scale and structural beauty, but they are in urgent need of preservation and restoration.

Attended by representatives of 14 different countries, the course provided an opportunity for the study of the preservation and restoration of cultural heritage methods employed in Japan and for comparisons to be made among the participating Asia-Pacific Countries. It is organized by the Cultural Heritage Protection Cooperation Office of Asia-Pacific Centre for UNESCO (ACCU). The course enabled participants to learn from Japanese heritage professionals and to exchange their own experiences.

I would like to express my gratitude to the following professors:

Professor Dr. Satoshi Yamato, an architect with the University of Tsukuba who presented Cultural Heritage Studies (Tokyo) for the introductory lesson in the history of protected buildings in Japan, explaining the system of designation and registration of buildings, as well as the traditions associated with wooden architecture found in Japan. It was important to appreciate the various systems in Japan that are set up for heritage protection and the practice of conservation of the wooden architectural heritage.

The session by Professor Dr. Shimada, on various principles and issues attached to the reconstruction of historic sites, was very constructive and gave me new insights into the reconstruction of historic sites, introducing me to survey methods for the conservation of vernacular houses and townscapes.

Historic districts are not well developed yet in Cambodia, so practical site visits to historic places during the course were especially interesting.

Dr. Gamini Wijesuriya, Project Manager of International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), introduced the wooden architectural heritage in the Asia-Pacific Region. He talked a lot about conservation and the different meaning of

conservation for each of the participants, and summarized the causes of wooden damage such as termites, climate, earthquakes, etc.

In the Nara Palace site, Mr. Shigeatsu Shimizu, Researcher with the Architectural History Section Department of Cultural Heritage, Nara National Research Institute for Cultural Properties, introduced the reconstruction of ancient buildings, enabling me to get more information on this topic.

In Kobe we heard a lecture by Mr. Yasumichi Murakami, Director of Cultural Assets Office, Hyogo Prefecture Board of Education. He gave an overall view of risk management for cultural heritage (based on lessons from rescue projects following the Great Hanshin Earthquake). He gave a summary of conditions of damage to designated buildings, of rescue protection measures for movable cultural heritage (art items), natural monuments, buried cultural properties, of restoration assistance systems in the public and private sectors, of repair costs of damaged historic buildings, etc.

Dr. Gamini Wijesuriya and Dr. Inaba attended country presentations and gave comprehensive comments about the issues facing various situations that confront each of our countries, and also all participants discussed the tourism problem and how to get budgets for supporting their heritage projects. Discussion about increases in the large number of tourists, and how this is affecting the local people and area, were very interesting and will provide material for good solutions to similar future problems in Cambodia.

Mr. Yukio Komine, Researcher with the Japan Institute of Insect Damage to Cultural Properties, showed us the many type of termites in Japan and the world, the problems of damage by insects in wooden buildings, and provided us with knowledge of how to prevent termite damage to wooden structures.

I also found interesting the lecture by Mr. Wataru Kawanobe, Deputy Center Chief for Conservation Science and Restoration Techniques, National Research Institute for Cultural Properties (Tokyo). He showed us synthetic resins and their organic chemistry, and reviewed factors in the deterioration of wooden material, such as:

-Discoloration
-Deformation
-Alteration
-Fracture
-Decomposition
-Strength reduction

He also went over the causes of deterioration, such as light, heat, water, wind, insects, etc.

Mr. Jin'ichi Murakami, Director of The Japanese Association for Conservation of Architectural Monuments (JACAM), gave a very interesting presentation on system and project planning for the restoration of wooden structures. He gave an overall view of JACAM's role in Japanese restoration systems and project planning for important cultural properties. I think it would be beneficial for Cambodia professionals in this sector to have some form of an on-going relationship with JACAM.

The practical training at the old farmhouse of the Tanaka family was definitely one of the most

enjoyable and useful parts of course, where I encountered many structures that were not only fun to work on but also very practical and essential for conservation and restoration .

Traveling to other prefectures (Aichi and Gifu) was definitely a very exciting and a good way to learn about the conservation and utilization of wooden heritage.

The most interesting part of the final week was the presentation on painting restoration Mr. Kubodera, section head in the Department of Cultural Heritage, Nara National Research Institute for Cultural Properties, on the bus to the Niu Kawakami Shrine, followed by the program of training with him on surveying methods of painting and restoration.

There are hundreds of paintings in Cambodia painted directly on walls, ceilings, columns, etc., which are often in need of conservation. Presently Cambodia does not have any fully trained local conservationists who are good with the conservation of such paintings.

The application of dendrochronology in Japan was explained by Dr. Mitsutani from the Nara National Institute for Cultural Properties, who gave a lecture on the differences learned from observations in his fieldwork. The practice of dendrochronology as an identification system is used informally in Cambodia, and could be utilized better in determining aspects of timber strengths, ages, and species of timber.

For the final day, we had an interesting discussion of future tasks in the preservation of cultural heritage and the progress of work in each country for protecting the value of heritage at World Heritage properties, focusing especially on the Waitangi Treaty Grounds historic precinct in New Zealand as explained by Dr. Aidan Challis, national heritage manager from New Zealand.

Course summary

I found the site visits very valuable for understanding the reasons why Japan implements full restoration and partial restoration techniques for historical buildings. My assessment of this practice after gaining insight into these projects has given me confidence that this method is appropriate in regards to:

- Preserving the integrity of cultural identity.
- Assisting in the preservation of historic evidence to sustain cultural history.
- Assisting in the preservation of traditional knowledge systems and skills associated with traditional craftsmanship.
- Conservation method (the process of caring for a place so as to safeguard its cultural heritage value).
- Works of art and special fabrics (carving, weaving, stained glass, etc.).
- Relocation.
- Invasive investigation.
- Repair (making good decayed or damaged materials).
- Maintenance (protective care of a place).
- Restoration (returning a place as nearly as possible to a known earlier state by reassembly, reinstatement and/or the removal of extraneous additions).

- Stabilization (arresting the process of decay).
- Reconstruction (building again in the original form using old or new materials).
- Adaptation (modifying a place to suit it to a compatible use, involving the least possible loss of cultural heritage value).

My impression of this training course

The training course focused on the preservation and restoration of wooden structures, a particularly prominent type of cultural heritage. Wooden structures in Japan are modest, but very strong and endowed with a firm set of rules and principles. Very interesting points can be seen in the structure of the wooden temples in Japan that have ordinary round columns, on the top of which are supported many of the principal members of the structure. This can be admired very much.

I think that in some countries such as Indonesia, Iran, Laos and Myanmar, there are many wooden architectural structures that are similar, but not exactly identical to wooden architectural structures in Japan.

I observed some different points between the Japanese cultural heritage and the Cambodian cultural heritage. In Japan, there are rich wooden architectural structures (wooden temples) that are famous cultural heritage sites. In Cambodia, there are rich architectural structures made of sandstone, brick and laterite, which are also very famous cultural heritage sites. In Japan many temples are lit up but in Cambodia we do not allow the use of electricity in any temples. In Japan most of the temples are restored, but in Cambodia only a few temples are being restored and a lot of damaged temples have yet to be restored. In Japan some temples have been destroyed by time and earthquakes, but there are no earthquakes in Cambodia.

The management of cultural heritage sites in Cambodia is divided into two parts:

1. The heritage that is registered on the UNESCO World Heritage list already, such as the region of Angkor, and is protected and managed by national authorities. In the case of Angkor it is called the APSARA Authority (Authority for the Protection of the Site and Management in the Region of Angkor). This authority is directly under the Presidency of the Council of Ministers, and its duty is to manage and protect the whole region of Angkor, and to coordinate and cooperate with international institutes for all temple restoration and development in all Angkor park projects. The government has placed APSARA in charge of research, protection and conservation of cultural heritage, as well as urban and tourist development. This legislative and institutional framework marks the beginning of a new active role Cambodia will take, responding to the call of her own people in the voice of her King, as well as to that of the international community, in managing Angkor as a national and world heritage site for the generations to come.

2. Other heritage sites located in other provinces and cities that are not inscribed in the World Heritage list yet, and are under the authority of the Ministry of Culture and Fine Arts, and under the direct responsibility of the Department of Heritage and Techniques

The APSARA Authority has two office locations:

-- In Siem Reap, where it acts directly in the field, with its national and international partners, APSARA is based inside the Angkor Conservation Compound, in the northern end of Siem Reap town.
-- In Phnom Penh, where it is in constant rapport with its supervisory ministry, APSARA offices are located on the building #187, Pasture Street, Sangkat Chaktomouk, Khan Don Penh, Phnom Penh.

The territorial authority of APSARA is clearly specified in Article 5 of the Law on the Protection of Cultural Heritage promulgated in 1996. The term "Siem Reap-Angkor" is defined in the Royal Decree establishing Protected Cultural Zones, with five degrees of protection in the region. Backed by these legal tools, APSARA is mandated to represent the Royal Government before all international partners concerned with cultural, urban and tourist development of this region. The Authority thus constitutes the Cambodian delegation to the International Coordinating Committee (ICC), and its Technical Committee.

Conclusion

The 2007 ACCU training course in Nara city offered many methods on its course menu and heightened interest for conducting the preservation and restoration of cultural heritage work in all of the Asia-Pacific countries, and particularly in the Kingdom of Cambodia. In conclusion, I can say that this training program was very fruitful for me, and I also believe the same holds for all participants. The experience that I have gained during this training program is applicable, in most cases, in my country.

Finally I am sincerely grateful to the ACCU Nara Office for inviting me to Japan and providing me with the opportunity to be involved in this training course. I believe that in the future all participants of these training courses will continue communication among themselves in order to share their experiences for the benefit of cultural heritage protection promotion in their respective countries.

I would like to express my gratitude to the government of Japan and other institutions for the financial support for my study stay in Japan. I would like to express my thanks to the Director of the ACCU Nata office, to all lecturers, and to the ACCU staff for the excellent and wonderful organization during the whole period of the training. Of course I am deeply grateful to all of the other participants for helping me during the training course

I would like to extend my very deep appreciation to the sponsors and the course organization team who not only arranged an excellent course but also looked after all the participants very well during our stay in Japan. **Arigatou gozaimashita**

China

ZHU Yuhui

THE POWER OF COORDINATION AND CREATIVITY:

Inspiration drawn from a comparison of Chinese and Japanese wooden structural architecture

Abstract

The magnificent, untrammeled and vivid Japanese wooden structural heritage displays another side of the Yamato nation which submitted to the Emperor, Shinto, Buddhism and Confucianism, and has thus become a significant symbol of the power of national vitality, the power of coordination and the power of the creativity; further, it becomes a special reference to Japanese society's repeated miracles of modernization (including the war tragedy) after the Meiji Restoration.

Keywords

Japan, wooden structural heritage, creativity, coordination, national characteristics, modernization

1 Introduction

Although several days short of ending the one-month course, a fruitful experience has already been attained, offered by the ancient monuments for me to study in this well-known city stretching as far as my eyes can see.

Looking back to the days after the Taika Reform edicts of 646 A.D., Chinese and Japanese wooden structural architecture developed abreast of each other and in close communication as symbolized by the following three events: the construction of Toshodaiji Temple in the middle of the eighth century A.D., the reconstruction of the Main Hall at Todaiji Temple in 1182 A.D., and the construction of the Houleyuan Garden in Xiaoshichuan River in the seventeenth century, thus leading to a similarity in style and brilliance in both countries.

Although many comparative articles in this field have become available, it is regrettable that few show a comprehensive grasp of its essence.

Modestly keeping pace with the former sages, and comparing the various characteristics of all the Japanese wooden structural heritage that I experienced and saw, or heard or thought of during this month with our Chinese heritage, I reach the conclusion of this valuable study period by means of a few features of Japanese architecture that differ from China, with the hope of being under the guidance of the experts and scholars from the ACCU!

2 Summary: The inclination to diversity and opening of the wooden structure

Though the monarchy had been preliminarily established as an absolute institution after the Taika Reform, it is known to have been less stable than in China, especially in such high-pressure times as the Ming and Qing Dynasties.

In correspondence with that, Japanese wooden architecture contains such highlights as: the Ise shrine (Fig. 2), which still keeps the rough, primitive and simple shrine style; the Main Hall at Horyuji Temple, mature and elegant, deriving from the Chinese style (Fig. 3); and even the Tanaka House, which we surveyed, which has a special gorgeous style resulting from the similarity of its upper portion to that of a shrine, with the lower portion in the Chinese style (Fig. 4).

If a detailed study on the wooden framed structure becomes available, it will be informed by the preservation of both Chinese and Japanese ancient styles and their high degree of "coordination," featuring the following three issues.

The more vernacular Japanese structures of various types seem to be different from the Chinese ones, as can be easily identified and narrated by the professionals.

There is a structural system with a rough image of a modern roof truss fabricated in three dimensions: vertical, horizontal, and inclined (Fig. 5).

The strengthening of the rafter influences the entire structure: the adoption of a double rafter expands the thickness of the roof and the depth of the overhang, thus enhancing the sense of weight of the roof (Fig. 6).

Generally speaking, such magnificent, untrammeled and vivid Japanese wooden structural heritage displays another side of the Yamato nation which submitted to the Emperor, Shinto, Buddhism and Confucianism, and has thus become a significant symbol of the power of national vitality, the power of coordination and the power of the creativity; further, it becomes a special reference to Japanese society's repeated miracles of modernization (including the war tragedy) after the Meiji Restoration (Fig. 7).

2.1 Magnificence and exquisiteness

The perfect illustration of "magnificence" is the South Main Gate of Todaiji Temple, Nara. This excellent portal is noted for its log construction and super size, which emphasizes the extension and cohesion of the structural aesthetic. However, it is difficult to see examples in the cradle of this style, China. There must be significant financial, cultural, and spiritual reasons for the elimination of such superstructure in its home setting, but only the variety of competition for funds in a big country and the lack of a kind of pure religious spirit can be attributed to it now (Fig. 8, 9).

A good example of "exquisiteness" is the Nigatsudo Hall, with its delicate railings and the lovely trail of lichen. Partly due to the narrow land, the rich and abundant change of the morphology of Japan, and the slim physique of the Japanese, there are usually some exquisite approaches used in dealing with the details, in perfect contrast with an uninhibited overall style (Fig. 10, 11).

2.2 Vertical lines and horizontal lines

In comparison with official architecture, a strong emphasis on horizontal lines is a key characteristic of Chinese vernacular architecture, but this is not as pure and stable as in Japanese monuments (Fig. 12-16).

Much of Japanese architecture is composed of vertical lines to which the lines mentioned above are applied. Today, similar examples in modern expression can be seen near the Huangpu River in Shanghai, China, and its implicit modern spiritual inclination is obvious (Fig. 17).

2.3 Pure and sumptuous: The metal decoration of the baluster at the Hachiman Shrine (Fig. 18)

Strong vision and spiritual infusion are visible in the contrast between the pure texture of the log and the dazzling gold-plating copper ornaments, found typically at Ise shrine. It is convincing evidence of the perfect derivation of Japanese aesthetics from religion spirit.

2.4 Religious spirit and inner dignity (Fig. 19)

3 Japanese wooden architectural heritage in modern society

3.1 Preservation and management system of the wooden architectural heritage under democratization and legalized institution (Fig. 20-22)

3.2 Preservation of the wooden architectural heritage supported with high level technology (Fig. 23-24)

3.3 Rational and scientific approach to problems of preservation, presentation, and reconstruction of structural heritage (Fig. 25-26)

4 Japanese wooden architectural heritage and folklore activities supported by national confidence and dignity (Fig. 27-36)

5 Conclusion

Though my experiences are still accumulating and my thoughts still in the process of fabricating, my words must end owing to the limit of time. It is needless to thank at this moment the *sakura* blooming in the spring and the dancing of maple leaves in the autumn, and the warmth we get from the sun for their great contribution to this brilliant architectural heritage of wooden structures. Beyond this, I especially thank the ACCU staff for this program and the enlightenment it has brought us.

List of figures

All the pictures in the text besides one that annotated are taken by the author

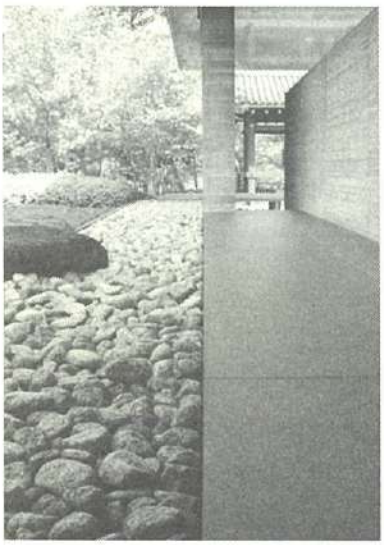


Fig. 1
Museum near the Phoenix Hall, Byodoin

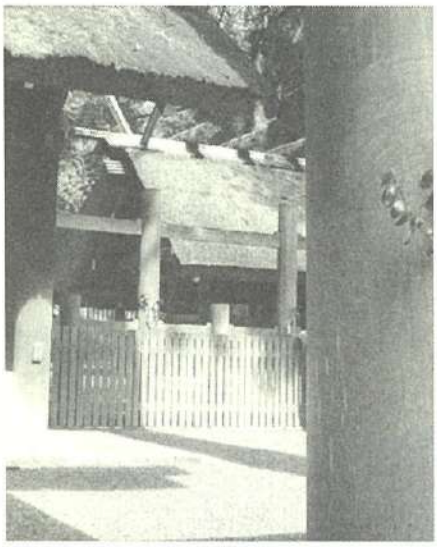


Fig. 2 Ise Shrine

Fig. 3
Main Hall in Horyuji Temple

Fig. 4 Roof of the Tanaka House

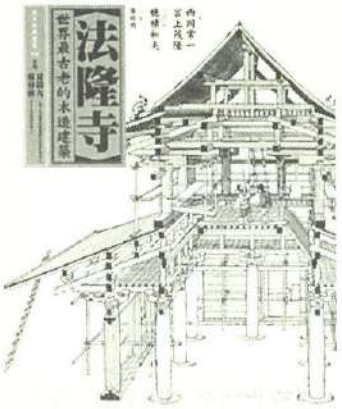


Fig. 5
Section of Main Hall at Horyuji Temple

Fig. 6 Roof of the shrine in Takayama

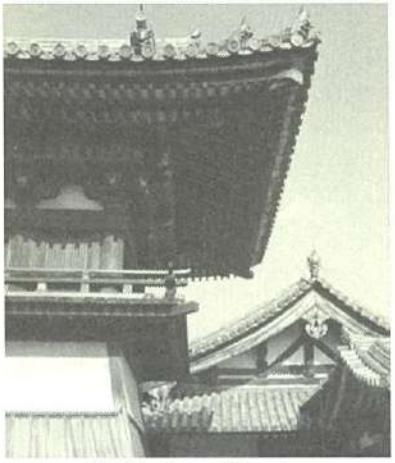


Fig. 7 Horyuji Temple

Fig. 8 Todaiji Temple

Fig. 9 Todaiji Temple

Fig. 10 Todaiji Temple

Fig. 11 Toshodaiji Temple

Fig. 12
Five-storied Pagoda at Horyuji Temple

Fig. 13
Lecture Hall at Horyuji Temple

Fig. 14 Todaiji Temple

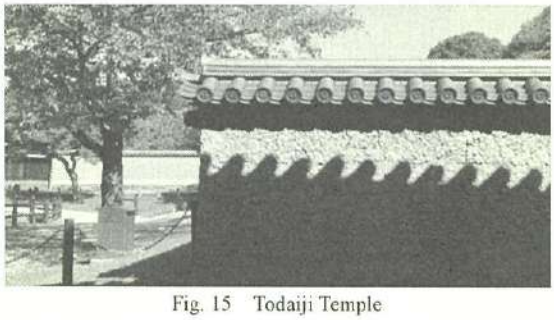


Fig. 15 Todaiji Temple

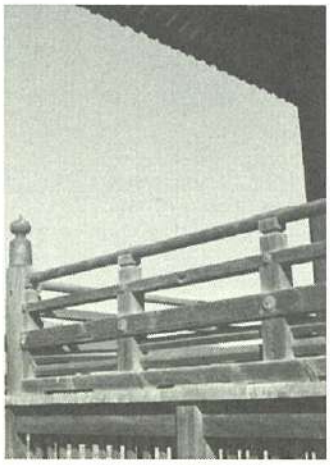


Fig. 16 Todaiji Temple

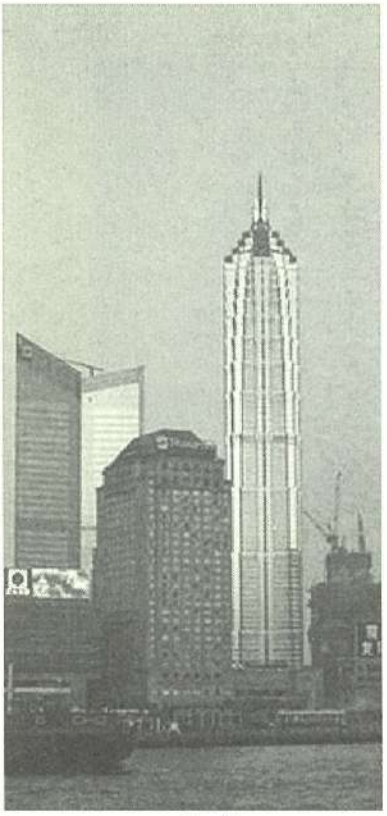


Fig. 17
Trade Mansion in Shanghai, China

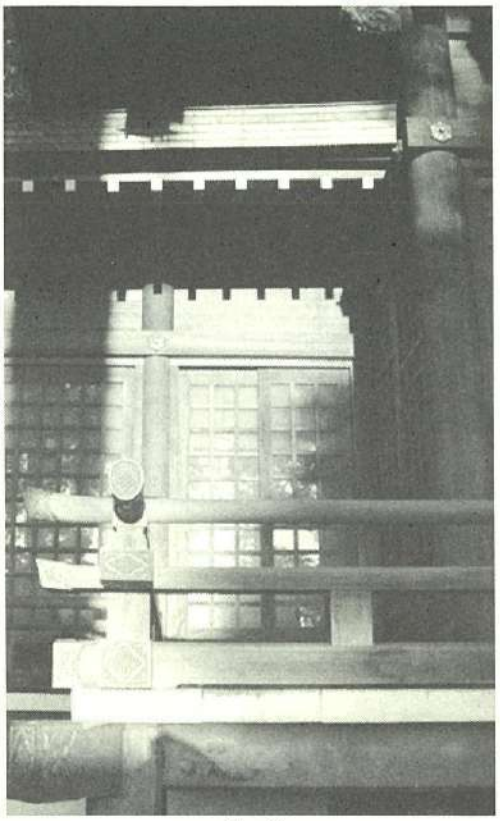


Fig. 18
Hachiman Shrine in Takayama

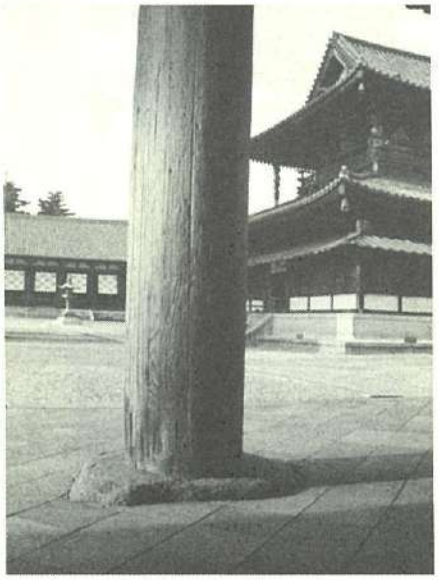


Fig. 19 Horyuji Temple

Fig. 20
Historic district (Imai-cho) in Nara

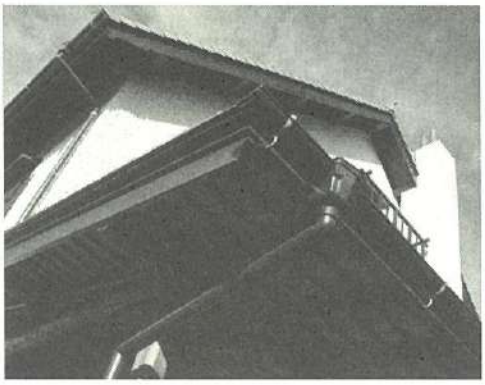


Fig. 22 Meiji Mura

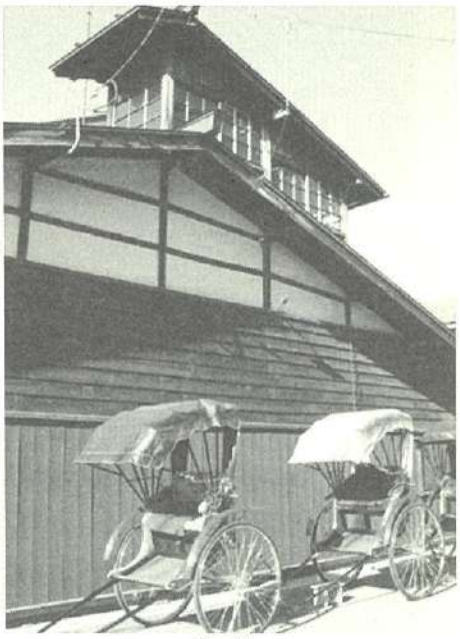


Fig. 21
Historic district in Takayama

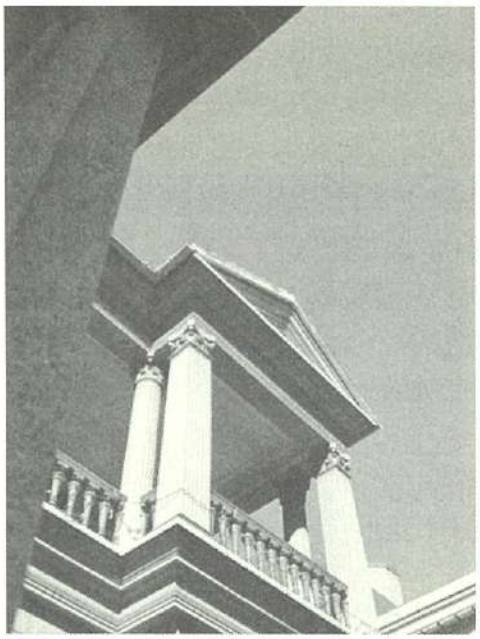


Fig. 23 Jugobankan, Kobe

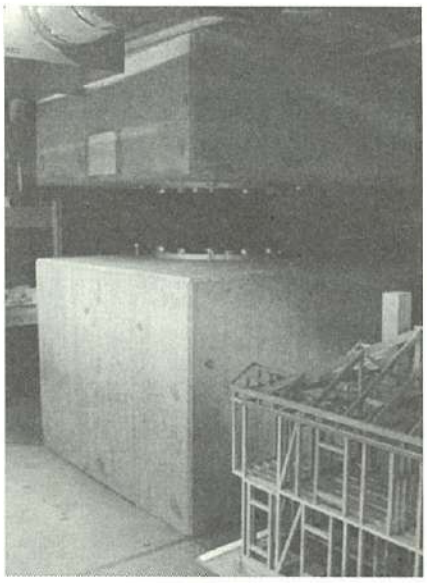


Fig. 24
Vibration damping mechanism at Jugobankan, Kobe

Fig. 25 Nara Palace Site

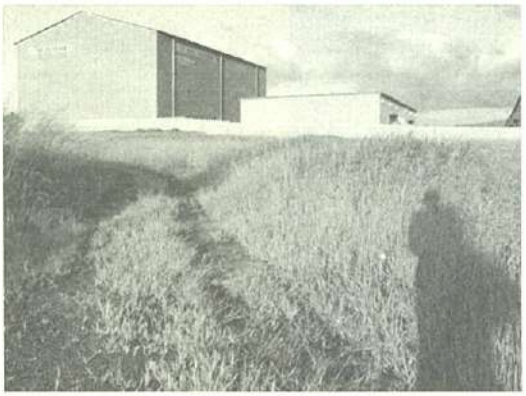


Fig. 26 Nara Palace Site

Fig. 27 Festival in Takayama

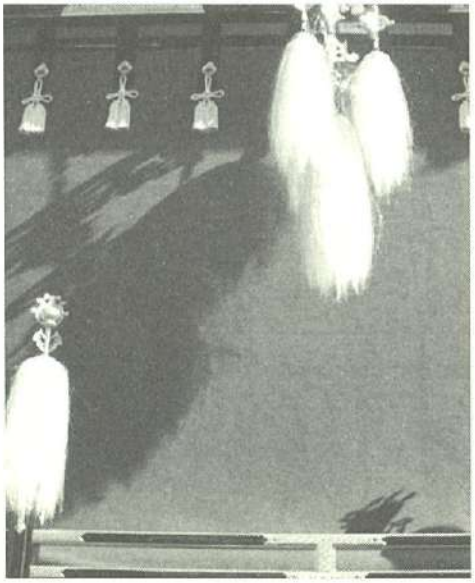


Fig. 28 Festival in Takayama

Fig. 30 Festival in Takayama

Fig. 29 Festival in Takayama

Fig. 31 Festival in Takayama

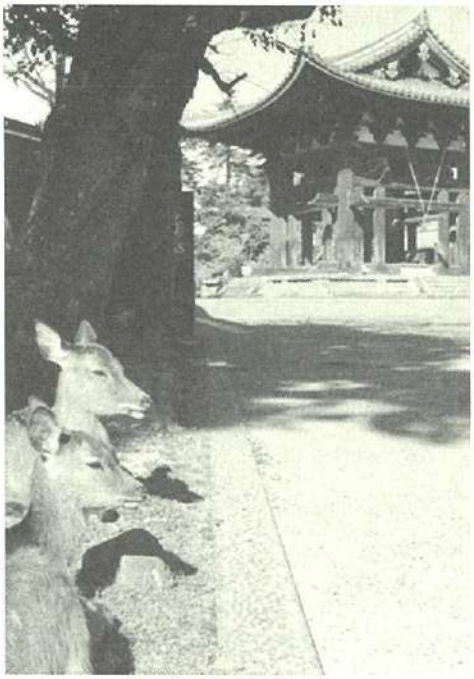


Fig. 33 Todaiji Temple

Fig. 32 Festival in Takayama

Fig. 34 Ise Shrine

Fig. 35 Toshodaiji Temple

Fig. 36 ACCU office

Reference

W. G. Beasley, *The Meiji Restoration*, Stanford University Press, CA, 1972.

Indonesia

Indah Sulistiana KUNCORO

Heartily and gratefully, I express my gratitude to the organizing committee of the "Preservation and Restoration of Wooden Structures" Training Course on Cultural Heritage Protection in the Asia/Pacific Region, for making this training successful.

Actually, I am newcomer in the field of heritage conservation. I started in this area by working on a site which was affected by the last earthquake in Kotagede, Yogyakarta, on 27 May 2007. So, I know it as "learning by doing." I worked under the Centre for Heritage Conservation which belongs to Department Architecture and Planning, Gadjah Mada University. My responsibility was taking immediate action based on site phenomena analysis on that time. With a small team, we made rapid damage assessments and first aid for structures. Because of that, we could establish a post on the site and continue making a bigger team to conduct a Community Empowerment Programme through Kotagede Revitalization, which was supported by JICA (Japan International Cooperation Agency), for eight months. Within this team, I conducted detail assessments of Javanese traditional buildings which were recommended for the Foster Parents Programme in order to raise funds for reconstruction or restoration and their promotion. We made documentation surveys and measurements, and conducted presentations through exhibitions. We worked with the local organization of Kotagede. So through these activities, I came to my own understanding about what conservation is, based on my significant experiences on site.

Damage to wooden Javanese traditional houses

There were 104 *joglo* houses, 45 *limasan* houses, 71 *kampung* houses, and 16 *panggang-pe* houses damaged. The main material is Javanese teakwood. These damaged traditional houses were spread along four sub-districts in Kotagede: Jagalan, Purbayan, Prenggan, and Singosaren. Kotagede it self divided under two region authorities, Yogyakarta city and Bantul region.

In my investigation, I found that some scientists say the *joglo* traditional house is very strong for with regards to earthquakes.

> Javanese traditional house is located on earthquake zone 3 (midlle level), it spread from Banyuwangi (on East direction) until Cirebon (on West direction). Refer to form and construction system, the Joglo type house look a master piece of Javanese traditional house. It has impression of weight construction with rong-rongan structure (core in frame system from umpak-soko guru-tumpang sari) as vertical structure system. When earthquake come, wood structure of-rongan of Joglo house as a core structure or core in frame, it's a restrain to lateral force and

depending on flexibility, brakebility, stability, elasticity and hiperstaticity of material and construction. The foundation system has hinge character or roll, connection system of tongue and gully configuration of secondary column (soko emper) and main column (soko guru), rigidity of main column (soko guru) from multy beam frame (tumpangsari/brunjung) are unity as earthquake responsive building. The test result of structure model of rong-rongan by vibration of earthquake force from horizontal slip table, is showed application of load system on Javanese traditional house support to stability. It has require on high frequency and acceleration low to high. Test on a vibration with low frequency and acceleration low to high, the load system make more deformation to model. The result of research is showed the structure of traditional Javanese house is safe on earthquake zone 3 (if base founfation maked clamp system).

http://www.petra.ac.id/~puslit/journals/articles.php?PublishedID=ARS07350101

But if that is so, why were so many *joglo* houses collapsed by the earthquake? After making surveys and measurements of dismantled *joglo* houses on site, I came to my preliminary analysis that there were several members of *tumpang sari* ornamentation which have no functional structure and just load multiple weight to the rigid frame below, so why did traditional people do it?

Starting from this point, many questions and thoughts arose in my mind about traditional structure not having an absolutely correct structure, so there must be many weakness. Is it possible to add some reinforcement? Or more extremely, is it possible to translate traditional styles into other wooden structures that are earthquake resistant? But what about the responsibility for authenticity in conservation? This is what I did not know. And because of this poor understanding, I applied for this training course.

Some reconstruction and rehabilitation work has been started for damaged heritage buildings in Kotagede after the earthquake. This work has been supported by many stakeholders who pay attention to disaster impact in Kotagede. There are nine traditional houses which have begun to be conserved by such stakeholders. But there are internal and external problems which make our work difficult to do, and below the conservation work standard. Internal problems come from our team, and external ones from other factors, as follows.

1. Lack of a construction management system for precise conservation methods and techniques. Lack of well trained and expert conservation consultants and supervisors to work in Kotagede, who can do analyses of structures and materials. Proper architectural conservation requires highly skilled techniques and profound experience in dealing with historic architectural traditions, together with general knowledge in modern architectural construction.
2. Work is left undone because high expense required for conservation.
3. Reconstruction has not been maximized using local community skills. This means the reconstruction cannot be done in parallel.

Natural hazards – earthquakes and termites

The last earthquake in 2006 has already damaged and torn down many cultural heritage assets, both high cultural monuments and folk settlements. It is not impossible that an earthquake will come again and swiftly destroy more cultural heritage assets in the future. Termites also make for deterioration of the wooden structure of heritage buildings.

Human hazards

Development and cultural crisis. Cultural crisis can result from a swift change from traditional to multistorey/high rise settlements, which are considered more able to solve housing shortages and accomodate the population. This results in new aggregated development, breaking the original fabric of Kotagede. Cultural crisis also results when many people sell and move their own cultural assets such as traditional wooden houses out of Kotagede. It was happening before the earthquake and become more rapid after the earthquake. This results in disaster for Kotagede's identity. Many traditional houses are abandoned and left empty by their owners.

Kotagede lacks a sufficient maintenance effort because present economic conditions are not favourable enough as in the past to support maintenance for heritage buildings.

Lack of structural and material codes. There are no structural and material codes or guidelines for the Kotagede Heritage District. This permits new reconstruction to proceed without respect for the original structure of heritage buildings. New concrete columns are built in heritage walls, even they are not monolithic or form a portal structure at all. This happen with government money for reconstruction through P2KP (Urban Poverty Alleviation Project) and Pokmas (peoples' groups) programs after the earthquake, because of poor quality assistance, lack of knowledge of traditional structures, and lack of a monitoring system. People just added new reinforcement in the same manner as for a new structure. And some dismantled and removed thick old walls and built new thin walls with new columns. People prefer to make it as a type of reinforcement, rather than rethinking it in terms of the right function within the larger structure.

Modernization brings development disrespectful of the original district structure, while valuable heritage sites remain within it.

Lack of city planning and district guidelines. Kotagede has a lack of government policies. The government does not have a long term agenda for managing and protecting this heritage district. No master conservation plan has been started, even though both long term and short term needs include a management team and system. The management team and system must result from a consortium of government bodies, and academic and professional institutions. But there is no clear consensus on how to move forward on a master conservation plan.

There is also no SOP (Standard Operational Procedure) for disaster risk preparedness. As a result of this, there are still dilemmas between preservation and disaster risk preparedness. For example in the Kotagede case, the narrow alleys which form the strong character present the highest risk for people safety.

Lesson learning (1): Forest as natural property = preservation of material + environment conservation

One lesson to be learned from Japan is its constant awareness about preserving the forest for current and future provision of materials. It was a smart and wise decision when the Japanese government made forest reserves as natural property. By preserving the forest, humans can guarantee the conservation of resources for wooden structures, and conserve the environment itself. This has resulted in Japan being the country with the second largest volume of trees for conservation after Finland (Satoshi Yamato, 20 September 2007).

Learning from this example, I searched for what is already publicly owned by Indonesia, because I fully believe that Indonesia is advantaged in having rich natural resources. I found information on the Internet about one alternative method for providing and growing teak wood with biotechnology. This experimental research has been conducted by Services Laboratory SEAMEO BIOTROP (SL-SEAMEO BIOTROP) in west Java since year 2000. Teak (*Tectona grandis*) is a hard plant which has a very long life circle, so that harvesting cannot be done for 40 years. With this new biotechnology, seeds of teak show faster growth (15-20 years), resulting in three times the volume of good quality teak wood compared to conventional methods (source: http://sl.biotrop.org/profil.php).

This is a helpful new solution for forest conservation in Indonesia, and for the lack of restoration material for wooden structures, but only if it is not strictly for commercial purpose. But unfortunately this approach has not been applied by the government in development planning or for any other alternative.

Lesson learning (2): Conservation = not an instant process!

Japan has over the past 110 years obtained good results in its conservation and preservation work up to now. But the process was undertaken step by step over a significantly long period of time. It has changed over the years because of the diversity of heritage to which it was applied, starting from only designated cultural properties (Old Shrines and Temples Preservation Law, 1897) up to the modern cultural property system which includes traditional houses, traditional skills, and the cultural landscape (Cultural Properties Protection Act, 1950). And it has been impossible to implement without problems and community resistance, and also controversial internal discussion. Japan experiences many earthquake, one reason why the western concept of authenticity cannot be applied

directly to produce sufficient realistic solutions. Safety is also very important. Accordingly, Japan has been experimenting with reinforcement for more than a century already. And the process of reinforcement itself has become part of the history of heritage buildings in Japan. My conclusion about this is that it is very important to start as soon as possible to develop reinforcement methods in the local context, using traditional materials.

Lack of restoration funding is problematic in all countries, including Japan. But this is not an absolute reason for not making efforts at restoration and conservation. It only requires strong commitment from the owner, the local community, and from local and national governments.

Lesson learning (3): Start from community, do not just wait

Conservation can start from the local community. In order to make it, government must respond and facilitate with policy. This has happened in Japan. Kotagede also has a grass roots local community organization, named the Kotagede Heritage District Local Organization, as a result of the Community Empowerment Program supported by JICA last year. But this organization still needs time and progress to strengthen its body, because there are still many other strong community organizations surrounding it, such as the intellectual and religious community within Kotagede. Actually, an integrated consortium made up of all of these organization is very important for mobilize conservation, so conservation can be done in many ways and from many perspectives.

Community-based initiative must develop in order to avoid guidelines made mostly by the government and not applicable to local sites.

Subsidy recommendations have to be done by owner initiative. Both repair and maintenance should also be mainly under the owner's responsibility. Total restorations fund have to be borne jointly by the owner, government and other donors. The percentage coming from the owners will depend on their financial conditions.

Lesson learning (4): Workmanship

This is a great challenge for me as a young student of architecture: how can I take part in using traditional workmanship in my further designs for reconstruction and adaptive reuse? Workmanship also should be the most basic consideration in restoration and conservation. As soon as possible, and as best as I can, I have to learn about, document, and take part in the transmission of knowledge and processes of traditional techniques. This can be started from any of the cases on site in Kotagede.

Lesson learning (5): Conservation work and practice = clear procedure + best effort on site!

Conservation repair work needs a clear procedure and a target for the best effort on the site. This procedure has to result from an agreement between all who take part in the conservation work, and

must be followed in all the decision making for each plan. The basic point for conservation is that the site is the most important item to discuss. And sacrifices must be made for good workmanship, rather than getting cheap restoration, in order to keep value, so this is the meaning of the best effort!

The on-site conservator has responsibility for wood quality control and supply. In the Japanese restoration system, wood has to be supplied from many districts to the agency conducting the restoration project. It has to be kept for a certain period of time for sufficient drying. So the agency has to make a time line for the restoration plan including this process.

The chief conservation architect has to work on site and work according to a clear procedure. A chief conservation architect must be a professional with a university degree and 12 years of experience, but he also can be a carpenter or someone with a high school degree who has 20 years of experience on site. This means that experience is the major requirement, and that restoration is a serious matter!

But there are several differences in conservation work when comparing Japan and Indonesia, especially Kotagede as a folk heritage district. The Japanese use contractors to make all restoration and conservation work. But at the Kotagede site, the need is to make restoration and conservation with the local community itself, because traditional techniques exist mostly within the unstructured indigenous community. Accordingly, it is also a big challenge to find traditional wisdom to apply in restoration and conservation work.

Lesson learning (6): Wood protection should be included in restoration plan!

The problem of deterioration of wooden structure in Javanese traditional houses is mostly caused by dry wood termites. Many types of wood protection use chemical methods. The same methods have been used in Indonesia as well as Japan. Such methods provide protection in two ways. The first is by embedding equipment in the soil under the building to block termites. The second is by polishing the wooden member's surface with a chemical. But these methods are relatively expensive for some owners.

Japanese traditional techniques use *urushi* (lacquer) to protect the wood. A chemical material that is not recommended is methyl bromide. This means that traditional techniques have to be investigated further and developed for wood protection.

Several chemicals which have a dual purpose (to avoid termites and lichens) have been applied for wood protection in Indonesia, such as the following.

No.	Type	Composition		Formulation active material	form
		Active Material	%		
1	CCB1	CuSO4.5H2O K2Cr2O7 H3BO3	33 37 25	95%	powder
2	CCB2	CuSO4 K2Cr2O7 H3BO3	34 38 25	97%	powder
3	CCB3	CuSO4 Na2Cr2O7 H3BO3	28,6 43,9 27,5	100%	powder
4	CCB4	CuSO4.5H2O Na2Cr2O7.2H2O H3BO3	32,4 36,0 21,6	90%	paste
5	CCF	CuSiF6.4H2O (NH4)2Cr2O7	36,3 63,7	100%	powder

(http://www.pikawan.com/images/infoilmu/rayap.htm, 18 October 2007)

Conclusion

In order to carry out conservation and restoration, we need to conduct research and to implement reinforcement of wooden structural heritage in line with the local context, the value of the heritage building, and risk disaster preparedness, in order to respect traditional workmanship. This is because it is important to think of safety and authenticity in conservation work. Both have consequences for the building and also for the people within it. But all of these factors have to result as an integrated outcome from a consensus about which desired value should be preserved, necessary for making the right efforts, choices and decisions in conservation and restoration work.

Iran

Hooman SOBOUTI

Introduction

Hooman SOBOUTI was borne in Zanjan (Iran) in 1980. He finished his Masters degree in architecture and is now engaged in PhD studies at the restoration and conservation branch of the Gazi University, Department of Architecture, in Turkey. He has been working in the conservation and restoration field since 1999 in Iran.

This final report has been prepared for the Training Course on the Preservation and Restoration of Cultural Heritage in the Asia-Pacific Region 2007: Preservation and Restoration of Wooden Structures.

The 2007 ACCU training course has been very stimulating and has provided a lot of subject matter to consider in the field of restoration and preservation of wooden structures. From the outset of the training program, all participants were privileged to have had lectures of high quality, sharing their experiences, expertise and assistance in their various fields and professions.
Japan is one of the most advanced countries of the world, which has achieved great success in scientific and technological fields. Japan has many trees and most of traditional Japanese architecture uses wood.

Conclusion

During my experience in Nara I gathered valuable knowledge that will help contribute in improving the situation in my country. I emphasize that the program was very effective for our understanding of cultural heritage protection/restoration. The program enabled each participant to enrich his/her theoretical and practical knowledge related to cultural heritage preservation, both in class and through on-site practical training. I have learned a lot of things about the restoration process. The restoration of wooden structures in Japan is characterized by the careful selection of wood and its preparation for the replacement of damaged parts, aiming to achieve a full compatibility of the new parts with the old material. In Iran we also use this method in our work.

It was good opportunity for us to make close observations of this type of architecture. This is because I think that Japanese architecture has it all, both the traditional and high technology. For example, their methods against earthquake disasters are may be profitably adopted in Iranian engineering because the Japanese check their systems, validate them for problems, and confirm their working condition. This is a good idea for use in our country because we have many earthquakes in Iran.

I also got many new and useful ideas from Japanese architecture and way of life, and I think it is possible to use these in Iran. For example, the system of using small transceivers that were made available for all of us to facilitate communication while walking and visiting the heritage sites was very useful and helpful.

It was very interesting for me to learn about the system of preparation of heritage documentation reports and the number of copies that are for distribution to many government and academic institutions. When I return back to Iran, I will try to use all of these systems.

The other important and useful activities in this training course were the presentations, made by the other participants over two days, on the status of preservation and restoration of their own countries' cultural properties. Those presentations were not only useful for improving my knowledge about wooden structures, but we also got much new information about the culture and architecture of other countries.

I participated in the program for the reasons of gaining knowledge and sharing experiences about the situations and conservation approaches that are available in other countries, concerning the protection and preservation of cultural heritage. I also wanted to learn about what effective ways those countries have found regarding this field, and in particular, how and what management systems their governments have used for protecting their heritage.
Iran is rich in cultural heritage, but some of it is on the verge of deterioration. Therefore, after I return, I want to provide my contribution to government agencies by working in the protection and preservation management of our cultural heritage.

When we return to our countries after this training course, we will apply the knowledge gained from this training. We learned things that answers the questions 'why', 'what' and 'how' in conducting heritage conservation. These are the most valuable lessons that we have learned from this training course.

Acknowledgment
First of all, I am glad to have participated in the Training Course held in Nara. I would like to express my gratitude to the ACCU (Nara office) for giving me this important opportunity to further my knowledge on the preservation and restoration of cultural assets, particularly on historical wooden structures.

I would like to express my special thanks to Dr. Yasushi NISHIMURA, who is the Director of the Cultural Heritage Protection Cooperation Office UNESCO (ACCU) Nara office, and Mr. Isao NAKAI, who is Director of the International Cooperation Division of the Cultural Heritage Protection

Cooperation Office UNESCO (ACCU) office.

Mr. Nakai has been very helpful in assisting us in everything in order to make the training program perfect. This shows his organization has experience in conducting training courses. I would also like to send my best regards to all the lecturers for sharing their knowledge with us.

I also want to express my heartfelt gratitude to Ms. Chiyaho HATA for translating for us the Japanese language into smooth English. And I would like to express my sincere gratitude to the three kind, patient and helpful staff of ACCU: Ms. Maki YOSHIDA, Mr. Eisuke NISHIKAWA, and Ms. Tomomi ITAYA.

Lastly, I would like to send my special thanks to Dr Gamini Wijesuriya of ICCROM, Italy, Dr. Aidan Challis of New Zealand, and Dr. Inaba of Japan, for sharing their useful knowledge last 18 October 2007.

Lao P.D.R.

Sitpaseuth PHONGCHALEUN

1. Introduction

First of all, I would like to thank the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Center for UNESCO (Mr. NISHIMURA Yasushi, Director), for giving me the opportunity to attend this training course. The ACCU Nara program of 2007 has been very stimulating and has provided a lot of subject matter to consider in the field of restoration and preservation of wooden architecture. From the outset of the training program, all participants were privileged to have lecturers of high quality sharing their experiences, expertise and assistance in their various fields and professions.

I would like to express my gratitude to the following lecturers: Mr. Shimada for the survey method on conservation of vernacular houses and townscapes in important preservation districts for groups of historic building in Japan, and for explaining the system of designation and registration of protected buildings. Also, for the explanation of traditions associated with wooden architecture found in Japan, on the inspection of the reconstruction of ancient buildings at the Nara palace site.

At first, I thought these methods were common sense for the conservation of cultural heritage in the Asia/Pacific countries, because many concepts and ideas of have been developed in Asia, but it is difficult to apply these concepts to non Asia/Pacific countries. But I came to realize that the principles can be applied anywhere. We should make efforts to find and perceive the values of our cultural heritage. Through these efforts we can identify our nation, our people and so on. Occasionally we forget why should preserve our culture heritage. Without principles we may misunderstand the values and forget to preserve them. This forgetfulness can result in serious problems. We should hand down our cultural heritage to future generations. Also we should regard them as common property. The important thing is not to forget these principles all time. The methods and application can be changed according to the particular countries but the principles cannot be changed.

2. Preservation and restoration in Japan

Before attending the training course on architecture and building restoration in Japan held by ACCU, I had many opportunities to learn about Japanese architecture from UNESCO experts who carried out historical house restoration. And at ACCU, Nara, part of the training included consulting documents and books by many domestic and foreign specialists on restoration experiences in Japan. But this was only theoretical work. However, in attending this training course with its practical work shops, I realized that Japan is interested in all kinds of architectural building and carries out careful, authentic architectural projects based on archaeological results, historical documents, and photos.

Restoration measures are also implemented methodically. The restoration materials are also chosen carefully. Apart from the use of modern machines in the same stages for saving money and labor, Japanese researchers and administration have fully observed their restoration principles. In particular, they use traditional tools for the maximum protection of the authenticity of relics.

One of the main characteristics of traditional Japanese wooden buildings is that the structure is reversible, in that is can be disassembled and reassembled without damage to the members. Because of this structural characteristic, it is possible to adopt the technique of repair by dismantling, which is common in the conservation of buildings in Japan.

Traditional roofing materials originally included organic materials such as thatch, cypress-bark shingles, and wooden shingles. With the introduction of Buddhism the techniques of clay tile roofing construction were brought from the continent.

3. Comparing the restoration work project

Existing roof tiles, handmade from clay, were taken up from the roof slopes and put back in place. The supervisor directed that each tile was to be handled with great care and cleaned mechanically with a hard brush to eliminate lichens, possibly in combination with diluted ammonia or a similar toxic wash. As many as 30 percent were in need of replacement by new tiles of the same format, color and texture. A test area was used to set the standard of required replacement, and the work plan was adjusted accordingly. Old tiles were used on outward facing roof surfaces, and new tiles mainly on the surfaces turning towards the inner courtyard.

As plain tiles have nibs which enable them to be hung on the roof, batten nails are not generally used. However, at corners above overhanging eaves in very exposed situations, every third course of tiles is applied with corrosion resistant nails, two nails for each tile, to avoid displacement due to wind.

Once the tiles had been stripped from the roof, a thorough investigation could be carried out of the rafters and battens. Insect-infected timber or fungal-decayed members was treated with liquid insecticides and fungicidal solutions. The surface had been flooded but without causing excessive staining. Special attention was required to all timbers embedded in positions near a wall. Structural timber (hard wood) in need of replacement was calculated and accounted separately on approval by the site architect. All new timber was hard wood and well seasoned.

Cat walks had been laid out under the plain sloping roofs for inspection purposes and mounting of electrical wiring. The length altogether was 185 running meters, including two ladders to reach the roof above the throne hall.

All exposed and visible timber under the first floor eaves had been painted with oil-based paint in traditional red-brownish color. Existing paintwork which was still intact but was due for repainting had been washed with soap or detergent and water, and rinsed thoroughly with clean water. The surface was then rubbed down with abrasive paper, rinsed clean before applying the undercoat and

topcoat. New joinery required complete painting, including priming. It was important that all end grains, edges and faces were properly coated.

All timber that was exposed at gables and under eaves above the first floor level had been treated twice with an colorless organic solvent preservation, and teak oil to substitute for loss of substance due to weathering and ultraviolet radiation.

Any decayed and structurally weakened timber had been repaired, preferably with new timber to be grafted onto the original member.

All ridges and finials were repaired in traditional way by use of hydraulic lime mortar, lime cement mortar, and were subsequently white washed and consolidated with clear lime water. All mortar fillets between the brick vertical surfaces and roof coverings were repaired and renewed with lime mortar that allows certain elasticity. Existing cracks and fissures in masonry were raked out, cleaned and repainted. Gables and walls above plain sloping roofs were repaired in the same process when scaffolding was erected. Loose lime was brushed down, plaster repaired, white washed and consolidated with two applications of clear lime water.

4. Acknowledgments

I would like to acknowledge all our on-site presenters from the various institutes, agencies and restoration work sites who provided their valuable time and expertise, which I believe were a very beneficial contribution to the success of this training program. They have enhanced my understanding and personal knowledge of techniques and management system for the preservation, restoration, and conservation practiced have in Japan.

My objective in participating in this program was to obtain useful general information about the protection of buildings as cultural heritage assets. I think that the tangible and intangible are equally important. Protected wooden cultural properties are represented by buildings, houses, industrial arts technology, and other arts of high historical value. The intangible heritage includes folk cultural properties such as traditionally transmitted occupations, religious as well as annual events, and folk performance arts, together with the objects used for these activities. Customs and events are essential for understanding the historical changes that have taken place in the daily habits and lifestyle of the local people. The methods for protection of intangible cultural heritage assets primarily consist of the technology presenting performances in a style as close as possible to the originals, preparing detailed archives in the form of picture, photographs, texts, and other media.

In particular, I now understand the guidelines implemented for the world heritage convention, which include the definition of a cultural and natural heritage mix, cultural landscapes, and moveable heritage, especially those of outstanding universal value. I obtained the knowledge and information necessary for the preparation of a nomination to the world heritage list. This includes the description of the property, justification for its inscription, reports on the state of conservation and restoration affecting the property, on its protection, management, and monitoring, plus documentation, contact

information and signature of responsible authorities on behalf of the state parties.

I was able to make important contacts with many representatives of other countries in the Asia/Pacific region. But above all the most important thing for me is to recognize what is conservation. I will always consider what we should do, why we should do it and how we should do it – these are the most valuable lessons that I learned from this training course.

Thank you very much.

Myanmar

Daw Soe Soe Win

1. Introduction

I would like to thank the ACCU for providing me this splendid opportunity for participating in this precious training course. I would like to thank my Government for nominating me to enjoy this opportunity. This course lasted about one month, from 18 September to 19 October in 2007. There were 14 participants from different countries in the Asia-Pacific region who had this training, and they will be using the knowledge in improving the restoration, conservation and protection of cultural heritage in their respective countries.

Japan is one of those countries that is well equipped with modern technology and technical knowledge. It has modern computerized technical tools and a robust economy to help it conduct the management of the conservation, restoration and preservation of cultural heritage.

The aim of the course was to introduce concepts and methods of preservation and restoration of various wooden structures with reference to Japan's Important Cultural Properties. It provided a platform for all participants, as well as the Japanese heritage professionals and specialists, to share and learn methods of investigating wooden structures, ideas and concepts, applied technologies, and documentation in the preservation and restoration of wooden structures.

2. General Overview of the Training Course

In the first week we had a very good introduction to the laws for the protection of cultural properties in Japan, the history of protection of buildings, and the system of designation for cultural properties. Japan has a long history of protection of its heritage through legislation and others means. My country has also been protecting its heritage by law and by preserving cultural heritage regions since 1998. Therefore the presentation on the different periods of architectural history in Japan, and how the difference styles that appear to be similar but are recognized as being different from careful observation of subtle differences (joints, colors, etc.) were useful. I also have had more time to observe things directly, in the short visit to the family residences in Imai-cho. All of those houses had good foundations and a good water drainage system.

In the second week we had on-site lectures at the Nara Palace Site, and at the Former Foreign Settlement and at Sawanotsuru Museum in Kobe. I learned about rescue efforts after the Great Hanshin Earthquake. Two days were allocated during the training course for all participants to present the status of preservation and restoration of their countries' cultural properties. The preservation sessions were coordinated by Dr. Inaba, Head of Project Planning Conservation Systems Section, National Research Institute for Cultural Properties, Tokyo, and Dr. Gamini Wijesuriya, Project Manager for ICCROM. Each participant presented about 20 minutes on problems and needs for cultural heritage protection and restoration activities in his/her respective country, followed by a short

discussion. The participant presentations were seen to be very positive because they allowed each participant to share ideas and comments on issues pertaining to his/her country's efforts to preserve and restore important cultural properties. Credit should be given to Dr. Inaba and Dr. Wijesuriya for their constructive comments and ideas during the two days of participant presentations. Their expertise and experience on issues related to the cultural properties in the Asia/Pacific region made the discussion stimulating.

The third week involved a practical training exercise at the Tanaka family house. We also visited Toshodaiji temple and observed the actual restoration work. The exercise of drawing the floor plans and sections at the Tanaka family house was excellent. All participants learned a great idea from this practical training. Apart from these hands-on practical training activities, participants were also given the opportunity to visit Japan's Important Cultural Properties outside of Nara.

A three-day visit to the Museum Meji-mura, in Aichi Prefecture, and to Gifu Prefecture in the fourth week was considered the highlight of the training course. Participants were given on-site lectures at various interesting heritage sites including the Takayama Autumn Festival, the Takayama local museum, the Yoshijima family house in Takayama, the World Heritage site of Shirakawa Village, and the Kanda family house in Shirakawa. All site visits were guided by experts and officials from various heritage agencies of the respective prefectures. Sufficient lecture handouts and reading materials were also given to all participants for reference purposes during the visits. Even though the visits were packed with lectures and working tours within the designated heritage areas, the participants really enjoyed themselves, particularly with every new discovery they made during the site visits. During the visits I observed preservation districts that have been designated by local municipalities. This is a unique concept in that the preservation district's character and the harmony of the buildings are very well preserved. These local municipalities have very good rapport with the local community.

The communities understand the value of their heritage, and the local communities also work very closely with the authorities for the preservation of their heritage. The provision of subsides for the owners is also a very positive thing in order to build up good rapport. The government and local authorities cover the cost of repair up to a maximum of eighty percent. The provisioning of subsidies certainly encourages the owner to undertake restoration work.

Japanese architecture is shaped by circumstances of climate, geography and customs. In Japan, with its high humidity, seasonal change and plentiful forest, wood has been the traditional building material. Traditional Japanese architecture has good foundation, good water drainage system, ventilation, well-aired rooms, slanted roofs, long overhangs and tatami mat-covered floors. Tatami mat is one of important elements in the traditional Japanese architecture. It is fixed in size, and while different depending on the region, this determines the building size. Most Japanese wooden buildings use frame structures with posts that bear the structural load.

What I learned about the restoration of wooden buildings includes the following items.

--Beams are mostly used in bent or curve shapes and large sizes (using a single tree)

--The same type of wood as in the original construction is used, following the original forms and methods.

--Replacement is only permitted to heavily damaged elements.

--Replacement may be done on elements that were changed during previous restoration works.

--All restoration work and changes made must be fully documented.

One of the most important aspects I learned is the use of traditional materials and techniques in the restoration of historic wooden building. Many wooden buildings in Japan are more than 500 years old, and were made using different method and tools as compared to modern buildings. In the restoration of wooden structures, depending on the proportion of rotten material, a wooden member may be reused after being repaired with traditional method that uses joint or graft. Sometimes weakened members may be reinforced by filling gaps with artificial wood.

Another important aspect of cultural asset preservation and restoration in Japan is the disaster preparedness plan. One of the greatest threats to historic wooden building is fire, as the outbreak of fire will destroy everything. It is no exaggeration that the history of preserving wooden structures in Japan is in fact a fight against disaster by fire. Japan has installed modern and sophisticated physical fire-fighting equipment in most historic wooden buildings.

Japan is one of the advanced countries of the world, which has achieved great success in scientific and technological fields. Of course the level of preservation and restoration of cultural properties is higher than in other countries.

Conclusion

During my study at ACCU, I gathered valuable knowledge that will help to contribute in improving the situation in my country. This course was a tremendous combination of theoretical and practical approaches in training. My knowledge had been improved in such a way regarding my profession that I see new light in thinking about my field of expertise. My stay at ACCU helped me exchange views with the participants from different countries, which enriched me a lot. The riveting memory of those exchanges will show me new tracks for the future regarding my work. I will share my experiences with young conservators and students at the Archaeology Training School in Pyay, in my country.

Acknowledgments

I am sincerely grateful to the Government of Japan and the ACCU Nara Office for inviting me to Japan and providing me with this training course. I would like to also commend our course coordinator and staff: NAKAI Isao, NISHIMURA Yasushi, KINOSHITA Wataru, YAMASHITA Tsutomu, OTANI Yasuko, HATA Chiyako. Thanks to all of you for your support and guidance throughout the entire program. Finally I would like to thank the Ministry of Culture and Department of Archaeology, National Museum, and Library, in Myanmar for nominating me to participate in this training course.

Nepal

Mangala PRADHAN

1 Todaiji Temple, Nara,Japan

2 Bhaktapur 55 Window Palace, Kathmandu, Nepal

1. Introduction

The "Training Course on Preservation and Restoration of Wooden Structures for the Cultural Heritage Protection in the Asia – Pacific Region" was conducted in Nara, Japan from 18 September to 19 October 2007. The course was jointly organized by Japan's Agency for cultural Affairs (Bunkacho), the Asia - Pacific Cultural Center for UNESCO (ACCU Nara Office), the International Center for the Study of the Preservation and Restoration of Cultural Properties (ICCROM), and the National Research Institute for Cultural Properties, Japan. The program was organized in cooperation with Japan's Ministry of Foreign Affairs, the Japanese National Commission for UNESCO, the Nara prefectural and unicipal governments and the Japanese Association for Conservation of Architectural Monuments (JACAM). The course was attended by representatives of 14 different countries within the Asia – Pacific region. The background of the course mainly focuses on the Asia – Pacific region, which is blessed with a wealth of cultural properties, most of them having outstanding universal value.

The opening ceremony was organized in the ACCU Nara office hall on 18 September 2007. It was commenced by an opening address from the Director of ACCU, Mr. Nishimura, and followed by the greeting speeches by officials from ACCU Tokyo headquarters, National Institute of Planning Department, Nara Prefecture Government, Nara Municipality Government etc. The speakers respectively covered the following themes: a short account of Nara's ancient history, when it was the capital from 710 A.D.; in 2010 A.D. Nara will be celebrating 1300 years of establishment; of 14 world heritage sites in Japan 8 are located in Nara; ancient Japanese culture started from Nara; many temples were built on the Chinese temple design but with time evolving from its original shape; cultural heritage is common heritage and it should be conserved for the future generations; etc.

After the greeting speeches it was time to give self introductions by the 24 participants who were from Cambodia, China, Indonesia, Iran, Laos, Myanmar, New Zealand, Pakistan, Philippines, Samoa, Sri Lanka, Thailand, Vietnam, and myself from Nepal. After the self introductions the members of the ACCU Nara office were introduced with the participants.

We had an opportunity for a courtesy call with the Vice Governor of the Nara Prefecture, Mr. Takigawa in the Nara Prefecture Office. We had a very nice conversation with him and he talked about the heritage, world heritage, and the old customs and rituals still prevalent in some of the temples which come from ancient Indian and Chinese Buddhist rituals and customs. Great civil wars of the 12th through the 16th centuries destroyed many of the ancient monuments, but those remaining have to be conserved by the people and the government. All of the country's heritage sites have to be preserved. He also said that heritages is in danger not just because of disasters like war and natural calamities, but that modernization is the major factor nowadays in the destruction of ancient heritage. He also told us to make comparisons between modern influences on tradition, and to learn modern technologies while in Nara. The pace of modernization in some way is harmful to those people who have very keen traditional taste. After meeting the Governor of Nara Prefecture Government, we were familiarized with the world heritage sites of Nara from the top of the Nara Prefecture building. The opening day concluded with a warm welcome dinner party in the Royal Nara Hotel.

2. Summary of the classes

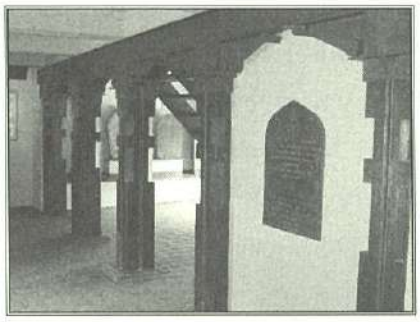
On 19th September Mr. Kazuhiko Nishi gave a very important lecture on the introduction to the cultural heritage protection system in Japan, and the preservation and restoration of wooden structures, and on conventions and charters relating to protection of cultural heritage. He gave very detailed information on international charters, guidelines, and conventions propounded by international groups or nations, starting chronologically from the 1931 Athens charter, to the 1994 Nara Document on Authenticity and the 2003 Hoi An Declaration on Conservation of Historic Districts of Asia. He also noted the agencies who following these charters work for the protection of cultural heritage

throughout the world. Mr. Nishi gave a chronological history of conservation of cultural and historical properties in Japan starting from the beginning of the Meiji period in 1868, to the present stage. He showed a documentary of spring and autumn festivals in Takayama, and gave some idea of how cultural heritage may be in tangible form, but also related to intangible forms, or be both ways in every community. This festival reminded me of many festivals in my country like the famous chariot festival of red and white Machhindranath, Kumari jatra, Bhagavati jatra of western Nepal, etc., in which community participation is the main characteristic of the festival. All these festivals have tangible and intangible aspects as well. Mr. Nishi talked about every important topic concerning the designation system in Japan, categorizing places as historic sites, places of scenic beauty, cultural monuments, groups of traditional buildings, natural landscape, etc., and the conservation techniques for cultural properties and national treasures, etc. There are also challenges encountered by the authorities. Designated buildings are changing due to time. Use of modern materials can be seen in some cases to give strength to the monuments. The government of Japan spends lots of money on cultural heritage conservation.

On 20th September Mr. Satoshi Yamato gave an introduction to wooden architecture in Japan. He conveyed the important information that Japan has 67% of its land covered by forest. This is the second highest behind Finland, the first. I wondered when I was on the tour to Aichi and Gifu prefectures where the 127,433,494 people of Japan live! He gave precise details for pre-modern Japan, and the history of the modern period of Japan from the establishment of the Meiji Restoration in 1868 A.D. Topics discussed included: the different constitutional and legal systems; the definitions and categories of cultural properties, and their designation, selection, and registration; the restrictions on alteration of their existing state, and financial support and tax incentives for the owners; the organization of the agency for cultural affairs; the number of buildings designated as important cultural properties or national treasures by period. He also gave us an idea of the techniques prevalent in Japan in the conservation of wooden architecture, which was very important and informative for me. The replacement method is similar to my country. And the introduction of iron supports to strengthen beams was very interesting. This kind of technique was applied in the palace of Patan in the Kathmandu Valley Protected Monument Zone. The 3D scanning method of measuring wood was introduced, which has given a new dimension to the conservation of architecture in Japan. I was impressed with the techniques of traditional carpentry, thatched roofing, cypress bark roofing, single board roofing, repair with dismantlement, partial repair, protection of environment, the safety objectives during work, and the preservation of the materials, all of which taught me how the overall conservation process goes smoothly in Japan.

On 21st September, an on-site lecture was organized on survey methods in the conservation of vernacular houses and townscapes. The visit to Imai-cho, an important preservation district for a group of historic buildings, and the on-site lecture by Mr. Toshio Shimada on the method of surveying

private residences and urban and streetscapes, were important for me to learn about the process of how such surveys are made. In all survey methods, whether in the area of tangible or intangible heritage, the purpose, method, notes and reporting are the most essential parts to any kind of survey. In my country also these are the main factors considered while doing surveys.



3 Patan Durbar museum

On 25th September, I was impressed by the lecture given by Mr. Gamini Wijesuriya, the representative of ICCROM. He acquainted us with the ICCROM organization, with the conservation and utilization of cultural heritage resources, with contextual conservation, and with challenges mainly focused on the Asia/Pacific region in terms of intangible heritage linked to the built heritage and the traditions that matter for conservation. I liked his presentation on knowing the views of the participants' countries. He shed light on the concept of conservation in context which is very important. In any conservation work care about what people traditionally treasure is essential to real conservation. In the Asia/Pacific region, challenges of conservation depend upon the intangible and tangible aspects of the built environment and its related cultural heritage, which guides modern conservation practice.

The 26th September on-site lecture on risk management for cultural properties was organized at the Jugobankan former foreign settlement in Kobe, the Kobe city museum, and the Sawanotsuru sake museum. Mr. Murakami gave a lecture on the great earthquake of Kobe city and its aftermath, and on the damage to shrines, temples, traditional residences, brick architecture, historic buildings, museums, folklore, etc. Rescue and restoration of natural and buried cultural properties, popular participation in investigation and restoration works, restoration systems in the public and private sectors, restoration of designated buildings, repair cost analyses, rebuilding plans, and so forth, were covered in a very detail manner. I was very impressed by the measures taken for the rescue and restoration processes in Japan. And its experiment with the use of base isolators is a new technology introduced to the world. This process, though expensive, can help prevent future damage from earthquake disasters.

The country presentations by the participants, conducted on the 27th and 28th of September, were interesting and enabled me to understand wood conservation, research and specific research methods applied in different countries. The curiosity of the participants was satisfied by the presentations. The comments and suggestion provided by Dr. Inaba and Dr Wijesuriya were very important for me.

On the 1st of October, Mr. Komine gave a lecture on the subject of prevention of termite damage to wooden structures, covering the current situation for cultural properties in Japan, measures to control insect damage to cultural properties, insect control measures, differences between insects and other creatures, primary insect pests of wood and their characteristics, pest control measures, detection of termites, prevention with chemicals, extermination, etc. This was a very important subject for me in that I do not have in-depth knowledge of insects, termites and their prevention, so this class was very beneficial for me to understand the subject.

On the same day Mr. Wataru Kawanobe gave an introductory lecture on conservation science for wooden architecture. It was a very technical subject, concerning topics like synthetic resins, organic compounds, polymers of various types, structural materials, coating materials, kinds and characteristics of adhesives, etc. In Nepal, in conservation and during the building process, different kinds of adhesives and mortars are used in traditional buildings and monuments, and in using them one has to determine the good and bad effects to the monuments.

On the 2nd of October Mr. Murakami gave a lecture on systems and projects planning for the restoration of wooden structures. The subject focused on the planning of a project and its processes, including the outline of the work, the restoration period, the policy of the restoration work, the process of the work, the preparation procedures, documentation, dismantling and surveying, numbering all the dismantled components, excavation if necessary, surveying related historic documents which are of importance, alteration of he present state, repairing the wooden members, reassembly, and the final finishing touches. His presentation was well planned and documented, and covered the most essential part of the conservation practice. I was happy to know that he was involved in the conservation of a Buddhist monastery (Iba Bahi) in Kathmandu from JACAM.

On the same day Mr. Tsuneo Hatano, councilor of the Japanese Association for Conservation of Architectural Monuments, gave the framework for the preparation of practical training and the overall process of conservation. He gave an overall idea of the Japanese process of the repair plan, the design of the project, the implementation of the project in detail, and the implementation of the repair work, etc.

On the 3rd, 4th, and 5th of October we participated in practical training at the old farm house of the Tanaka family. We made sketches of the house, measured the dimensions of components and inter-columnar spaces and recorded them, made sketches in cross-section and recorded the species, quality, construction method and configuration of the materials. This training program was very interesting to me, because I am not an architect but I was acquainted with the process of how to make plans and cross-sections and measurements. Though it was hard for me I really enjoyed doing it. I learned about the typical house style of Japanese traditional architecture, its components, its aesthetic

value and importance. The measurements of tatami mats was very easy and practical. During this training period we got the opportunity to visit to the reconstruction site of the ancient Toshodaiji temple, and learned about the reconstruction project, and the conservation and documentation of the paintings.

On the 9th, 10th, and 11th of October we went on a three-day excursion tour of Aichi Prefecture and Gifu Prefecture to study conservation and utilization of the wooden heritage. In Aichi prefecture we visited the Meijimura museum. They tried very hard to preserve the traditional houses to save for future generations to see and learn from. In Gifu prefecture we visited Hida Takayama and observed the Takayama autumn festival. Takayama is a historic and traditional town which has conserved its historic and traditional fabric in a way I really liked. The visit to Shirakawa-go was very interesting. It reminded me of villages in my country but it was very well organized and developed by comparison. As it is inscribed on the world heritage list, the people and the authorities take good care to maintain the place. But I did not like the traffic running through the middle of the village; they should make that a pedestrian area as most of the heritage sites in Europe do.

On the 12th of October, Mr. Mitsuru Nagao gave a lecture on the subject of management and disaster reduction of wooden structures, dealing with the need for a conservation master plan and risk preparedness. This lecture was very important for management and risk preparedness. Japan has advanced beyond many other countries in these matters I suppose. I wonder if my government will think about it soon. Because in my country there are very few examples of earthquake strengthening, nor is there much concern for other disaster management. The lecture focused on the guidelines for drawing a conservation master plan for important cultural property buildings, including the objectives of the guidelines and master plan, the planning zone, the contents of the plan, technical assistance, and verification of the plan and development of the plan. It was also focused on standard composition of the conservation and utilization plan for important cultural properties, composed of conservation and utilization plans, environment protection plan, risk preparedness plan, and legal procedures. He gave in-depth ideas on fire prevention, seismic safety, and crime prevention, and the equipment necessary for risk preparedness.

On the same day Mr. Ken'ichi Murata gave a lecture on the handing down of traditional skills and securing materials for repairs. His lecture was mainly focused on conservation of wooden buildings and how they differ from stone buildings, on the systems for repairing cultural heritage and the process of repair, and on the handing down of traditional skills and securing materials for repair.

On the 15th of October, a practical training program on the survey of paintings and the formulation of a painting restoration plan was organized with an on-site lecture at the Nishigoten and Higashigoten buildings of the Niukawakami shrine, by Mr. Shigeru Kubodera. He gave an introduction to Japanese

paintings, explained the role of paintings in religious architecture, the methods adopted for restoration of paintings in Japan like partial painting, complete painting, maintaining the original painting, the cultural value of painting from the aspects of style, the techniques and principles of restoration of the paintings, etc. We did a practical training of how to identify and document colors, pigments, and styles, how to assess paintings and make proposals for their conservation. The training was followed by discussion about the observation and most of the discussion was on how to preserve and conserve the paintings on different contexts.

On the 16th of October Mr. Takumi Mitsutani gave a class on the very important subject of dendrochronology in Japan, covering aspects of tree species and annual rings. It provided a lot of knowledge about an absolute dating method which is necessary in archaeology and conservation. Japan has developed a strong emphasis in this field of analysis, with the abundance of waterlogged sites where wood is preserved and can be uncovered during excavation. A variety of equipment has been devised for the measurements required in this and in other areas of scientific analysis, whether in archaeology or in the field of other cultural matters. In Nepal we do not have as much expertise or equipment, but with the help of a foreign conservation party, we were able to do a dendrochronological survey in the trans-Himalayan place of Mustang, which helped to construct a dendrochronological master sequence for dating some sites.

On the 16th and 17th of October, Mr. Aidan Challis lectured on the future tasks in the preservation of cultural heritage from the perspectives of theory and practice. His class was very interesting because he was dealing with most of the issues of the world heritage, the nomination process, tentative list, operational guideline, future tasks in the preservation of cultural heritage, values and identity, outstanding universal value, criteria, qualifying conditions like authenticity, integrity, protection and management, general observations on world heritage decisions, charters concerning conservation, the Nara document on authenticity, contextual conservation concept of Mr. Gamini Wijesurya, and several case studies from New Zealand's tentative list. I was very impressed with his presentation skills, and by the discussion part which encouraged me to put my thoughts to my colleagues.

3. Status of conservation in Nepal

In 1953, the Department of Archaeology was constituted by Government of Nepal. Three years after its formation an Act named the 'Ancient Monument Preservation Act 1956' was formulated and enacted. This act also has been the principal legal entity dealing with the matters relating to the protection, preservation and the management of the cultural properties and heritages of the country. The provisions of this act also ensure the preservation of individual elements of any cultural properties whether movable or immovable. Likewise, the act also provides ample provisions to protect and preserve any individual monuments, group of monuments, sites and even vernacular edifices

located throughout the country either private or public having archaeological, historical, artistic and aesthetic values. This act authorized the Department of Archaeology as the principal governmental authority to protect and preserve the vast cultural heritage of the country.

Main Functions of the Department of Archaeology

- Preservation and protection of monuments and archaeological sites.
- Conduct archaeological exploration, and carryout archaeological excavation.
- Carry out research activities on Nepalese history, culture and archaeology.
- Collection, research and publish the archival materials.
- Establish the museum and enhance the organization of museums.
- Management and preservation of the World Cultural Heritage Sites.
- Prepare the inventory of all types of the cultural heritage.
- Control the illicit export and import of the movable cultural property.
- Provide technical and financial assistance to the local people and agencies for the monument conservation.

For the execution of the aforesaid tasks, along with other regular works like planning and programming, the Department of Archaeology has eight sections in its office at Ramshah Path, Kathmandu: Administration Section, World Heritage Conservation Section, Monument Conservation Section, Engineering Section, Photography and Documentation Section, Planning, Evaluation and Publication Section, Archaeology Section, Curio Inspection Section. The offices like National Archives, Central Cultural Heritage Conservation Laboratory are also functioning under the Department.

In Nepal, if we talk about the legal and legislation system, the principle Act relevant to the conservation of heritage is the Ancient Monument Preservation Act (1956). There are various other Acts that directly or indirectly address heritage conservation issues, which should augment – however, often contradict – the principle Act. One is the Ancient Monument Preservation Act 1956 - Fifth Amendment 1996. This legislation for the conservation, protection and management of cultural property is based on the Ancient Monument Preservation Act (AMPA), 1956, its subsequent amendments (the latest having been the fifth amendment in 1996) and the Ancient Monument Preservation Rules 1988. The Ancient Monument Preservation Act gives the Department of Archaeology the legal provisions to declare a monument or area to be a Protected Monument Zone (PMZ). The Department of Archaeology is subsequently responsible for the protection of the site, including the prescription of building bylaws, approving requests for building permits and for any other construction activities within the zone. The Department of Archaeology is given the authority to stop inappropriate and/or illegal building activities and to request for the demolition of unauthorized constructions. The seven Monument Zones of the Kathmandu Valley World Heritage property have been declared PMZs and the boundaries have been announced under the provisions of the AMPA. The

Department of Archaeology is therefore responsible for the preservation of the areas comprising the property inscribed on the World Heritage List. In respect to the protection of the World Heritage property, a sixth amendment to the AMPA has been found necessary. This is particularly so in respect to the devolution of powers and responsibilities to the Elected Local Government Bodies, the Pashupati Area Development Trust and the Guthi Corporation.

Local Self-Governance Act (1999)

The Local Self-Governance Act (LSGA) 1999 is the principle act for the decentralization of powers to the *District Development Committees (DDC)*, the *Municipalities* and the *Village Development committees (VDC)*. The LSGA gives the elected local government bodies the function and duty – to varying degrees – to record, maintain and preserve the tangible and intangible heritage within their area of jurisdiction. Without detailed differentiation, these provisions may conflict with the AMPA. Under the LSGA, the municipalities are given the mandatory function and duty to prepare an inventory of the culturally significant places and maintain and protect them. In respect to the physical development, the municipalities must prepare a land-use map and must approve the design permits. In respect to the PMZ and listed monuments and historic buildings, the approval of building permits is done through the Department of Archaeology. The wards of the municipalities are given the functions, duties and powers to *help* preserve monuments and important sites within their ward. The LSGA gives the VDCs limited functions, duties and powers, and these are not specified as being mandatory. The involvement of VDCs in physical planning and conservation is less concrete. They are responsible for keeping records, maintaining and preserving religious and cultural places, as well as for preserving languages, religions and culture. The VDCs are also to prepare *criteria* for houses, buildings, roads and other physical infrastructures to be constructed within the village development area, and to grant approval for their construction. Of the seven Monument Zones of the Kathmandu Valley World Heritage property, Changu Narayan is the only one that is situated within a VDC. Due to the limited authority – and resources – of the VDC, it will be necessary for the Department of Archaeology to remain directly involved with site management.

Town Development Act (1988)

The Town Development Act (TDA) 1988 mainly deals with the reconstruction, extension and development of towns. In order to implement town planning in any particular area, the TDA allows for the formation of *Town Development Committees (TDC)*. In the Kathmandu Valley, the *Kathmandu Valley Town Development Committee (KVTDC)* is responsible for implementing the Act. The TDA includes regulations for the reconstruction and extension of the area of a town, for fixing land-use zones, preparing bylaws, demolishing unauthorized construction and setting standards for physical development. Through the LSGA most of these responsibilities have been transferred to the municipalities.

Pashupati Area Development Trust Act (1987)

The Pashupati Area Development Trust Act (PADTA) 1987 is a specific act for the conservation of the Pashupati Area. It provides for the establishment of a Pashupati Area Development Fund to manage, maintain and preserve the natural and cultural heritage in the Pashupati area and prohibit the registration of land within the area to any person or institution. The Pashupati area has, however, also been declared a PMZ under the AMPA. The PADTA was recently amended to change the condition of involvement of the royal palace in the trust. The PADTA established the *Pashupati Area Development Trust (PADT)* as the authority for the development, protection and maintenance of the Pashupati area. The main objective of PADT is the implementation of their Master Plan to develop and conserve Pashupati as a religious centre for the Hindus.

Guthi Corporation Act (1964)

The Guthi Corporation Act (GCA) 1964 was established in 1964, nationalizing all *Guthis* (traditional community based trusts with legal ownership of most religious monuments) to a centrally organized unit, the *Guthi Sansthan*. The amendment of 1976 classifies *Guthis* into three categories: Raj Guthi (state), Niji Guthi (private) and Chhut Guthi (exempted). The Guthi Sansthan is to perform religious rites and festivals, preserve cultural heritage, monuments and other religious buildings, preserve ancient ornaments and article of religious and cultural importance. The act also prohibits registration and sale of land belonging to temples or spaces for public festivals and worship. The Guthi Sansthan is still the legal owner of many monuments and historic buildings within the PMZs. However, due to diminished community support and lack of funds, the Guthi Sansthan's role has been reduced to basically performing religious rights and festivals.

Building Bylaws

There are legal provisions for the preparation of Building Bylaws by the Department of Archaeology (in the AMPA), by the Municipalities (in the AMPA) and by the Town Development Committees (in the TDA). There are contradicting bylaws being implemented in the areas comprising the World Heritage property. The Department of Archaeology has prepared "*Building Bylaws and guidelines – 2048 (1991) (with amendments) for Kathmandu Valley Protected Monument Zone*". These are general bylaws for all PMZs which do not account for the diversity of the individual PMZs. The municipal building bylaws for Kathmandu Metropolitan City and Lalitpur Sub-Metropolitan City were prepared by the KVTDC. The municipal building bylaws for Bhaktapur Municipality were prepared by the municipality itself. For all three municipalities, the bylaws prepared by the Department of Archaeology were taken as a basis, however some major alterations were made. One of the most drastic differences is the provision for allowing reinforced concrete frame structures to be used when reconstructing. Additionally, the PADT has prepared its own interpretation of the building bylaws.

National Building Code

The National Building Code, which was initially prepared in 1994, has recently come into effect and the municipalities have started enforcing the code. The negative impact for the conservation of heritage buildings has been the interpretation that historic load-bearing structures do not have adequate stability and all new construction needs to be reinforced concrete frame structures. The code emphasizes seismic stability, yet clearly makes provisions for load-bearing masonry structures.

Other Legal Issues

One of the main difficulties faced in trying to preserve privately owned historic buildings has been the practice of hereditary division of property. The historic buildings are divided up vertically to allow all parties to own part of the land. There are no legal provisions to stop hereditary division of historic buildings. Legal provision for ownership of individual floors of a building is still under formulation.

Kathmandu Valley World Heritage Site

The Kathmandu Valley World Heritage Site was inscribed on the World Heritage List under criteria iii, iv and vi. Consideration has however been given to the fact that the criteria, as formulated in 1979, have evolved as a basis for giving more attention to "living cultural traditions" in the management of the present day World Heritage property. In these terms, the Kathmandu Valley World Heritage Site can be described as testimony to the unique "Newari Culture" which is still alive today. The cultural traditions of the multi-ethnic people who settled in this remote Himalayan valley over the past two millennia, referred to as the Newars, is manifested in the unique urban society which boasts one of the most highly developed levels of craftsmanship in brick, timber and bronze in the world. The Kathmandu Valley World Heritage Site is comprised of exceptional architectural typologies, ensembles and urban fabric which illustrate the highly developed culture of the Kathmandu Valley which reached an apogee between 1500 and 1800 AD. The exquisite examples of palaces complexes, ensembles of temples and stupas are unique to the Kathmandu Valley. The Kathmandu Valley World Heritage Site is tangibly associated with the unique coexistence and amalgamation of Hinduism and Buddhism with animist rituals and Tantrism. The symbolic and artistic values are manifested in the ornamentation of the buildings, the urban structure and often the surrounding natural environment, which are closely associated with legends, rituals and festivals. In 2003 Kathmandu valley was taken into the world heritage in danger list. After four years The World Heritage Committee meeting held in Christchurch, New Zealand in June 2007 has removed Kathmandu Valley, Nepal, from the List of World Heritage in Danger, recognizing progress in the sites' state of preservation. The World Heritage Committee commended Nepal's efforts to protect the outstanding universal value of the site in the face of urban development.

Guiding conservation principles

The Guiding Conservation Principles deal with the legal framework for the conservation and maintenance of classified monuments. Classified Monuments are all buildings and structures that have been listed and categorized in the most recent inventories prepared by the Department of Archaeology. The Guiding Conservation Principles are to be enforced for all classified monuments. The principles' aim is to preserve and maintain all those elements and attributes that contribute to the value of the historic building/structure for which the monument has been listed and classified in the inventory and to ascertain that all other elements and attributes are compatible and appropriate to the building/structure and its context.

Criteria for Classification Monuments

The Ancient Monument Survey and Classification Committee developed the following criteria for the classification of monuments in a series of meetings held between 17th February and 26th June, 2000.

Criteria for Classification I. All monuments and historic buildings that were built before 1825 BS (1768 AD) and that have remained intact till date. Monuments which are unparalleled from the artistic, architectural and historic standpoint. These include all Mallaperiod palaces, temples, monasteries, stupas, maths and architecturally important private and public patis, sattal and houses - buildings that are representative of excellence of the art and skills of the country; all superior-class Malla-period artworks, sculptures, statues of kings and courtiers, and all pieces of art in any medium; likewise, Licchhavi-period statues/sculptures, chaityas, stone water conduits, inscriptions and relics from pre-Licchhavi period. It has been proposed that the buildings constructed before 1903 BS (1846 AD) shall also be included in this Classification. These include buildings that are of superior class from artistic and architectural standpoint such as Shah-period palaces and buildings that have been built in exquisite artistic style and that have remained intact till date. Likewise, all the structures that are representative of art and architecture of the period before 1903 BS such as all royal, religious, public or private monuments, buildings, temples, exceptionally artistic statues, stone water conduits etc. Some examples of buildings in this Classification: Shah period palaces, temple complexes with exquisite artworks, buildings that display superb woodwork and use of highly refined traditional brick (dachi apa); temples that were built in traditional or "cupola" style (being less in number, these need to be included in this category); gold-plated statues (religious or secular), statues and images of rulers and courtiers etc. from the Shah period. Likewise, archaeological sites located at different districts of Nepal and Medieval or pre-Medieval period buildings such as palaces of rulers from different time periods, houses, temples, stone water conduits, forts – that are important due to their period, art, architecture and religious significance and that have remained intact till date have been proposed to be included in this category. All Medieval and pre-Medieval period gumbas of outstanding significance (whose form and size have not been changed) and ancient caves are also proposed in this category.

Criteria for Classification II. Private and public temples, palaces and buildings of Rana period – constructed after 1903 BS (1846 AD), associated with important historical figure(s) or event(s), notable examples of art and architectural excellence, retaining their beauty and original form; representative of art and architecture of their time period have been proposed to be included in Classification II. Monuments like temples, houses and buildings etc. that were built before 1825 BS (1767AD) but are not included in Classification I – monuments that are important from historic, artistic and architectural standpoint, that have retained their original form, character and features but have undergone minor modification during renovation are also proposed in this category. Monuments like temples, houses and buildings etc. that were built after the Unification of Nepal (1825 BS) but before 1903 BS – monuments that are important from artistic and architectural standpoint, associated with important event(s), representative of original art and architecture of that time period but have undergone minor modification during renovation and conservation works are also proposed in this category.

Criteria for Classification III. Monuments and artworks of local importance such as temples, buildings and houses etc. that can not be included in Classification I and Classification II Monuments; that are representative of the importance of their locality and periphery are proposed in Classification III. Monuments that were built before 1825 BS and, although having undergone a considerable change in their original style during renovation and conservation works, have retained few representative art elements of that time period are also proposed in this category. Likewise, the artworks that, after being destroyed in 1990 BS earthquake, were renovated in unscientific and simplistic way yet retaining a few old artistic elements are also proposed to be included in this category. Structures, temples, buildings and houses etc. that were built before 1903 BS – monuments that are not so much attractive from artistic and architectural standpoint; that have undergone considerable modification and change have been proposed in this category. Rana-period structures and artworks that were built after 1903 BS and not included in Classification II are also proposed to be included in this category.

Types of Building Bylaws

Within Monument Zone boundaries. Building Bylaws have been specifically prepared for each Monument Zone and are an integral part of the Municipal Building Bylaws. The responsibility for the enforcement of these bylaws lies with the respective Site Managers, supported by the Department of Archaeology.

Within the Buffer Zones. The buffer zones have similar bylaws, however focusing more on the impact these buildings would have, rather than the value of the buildings themselves. However, it is of paramount importance to keep in mind that no activities should be allowed within the buffer zone

that might negatively impact the outstanding universal value of the Monument Zone. These might be activities or construction that affects the elements and attributes of the Monument Zone; visually, by means of pollutants, noise or smell, or changes the traditional character of the place. In implementation Process the Building Bylaws is accompanied by a detailed implementation process clearly defining the authorities, the flow of information and the decision making and monitoring provisions.

Content of Building Bylaws

The Building Bylaws address the issues like: (1) the positioning of the building on the plot; (2) the response to neighboring buildings and public spaces; (3) the volume and size of the building; (4) the overall building form including projections and roof; (5) the scale of the building and the floors, including cornices; (6) the materials; (7) the color and texture; (8) the essential construction details; (9) the openings; (10) the plinth; (11) the services, including water, sewage, waste, electricity, telecommunication, drainage, their connections and visual impact; (12) the usage and functions; (13) building styles if relevant.

The Building Bylaws also address circumstances like the demolition of existing buildings, the division of existing buildings, reconstruction and the reuse of materials, and extensions, both vertical and horizontal.

4. Conclusion

The reason for giving at length the above information on the world heritage status is merely to share with all what the status of world heritage is in my country, and what concerns there are about the world heritage. Regarding the conservation of important cultural heritage, we are do reasonably well given our context. I cannot compare my country favorably with Japan, which has a long history of conservation in the modern period. It is a developed country so that it is very keen to conserve its heritage in any way, but with the limited budget allocated by the government of Nepal, even though we would like to conduct more complete conservation we cannot do so because of lack of money. There are hundreds of monuments scattered all around the Kathmandu Valley. They possess beautiful wood carvings along with medieval Nepalese woodwork. While wooden structures are not found in Nepal that are as elaborate as some in Japan, every structure nevertheless includes a wooden door, windows, struts, entablature, beam bracket, door wings, rafter and tympanum. These parts are integral to Nepalese architecture. Basically, Nepalese style temples and traditional houses used many wooden members. The wooden parts of these monuments are conserved by the people with their traditional knowledge from time immemorial. After the establishment of Department of Archaeology, certain acts were promulgated for the conservation of wooden structures associated with monuments as I mentioned before. We have hundreds of monuments all around the Kathmandu valley, so it is very

hard to conserve them within the government's limited budget. The government agencies use modern technology for the conservation of these old architectural specimens while people prefer to adopt traditional technology for maintaining these monuments. At present, lots of problem can be seen for the conservation of wooden specimens in the Kathmandu valley. They are a lack of sufficient budget, lack of experts, lack of modern technologies, lack of proper management, lack of coordination between government agencies, lack of sufficient manpower, lack of coordination between traditional and modern technology, lack of documentation for wooden specimens, lack of public awareness, etc. However, at present the government has some helping hands from INGOs, NGOs, local governments and communities. Some conservation work is being done within the standards of international charters and with the traditional continuation of culture as well.

To compare the world sites of Nara and Kathmandu, Nara has eight world heritage sites and Kathmandu valley is one world heritage site consisting of seven monument ensembles, within which are old settlements and their traditional culture, customs and creed. With the world going toward modernization the people within the world heritage area also wanted to go to modern living. So we were having great difficulty convincing the people that they should live in traditional houses and not demolish old houses, and if they have to build new ones they have to follow the strict rules of the government, so the people started to violate the law. Since the government is not strong enough to impose its will on the people, the bylaws were accordingly changed a little to win the people's hearts. What I have learned from this is that in the name of conservation we do not have to stick to the strict bonds of tradition, if modern technology is good enough to secure the safety and wellbeing of the people.

Japan is one of the richest countries in terms of cultural properties in the Asia-Pacific region. Further, the cultural properties and historic monuments etc. of ancient Nara, which have been inscribed on the World Heritage list consist of eight heritage assets. In this training course I have had the opportunity to learn a lot about system management for individual heritage assets included among the historic monuments of ancient Nara, protected and preserved by the national government under laws for the protection of culture properties, with buildings protected as national treasures or important cultural properties, the Kasugayama primeval forest as a special natural monument, and the Nara palace site as a special historic site. In addition, the national government has designated the places where those building are located as historic sites in order to reinforce the degree of protection. The law provides for the conservation of the building and subterranean remains, as well as the natural features of the immediate environment around the properties.

In particular, as the maintenance and management of the building included in the properties is the responsibility of their owners, in the case of conservation repair work, the owners can receive financial support from the national government, subsidizing 50% - 85% of the total cost, and also

from local governments. The execution of the repair work is entrusted to Nara prefecture, and is carried out by their highly skilled conservation specialists, who follow the work continuously from preliminary investigation phase through the actual repair phase. The subsidy policy in Nepal is quite similar, but the Nepalese government has only a limited budget, and procedures which do not make the people feel like it is easy to receive a subsidy. But whereas in Japan the process is even longer, people are very happy to get subsidies and conserve their important cultural property.

I was very much impressed by the good efforts made on the part of Japan's national government, prefectural governments and municipalities, to conserve the heritage. Designation, inventory, and documentation are important tasks for conserving the heritage. Privileging traditional technology and workmanship, conservation of the material (e.g. forest), risk preparedness, conservation master planning, documentation techniques, use of sources in a perfect way, experimentation with wooden structures and reinforcement in the local context, education and training in understanding wooden structures, good foundations and fire protection systems, survey methods for traditional buildings, broader concepts of conservation and reconstruction to retain authenticity, respect for original knowledge, storage of conservation information, wide range of structure and conservation context, sharing of similarities and differences, different techniques of measuring and drawing – these were the approaches I became acquainted with.

In Nepal, which has an exceptionally rich heritage constructed from timber, the elimination of malaria in the forested lowlands, and subsequent clearance of the jungle by people moving down from the mountains and cutting down the trees, seemed to present a problem of timber supply, but an examination of the trees used in the construction of the Sundari Courtyard of Patan Palace showed that with the exception of the big lintels and posts of the ground-floor openings, no timber came from a tree more than about 70 years old, which had been quartered or halved to produce the beams. If trees of this age are the most frequently required, the idea of sustainable forest reserves for timber conservation becomes achievable within a generation. In Nepal, the *sal* (Shorea robusta) trees required for conservation timber can be seen successfully regenerating along the entire forested strip at the foot of the Himalayas, except where there is overgrazing by cattle or goats, or where peasants have made paddy fields beneath the adult trees. A traditional timber house would normally be rebuilt when it reached a certain stage of decay, but the crisis in timber supply means that this is a luxury we can no longer afford. The shortage of timber means that not only does the retention of the original fabric have value in maintaining authenticity, but is also the only sustainable way that the heritage of timber houses can be maintained, by minimizing the amount of new timber used, so that the maximum number of old buildings can be repaired and saved for the future.

For wooden heritage, minimum intervention may not be sufficient for conservation. Learning such techniques will distinguish the conservation carpenter from the ordinary structural carpenter. It is extremely unusual for a timber which requires repair to exhibit an identical level of decay along its

whole length. It is much more likely that one end may have damage which requires replacement rather than the whole timber. If we are to achieve sustainability in timber conservation in the region, given the shortage of timber, much greater emphasis must be placed on the repair of individual timbers rather than replacement. The bases of timber columns are also a place in which decay is likely to occur, and schemes involving repair *in situ* rather than by complete dismantling may require modified repair joints which enable a new foot for the post to be slid in sideways while the rest of the structure remains standing. In Japan I admire the custom of placing of stones under the wooden beams which helps prevent the wood from rotting and from being attacked by termites from the ground below. But in Japan the practices of dismantling and repair, and taking one heritage unit from one place to another, are normal activities that differ from our culture.

Acknowledgments

The training was very beneficial, and a good opportunity for me to learn all aspects of conservation from Japanese and international experts, and to share ideas with other participants, which will be very helpful for me in dealing with future challenges I have to meet. When I came here I had a little knowledge of conservation which I acquired from the short period of my job in the Department of Archaeology. From this training program I have now been refurbished with broader ideas in the field of conservation science. This should not be the end of my training, as conservation is a on going process. The problems to be addressed in this regard may either be unique to particular local context, or common to the Asia-Pacific region or the world. The initiation of the exchange of ideas, information, and of dialogue has to be continued in the future between the participants.

The course was well organized. I admire the well-trained members of the ACCU Nara office and their efforts to complete the training programs on time and in scheduled fashion. I thank them from the bottom of my heart for their generosity, their helping nature and their hospitality. I would like to express my gratitude to the Bunkacho (Agency for Cultural Affairs in Japan), the Cultural Heritage Protection Office Asia/Pacific Cultural center for UNESCO (ACCU Nara), the International Center for the Study of the Preservation and Restoration of Cultural Properties (ICCROM), the National Research Institute for Cultural Properties, the Ministry of Foreign Affairs of Japan, the Japanese National Commission for UNESCO, and to the Nara prefectural and municipal governments for giving me the opportunity to participate in this training course. I would like to thank heartily the director of ACCU Mr. Yasushi Nishimura, and the staff of the international cooperation division beginning with its director Mr. Isao Nakai, associate director Mr. Wataru Kinosita, section chief Mr. Tsutomu Yamashita, and staff member Ms. Otani Yasuko, plus all other staff of the ACCU office for their excellent handling of the course from its inception to completion, providing all the guidance and necessary information. I also would like to thank Ms. Chiyako Hata for her very skillful translation of

the lectures and other relevant information, and to the lecturers and experts especially for their expertise and lecture.

I also would like to thank the Government of Nepal, Mr. Jal Krishna Shrestha, Joint Secretary for the Ministry of Culture, Tourism and Civil Aviation, and Mr. Kosh Prasad Acharya, Director of the Department of Archaeology, for nominating me for this training course. And at the end I would again like to thank the ACCU and ICCROM for giving me this opportunity, and thank the staff of ACCU for their help and cooperation.

Thank you

Namaste

New Zealand

Ellen Margaret ANDERSEN

Introduction

This final report has been produced for the 2007 Training Course on Cultural Heritage Protection in the Asia-Pacific Region - Preservation and Restoration of Wooden Structures. The report will present a number of comparisons between current practices in Japan and New Zealand, and discuss the relevance of the training course to conservation work in New Zealand. This report will also comment on how the knowledge gained in this training course can be applied to cultural heritage protection and restoration activities in Maori built heritage in New Zealand.

This report has been prepared by Ellen Andersen, Maori Heritage Advisor for the New Zealand Historic Places Trust- Pouhere Taonga, for the Asia/Pacific Cultural Centre for UNESCO Cultural Heritage Protection Cooperation Office (ACCU), Nara, Japan.

I have been working in my role as Maori Heritage Advisor for the New Zealand Historic Places Trust for nine months. The New Zealand Historic Places Trust is a government agency funded by the Government's Ministry of Culture and Heritage. This job role includes the preparation of reports for the registration of sites of significance to Maori, and the assistance and advocacy in heritage management issues. This role includes Maori built heritage, but also encompasses non-built heritage such as archaeological sites, burial grounds, sites where important historical or mythological event occurred, and the landscape remains of sites that previously contained built heritage.

Prior to commencing my current job, my work experience has primarily been in the field of architecture and conservation of historic buildings. I have worked in these fields in New Zealand, Australia, and the United States of America, and my main focus of academic research has been in wooden traditional architecture of the Pacific Islands (including New Zealand). This training course has provided a rich variety of extremely useful information, learning experiences, and opportunities to extend my knowledge in conservation concepts and practices.

In regards to how I can apply this learning experience to conservation work in New Zealand, I feel the training can be divided into two main categories:

- Training associated with the physical conservation and restoration of built heritage (which relates strongly to my previous work experience in architectural conservation)

- Training associated with the work of a government agency active in the protection, registration and management of places of significant heritage value in New Zealand (which relates strongly to my current job)

Since the aim of this report is to discuss how this training course can be applied to my work and current conservation practice in New Zealand, I will focus on the second of these two categories and discuss this training in terms of its relevance to the role of the New Zealand Historic Places Trust as New Zealand's leading heritage agency.

Relevance of Training to the work of the New Zealand Historic Places Trust

There have been a great number of aspects of the training in this course that I can apply to my work in New Zealand. There are three primary themes that have been very useful and important for me in this training course. These can be divided as follows:

1. **Legal and governmental frameworks**; including registration, designation, and legislation relating to the protection of cultural heritage.

2. **Documentation and management planning for built cultural heritage;** including conservation plans, conservation masterplanning for built cultural heritage, and risk preparedness planning.

3. **Frameworks for considering built cultural heritage values;** including concepts relating to authenticity, continuity, and living cultural heritage.

There is much more research that I need to undertake to gain a more complete understanding of these themes, but I will use this report to give an overview of how the knowledge gained on this training course has given me a better understanding of conservation practices in Japan and how they relate to the situation in New Zealand.

Legal and Governmental Frameworks for Cultural Heritage Protection in Japan and New Zealand

New Zealand and Japan both have legislation for the protection of cultural heritage. In Japan, the Law for the Protection of Cultural Properties was introduced in 1950 and has undergone many changes to keep the legislation up to date as the needs and views of society changes. Japan has technically had heritage protection legislation in place since 1871 with the Law for the Preservation of Ancient Artifacts, which primarily focussed on temples and shrines. A system for the registration of

cultural properties was introduced into this Act in 1996 to provide a national inventory of important historic buildings.

In New Zealand, the Historic Places Act was first established in 1954, with the purpose of making provisions for the preservation and marking of places of national or local historic interest and the keeping of permanent records in relation to these places. The primary purpose of this law was to establish an inventory such as was introduced in Japan in 1996. This Act underwent revisions in 1980 and 1993, and most recently in 2004. This act does not provide any legal protection for registered historic buildings, but does have legal provisions for items defined as an archaeological site. This can include any place associated with pre-1900 human activity (so can include pre-1900 built heritage).

The earliest legislation related to Maori cultural heritage was the Maori Antiquities Act of 1908, which focussed on the export of artifacts (including built heritage) from New Zealand. This law was replaced by the New Zealand Historical Articles act in 1962, then the Antiquities Act of 1975, which has now been renamed as the Protected Objects Act. The Historic Places Act and the Protected Objects Act are the two main legal protection mechanisms for Maori Built Heritage in New Zealand, although clauses and related legislation is found in other New Zealand Laws, and heritage properties are also protected through local government acts (similar to municipal government).

The Japanese Law for the Protection of Cultural Properties and the Historic Places Act address many similar issues, including;

- Defining a categories of importance for cultural heritage properties
- Provision for a register of important cultural heritage
- Buried, or archaeological cultural heritage
- Historic districts, or areas of more than one important cultural heritage site
- The establishment of a Council for the protection of heritage places

The details of these provisions are different between the two countries with many more legal protection mechanisms present in the Japanese legislation than the New Zealand Act. A closer comparison between the two would be very useful to undertake, but the initial comparison that could be made between the two is perhaps that the history of Japanese legislation has been to provide legal protection for important ancient properties, which later expanded to a more inclusive inventory of important cultural properties, whereas in New Zealand, the process began with the general inventory, but the Act has not evolved to incorporate a level of protection for historic places as seen in Japan.

Some of the key issues that are covered by the Law for the Protection of Cultural Properties in Japan,

that are not accounted for in New Zealand heritage legislation include;

- **Intangible cultural property;** such as ceremonies, festivals, important songs and dances.

- **Intangible cultural property;** such as crafts, tool manufacturing processes, traditional construction techniques, construction material gathering places in the landscape, and manufacturing processes.

- **Folk cultural property**; which may be described as cultural heritage which tells us about the everyday life of people, this is cultural heritage which is – as Gamini Wijesuriya of ICCROM explains – seemingly simple, but significant.

- **Cultural landscapes;** introduced in 2004, cultural landscapes may be described as landscapes that have evolved in association with the modes of life of people, and the geo-physical features of the region which are indispensable to the understanding of the lifestyles and livelihoods of the people of Japan.

These issues are all applicable to the New Zealand heritage conservation environment and I hope that future developments in our heritage protection and advocacy processes will incorporate many of these important themes into the operational objectives of a government agency such as the New Zealand Historic Places Trust.

Documentation and Management Planning for Built Cultural Heritage

The opportunity to learn more about documentation methods in Japanese built heritage conservation has been invaluable for me during this training course. There has been an extremely useful range of approaches to documentation and preservation planning shared with us, from the broad ranging planning process for the registration and documentation for historic districts, through to the highly detailed conservation practices associated with processes such as dendrochronological analysis of historic wooden members, and conservation science for synthetic and organic resins.

I feel that some of the more large-scale processes will be most immediately applicable to conservation practice in New Zealand, such as the community-consultation focus of historic district registration and survey process, and the risk-preparedness guidelines and procedures we have had the benefit of receiving.

Perhaps one of the most interesting documents that I have received during my training has been the **Guidelines for Creating a Conservation Masterplan for Important Cultural Property Buildings**, prepared by the Cultural Properties Protection Department of the Agency for Cultural Affairs. This

document was presented by Mr Mitsuru Nagao, Specialist for Cultural Properties, from the Architecture and Other Structures Division of the Agency for Cultural Affairs, Japan (*Bunkacho*). This document outlines a resource that has the potential to be very useful in the field of Maori built heritage, as it has a much broader scope than heritage preservation planning documents currently used in New Zealand, such as conservation plans produced according to J.S. Kerr's guidelines.

Firstly, the conservation masterplan allows communities to acknowledge and extend a planning area beyond what may be their own properties. The community is empowered to identify and consider associated features that are important to the heritage of the community such as significant mountains, rivers, and places where traditional building materials and foods are gathered.

Secondly, the guidelines in this conservation masterplan allow the community to document and record the present condition of built heritage (in a similar way to current conservation plans) but also incorporates daily and periodic maintenance plans, and methods for monitoring deterioration.

Thirdly, the inclusion of an extensive risk preparedness plan, identifying not only how to prepare for potential natural hazards (or arson), but also an opportunity for communities to identify procedures of how to cope during a disaster, and following a disaster. Mr Nagao devoted a substantial amount of time to the discussion of fire safety mechanisms, which is a very important consideration for Maori built heritage in New Zealand.

The guidelines also discusses issues concerning ways to share heritage with the public, and ways in which planned maintenance and repair programmes can enable the transfer of traditional knowledge from generation to generation. I feel very privileged to have had this information translated into English, and look forward to sharing this with colleagues at the New Zealand Historic Places Trust.

Frameworks and Concepts for Considering Built Cultural Heritage Values

A secondary purpose that much of this training course has provided opportunities to discuss has been the many different ways of understanding and framing the key concepts in built heritage conservation around the world today. There is much more emphasis today in the celebration of the diversity of the world through cultural heritage, and therefore the recognition that there is a need for a multitude of culturally-specific responses to built heritage conservation, rather than a universal values system that must be adopted by all.

When discussing the motive behind heritage conservation amongst this culturally diverse group of people, the most common theme to arise is that cultural heritage is something important that has been handed down to us by past generations, and we should ensure that we are also able to pass the heritage on to the next generation.

Wrapped up in this notion are many issues surrounding continuity, change, and authenticity. The idea of 'living cultural heritage' has been discussed many times and notion that heritage places only have value when a group of people value it (identifying the cultural group as a critical component of the cultural property).

Some of the issues surrounding authenticity, continuity, and heritage value that have been discussed are as follows:

- Is the place still in use?
- Is there a contemporary community associated with the place?

- Is there authenticity in the materials?
- Is there authenticity in the construction methods and techniques?
- Is there authenticity in the spirit of the place?

- Is there continuity in the materials?
- Is there continuity in the construction methods and techniques?
- Is there continuity in the spirit of the place?

Many of the places we have visited have embodied these heritage values in different ways, and it becomes apparent that there is not right or wrong approach to operating in this kind of values-based framework.

One example I would like to discuss briefly from this course was the visit to Meiji-Mura Open Air Museum. Meiji-Mura was established to preserve and display examples of Japanese architecture from the late 19th century and early 20th centuries. This museum is home to many buildings that were destined for demolition and moved to this site with the forethought that the buildings of this period may be of some value to people in the future, even though Japanese society of the time did not generally regard this type of architecture as being of heritage value. Many heritage practitioners object to this kind of presentation of buildings as a pastiche of the past, and a loss of heritage value due to loss of geographical context. Another way to look at a case such as Meiji-Mura is that through relocation they have managed to retain stories of a time, rather than that of a place, and the heritage value is gained though the static heritage value of telling the story of a particular point in time. If these buildings remained in their original location, had not been threatened with demolition, and maintained to the present day, it is likely that they would hold dynamic heritage value, telling the story of a place and its changes over time. These are both important and valid heritage values, and every heritage place holds a combination of static and dynamic values.

Perhaps an example of these static and dynamic values in Maori heritage in New Zealand could be illustrated with ancient rock art and marae built heritage. At many of the ancient rock art sites in New Zealand we have static heritage values in the importance of being able to see the actual work of art created in pre-European times, and it is generally unheard of to hear advocacy for repainting the art works. The rock art also possesses a dynamic heritage value in the use, where these places of significance are still visited on a regular basis by local Maori, but the visit is often no longer as part of traditional movement through the environment for food gathering, but for commemorative, educational, and other ritual purposes. In marae buildings, the continuity of use of the place for gathering, meeting, celebrations and other activities is extremely important, and the buildings will be maintained, restored, and extended to ensure the community can continue to use the place. There is dynamic value in this built heritage, where continuity of use is of priority, and the place retains important cultural heritage value even if physical fabric is changed.

International Perspectives on Cultural Heritage Protection

One theme of discussion during this course which does not relate directly to my work, but is of great interest to me has been the relation this course has to the work of UNESCO and the UNESCO World Heritage List. Many discussions have focussed on the issues faced by Asia Pacific countries in the process for inscription on the World Heritage List. I have followed the many discussions with interest and hope I will have the opportunity to share some of these views with the people in New Zealand that affect the outcome of New Zealand's contribution to this programme. The training has also allowed me to develop some of my own views on the current tentative list in New Zealand and the strengths and weaknesses inherent in it.

In conclusion, I would like to say that I can not understate the benefits this training course has provided for me, and am amazed and the broad range of learning experiences I have had the opportunity to take part in during my time here in Nara. There is and incredible amount of information I can now take back to New Zealand to share with colleagues and heritage practitioners, and I am very grateful to all of the contributors who have shared their knowledge and made various Japanese documents available in English.

I would like to congratulate and thank ACCU for having such an exceptional group of staff members and assistants for this training course, and I hope I will have the pleasure of reciprocating the hospitality and kindness that has been shown to me while in Japan.

Pakistan

Muhammad Ismail KHAN

I would like to express my sincere thanks to the Government of Japan and Mr. NISHIMURA Yasushi, Director of ACCU Nara, for giving me the chance to attend the ACCU training course on Cultural Heritage Protection in the Asia/Pacific Region 2007, on the "Preservation and Restoration of Wooden Structures," organized by the Cultural Heritage Protection Office Asia/Pacific Cultural Center for UNESCO (ACCU), Nara, from 18 September to 19 October 2007.

The country of Japan is very famous for its ancient historical monuments, many of which are registered on the UNESCO World Cultural Heritage List. On 18th of October an opening ceremony was inaugurated at the ACCU office at Nara by the Director of ACCU. He explained the importance of the training course and about the history of Nara city, and all the participants introduced themselves and described their areas of work. I am very happy to receive this opportunity to participate in this training course on the protection, preservation and restoration of wooden structures in the Asia/Pacific Region held in Nara, Japan.

I am an Archaeological Conservator in the Ministry of Culture, Department of Archaeology and Museums, Government of Pakistan, Peshawar Sub-Regional Office, and my primary duties are with the Conservation Branch. Before this training course, I never had a chance to train abroad outside of Pakistan, and my main interest for participating in this course is to learn what is common and what is different in the field of wooden structures as well as in wooden architecture between our countries, as there are fourteen participants from different countries in this training course and they come from Cambodia, China, Indonesia, Iran, Laos P.D.R., Myanmar, Nepal, New Zealand, Philippines, Samoa, Sri Lanka, Thailand, and Vietnam.

The contents of the course covered a great amount of information about the characteristics of cultural heritage wooden structures, about conservation and restoration works, about the proper documentation of cultural properties, about laws and regulations for cultural properties, and the importance of intangible cultural heritage protection.

This training course on the Preservation and Restoration of Wooden Structures and Cultural Heritage in the Asia-Pacific Region held at Nara Japan from 18 September to 19 October 2007 focused on important information related to the preservation and restoration of Japanese wooden structures and buildings, and for the study of the preservation and restoration of the cultural properties. We have learned many things about the preservation and restoration of architectural monuments, as well as how to preserve each monument, and we have also learned much about preservation methods for all

kinds of architecture and the materials used for wooden architectural relics, and gained experience in the restoration of wooden architectural structures, and learned the steps in the restoration process. These matters, presented during the lectures and learned through on-site practical work, will be very useful for me.

The training course introduced methods of preservation and restoration of different wooden structures, with reference to Japan's Important Cultural Properties. It provided a good atmosphere for all the participants, as well as Japanese heritage professionals and specialists, to understand different methods, ideas, concepts, documentation approaches and technologies in the preservation and restoration of ancient wooden buildings. This report, prepared as a requirement of the course, evaluates and provides comments on the training course, focusing mainly on its curriculum, the lectures, the hands-on training and on-site lectures, and includes this participant's presentation and discussion of a few important issues that Pakistan can learn from Japan in the preservation and restoration of important cultural properties and of wooden structures.
The report concludes with some suggestions that the organizers may wish to consider in conducting similar training courses for draftsmen/craftsmen in the future. In our country there is no such training for draftsmen and craftsmen of wooden structures and buildings.

Syllabus of the Course

The thirty-day training course was comprised of three main parts that included a series of lectures conducted in the Asia-Pacific Cultural Center for UNESCO (ACCU) office Nara. Practical training and on-site lectures included a three-day study tour and practical training outside of Nara Prefecture. Also included were participants' presentations and practical documentation work that was performed in the field. Personally, I think the training course was well structured and covered many important issues on the preservation and restoration of cultural properties, especially on wooden structures of Nara, Japan. The course was very useful for me and offered a great opportunity to polish my knowledge in the field of preservation and restoration of culture properties. I learned an incredible amount from the experience of the training course, and I will share and utilize such knowledge and experiences in my future work especially for the preservation and restoration of wooden structures and buildings in Pakistan. The three-day study tour was truly informative and enjoyable, and it was really interesting to see how sites, especially Shirakawa village, have been preserved and presented in various ways for public appreciation. It goes without saying that all of the learning experiences gained from the course will be shared with my staff and colleagues in my department in Pakistan. I hope that the community of Pakistan's archaeological engineers and archaeologists will work together to progressively improve the wooden architectural preservation and restoration work in Pakistan.

Cultural Heritage of Pakistan

Pakistan was one of the two original successor states of British India, which was partitioned along

religious lines in 1947. Pakistan was, in prehistoric times, home to the Indus valley civilization (2500–1500 B.C.) that stood beside Buddhist secular and religious buildings erected later, between the 3rd century B.C. and the 7th century A.D. Magnificent Muslim tombs from the 12th century were accompanied by palaces, mosques and forts of Mughal emperors of the 16th to the 17th centuries. The country's main cities reflect the many influences, both historical and modern, that have made Pakistan what it is today. The Sheesh Mahal (Mirrored Palace) of Shah Jahan of the Mughal dynasty has challenging problems of preservation, which are now being addressed through financial and technical assistance from UNESCO. For the preservation, conservation and maintenance of the rich tangible cultural heritage of the country, the Government of Pakistan has established the Department of Archaeology and Museums under the Ministry of Culture. As custodian of the nation's cultural heritage, this Department is solely responsible for the protection, preservation and development of the ancient sites and monuments spreading over the entire country. With limited resources and manpower available, we are doing our best to cope with this huge task, but we certainly need both financial and technical assistance for the preservation of large numbers of items of our tangible, movable and immovable heritage. Since the training course to which I am a participant is primarily related to the conservation of wooden heritage, I shall only refer to the rich wooden architecture of my country.

Preservation, Restoration and Conservation Problems in Pakistan

Conservation of the built heritage is not an integral part of urban planning and development in Pakistan, as it is in many countries of the world. Nevertheless, efforts are being made in some historic cities of Pakistan to introduce these elements as part of urban development. The restoration of historic areas not only adds variety but also modulates the scale of our urban fabric, creating visual contrast and excitement within the city while protecting the important reminders and representations of the past. In addition, it adds to the distinctive character and identity of our urban fabric, giving a sense of history and memory of the place. Buildings are selected for conservation based on their historical and architectural significance, their rarity in terms of building types, styles, and their contribution to the overall environment.

The following are a few of the problems being faced by our country in the preservation, restoration and conservation of wooden structures.

a. Private owners do not like government interference regarding their private buildings and are not cooperating with the conservation of these buildings. At times they even do not cooperate in the study of problems being faced by these buildings.

b. Environmental pollution and related problems are major causes of damage to wooden buildings. Buildings of historical, architectural and cultural significance merit conservation. Since almost all the wooden buildings are privately owned, however, it is not easy to identify such buildings and recommend them for conservation.

c. Lack of experts in wood conservation is one of the major problems being faced by custodians of the built heritage.

d. Wooden buildings and structures within big cities such Thatta, Lahore and Peshawar are located mostly in areas which have been overpopulated for centuries, and the new generation thinks that the maintenance of these wooden buildings is no longer possible because of the high cost. Furthermore, demand for commercial buildings in order to make money is another matter of concern. This has resulted in the people's demolishing wooden buildings so as to build new reinforced concrete structures for both residential and commercial use, which not only fetch more in terms of rent, but are more market oriented.

e. Wooden structures located in narrow and congested areas, with oozing water from water supply lines and sewerage systems, are the most adversely affected ones. The owners are unable to maintain these buildings due to such problems and prefer to replace them with concrete buildings.

Expectations

I have high expectations from my visit to the great country of Japan, known to us all as the rising sun of the East. The expertise available here for the conservation of Japan's traditional wooden buildings and the technology developed for this purpose are quite unfamiliar to us. I shall be better equipped when I return to my home to preserve valuable examples that have survived among the wooden architectural heritage.

The greater challenges and the problems I can identify are not so easily solvable, but I believe at the same time that our Japanese friends have always come to help whenever we needed them and that they will support us in overcoming the challenges we face ahead of us. I take this opportunity to thank the government of Japan and organizers of this highly important and useful training course which is important for those of us concerned in the actual conservation of the heritage of developing countries. I wish to assure the government that I will live up the expectations of the organizers and will try to deliver my best through the completion of this training course.

Discussion

Final Lecture given by Dr. Aidan Challis, Archaeologist and National Heritage Policy Manager of New Zealand's Historic Places Trust, was very interesting and very important for me. He fully explained the need to respect cultural heritage, and the future of preservation of the cultural heritage including theory and practice for wooden structures. He also introduced and assessment for the Asia-Pacific Region of the strategic objectives for implementing the World Heritage Convention for the year 2007. He provided us a chance to identify future tasks that each participant can perform, and

allowed for group discussions on some ideas and practices seen in the Nara training course.

Acknowledgments

It is my pleasure to say that the training course on the Preservation and Restoration of Cultural Heritage in the Asia–Pacific Region, 2007, was very successful. I perceived that after the one month course, all the participants had received a lot of knowledge about the preservation and restoration from Japanese experts. This course is very useful especially for me, and it will contribute in a practical way to the preservation and restoration of wooden architecture in my country. The data collected from the lectures and from the on-site practice will be very useful for the preservation and restoration of wooden structures in Pakistan. I would like to thank Mr. NAKAI Isao and all the staff who collaborated with us, and I also thank the ICCORM and the NNRICP representatives. I am also thankful to my Director General at the Department of Archaeology and Museums, Government of Pakistan, who nominated me for this training course on the Preservation and Restoration of Wooden Structures in Nara, Japan.

Philippines

Maria Joycelyn Bolhayon MANANGHAYA

Wood Conservation and Other Conservation Practices in the Philippines: Application of the ACCU Training Course to the Conservation of Philippine Wooden and Other Heritage Structures

Highly relevant and valuable information was disseminated in the training program on wood conservation organized by the ACCU Nara Office in Japan. The training in itself was very comprehensive and encompassed several subject matters. The topic of wood conservation was intensely discussed in the training program, and related discussions focused on such topics as World Heritage conservation, the traditional building practices of Asian and the Pacific countries, the culture of Japan and the way of life of the people, Japan's general view of conservation, its construction and conservation approaches employed in its non-wooden types of architecture, etc.

This valuable information, provided through lectures in class and in the field, was further enhanced and validated through the experiences shared by the participants of this training program, who come from different Asian and Pacific countries. They articulately expressed their own conservation practices through formal presentations, through sharing ideas in class discussions, and through informal discussions with the other members of the training program. All such information is useful to heritage conservationists and architects alike, and to the different Asia and Pacific countries which have sent representatives to this training program. Several of the best practices in Japanese conservation, and those learned from other countries, can be applied and adapted to the conservation and management of heritage in different countries in Asia and the Pacific.

Furthermore, the participants were able to re-articulate and enhance their knowledge in this field, primarily because valuable information was shared with them by the instructors who come from the Japanese government, from Japan's professional sector and from ICCROM, who are all expert specialists and who have extensive knowledge in the field of heritage conservation. The ACCU office and its staff members have also been very supportive, having greatly contributed to the success of the program, by working hard and providing the necessary assistance and ensuring that all activities are carried out on schedule and in the best manner possible. They have patiently and meticulously guided the participants in all aspects of the training program.

As mentioned, the lectures did not center solely on wood conservation, but also addressed issues concerning heritage and culture conservation in general and about Japan's in particular, and also focused on Asian and Pacific practices in this field. The training was made more enriching as lectures

were not only carried out in class but also through practical on-site hands-on work experiences. Since all who attended the training program are directly involved in the field of heritage conservation, they were able to articulate their own knowledge on the issues presented, according to their own experiences.

The different types of architecture found in Japan, ranging from those made of wood, to those made of brick and stone, were comprehensively studied. Wood being the prime building material used in Japanese architecture for centuries, this theme was worth focusing on in this training program, as the Japanese started with wood conservation practices at a very early stage. Knowing the delicateness and importance of their traditional architecture, which is primarily made of wood, the Japanese have developed their own conservation techniques, which have been enhanced and improved through centuries of experience, as they have constantly faced many challenges in their preservation work. The numerous lectures that focused on issues pertaining to wood as a building material in Japan and in other Asian and the Pacific countries were very valuable and worth comprehending.

Therefore, the lectures presented in this training program, and the best practices learned from Japanese architecture and its conservation techniques, may be seen and understood as applicable with regard to aspects of the architecture of Asia and the Pacific that are similar to that of Japan. This is in relation to the use of wood as a building material.

Some aspects of the Japanese method of wood conservation are indeed related to that of the Philippines, particularly as some features of Philippine wooden architecture are similar to that of Japan. Likewise, some features of non-wooden heritage buildings of Japan show similarities to the features of non-wooden heritage buildings in the Philippines. This is seen in the manner of use of the same materials (either brick or stone or combined with wood) and in the building construction techniques applied therein. Therefore, many aspects of the conservation methods that the Japanese employ for their heritage structures are similar to that of the Philippines.

Nevertheless, there are features that are characteristic only to Philippine architecture which, are not found in Japanese architecture. These differences are primarily attributed to differences in culture and the geographical locations of the two countries. These geographical differences have been contributed to differences in the arrival of external influences to these two countries, affecting the development of their architecture.

Also, the differences between the two countries are particularly linked with the specific characteristics of their environmental conditions, in relation to their geographical locations, which in turn affect the climatic, geologic and biologic conditions (flora and fauna) of each country, which are fundamental factors in the development of the specific architectures of these places. It is important to note that the

different external influences which have affected both countries have greatly aided in the development of the different architectural styles found therein.

COMPARATIVE ANALYSIS OF THE CHARACTERISTICS OF CULTURAL PROPERTIES

Heritage properties in the Philippines are classified into natural and cultural. Cultural properties are further classified as tangible and intangible. Under the category of tangible are found heritage sites and structures that are further sub-classified into cultural landscapes, heritage structures and vernacular architecture. This classification is similar to that seen in Japan. Perhaps the difference lies in that in Japan, intangible cultural properties are designated separately from folk cultural properties, whereas in the Philippines, most folk culture manifestations are either classified as tangible (vernacular architecture) and intangible (music, chants, dances, clothing, etc.) practices of local/traditional communities.

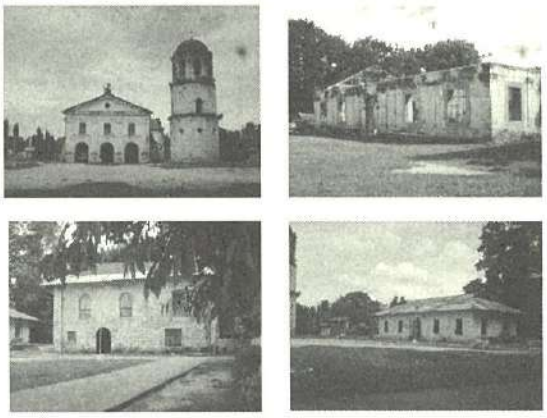
Japan has sub-classified intangible heritage to include knowledge holders of traditional information as well as techniques for cultural properties (both construction techniques and folk techniques). Such knowledge holders and traditional techniques are officially recognized as having their own heritage values, thereby meriting their being in the official registry of Japanese cultural properties. In the Philippines, recognition of knowledge holders of traditional information has also been long established, and an official list is kept in the database of national culture agencies.

Like in the Philippines, Japan has officially included in its classification groups of historic buildings or historic districts. Examples of these in Japan are the Imai-cho district in Nara, and the Takayama and Shirakawa-go villages in Gifu prefecture. In the Philippines, outstanding examples of these are the Historic Town of Vigan, and the village cluster sites of Ifugao (Bangaan, Batad and Central Mayoyao villages); both properties are included in the UNESCO World Heritage List.

Batad rice terrace cluster site and Ifugao house, Ifugao province

Sub-classifications of cultural heritage properties (architecture) in the Philippines are based on the period of development of the architecture, the type or kind in relation to the use/function of these structures, and their association with particular groups. For example, cultural properties considered as pre-historic (pre-Hispanic) are those that are closely linked with the ethnic communities to which they are associated. Examples of these are Ifugao houses, which are associated with the Ifugao culture and people of the Ifugao province in the Philippine Cordilleras, island of Luzon, Philippines. Another example is the Torogan house, which is associated with the Maranao culture and the people of Lake Lanao in the island of Mindanao, Philippines. Most pre-Hispanic buildings are classified according to their use/function, and are largely domestic related – houses, granaries, kitchen, storage areas, dormitories, etc.

Colonial heritage structures in the Philippines, on the other hand, are classified according to the period with which they are associated, such as Spanish or American, and according to their use/function, such as religious, civic (government buildings, school houses, hospitals, etc), and domestic.



Loay church and complex (Casa tribunal, Escuela de Ninos y Ninas), Bohol province

In the Philippines, protection of heritage by law is made under official designations identified in the Philippine National Registry. These designations are: National Cultural Treasures, Important Cultural Properties, Cultural Properties, National Historical Landmarks, National Landmarks, National Shrines, National Historical Sites, National Monuments, Classified Historic Structures, Heritage Houses, and UNESCO World Heritage Sites. There are also heritage structures and sites that are legally protected under local ordinances. They vary according to their kind, typology and classification.

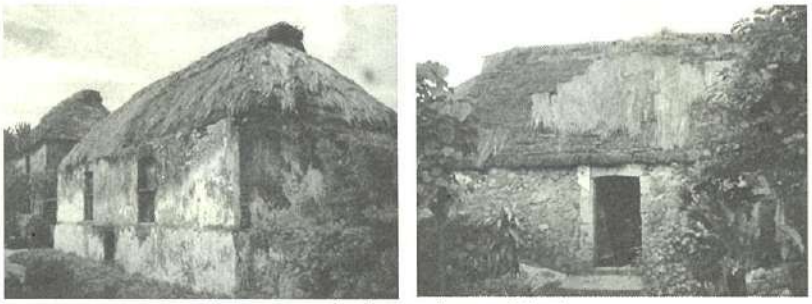
Cultural properties are likewise protected by national government agencies such as the UNESCO National Commission of the Philippines, the National Commission for Culture and the Arts, the National Museum, the National Historical Institute, the National Archives, the National Commission for Indigenous Peoples, etc.

Sta Maria Church, Ilocos Sur
A UNESCO World Heritage Site

Retablo of Calape church, Bohol province

Natural properties in the Philippines, on the other hand, are protected by the Department of Energy and Natural Resources. Under their jurisdiction are such classifications as the National Integrated Protected Areas System (as Protected Area, National Park, Natural Monument, Natural Biotic Area, Protected Landscape/Seascape, Strict Nature Reserve, Wildlife Sanctuary, etc.).

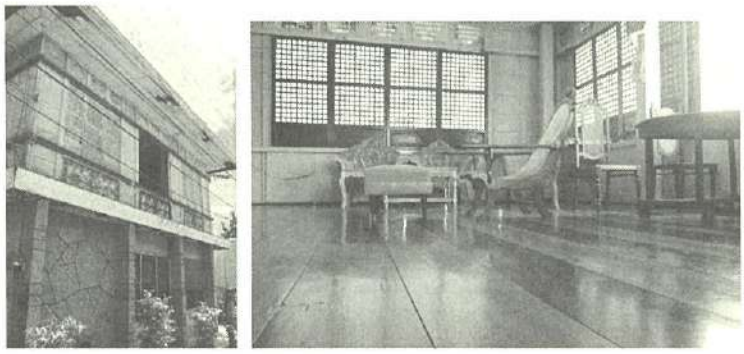
Vernacular architecture, although recognized as cultural property, has yet to be officially registered under a specific designation. Present protection of these cultural properties is isolated and specific. For example, the vernacular houses of the Ifugaos are covered under UNESCO World Heritage protection, being located in the heritage cluster sites of Ifugao that have been recognized as priority sites in the WH List. In contrast, another cultural property in the Philippines – the vernacular houses of the Ivatans – are protected through local ordinances of the Batanes islands' municipalities to which they are linked.



Ivatan vernacular houses, Batanes Islands

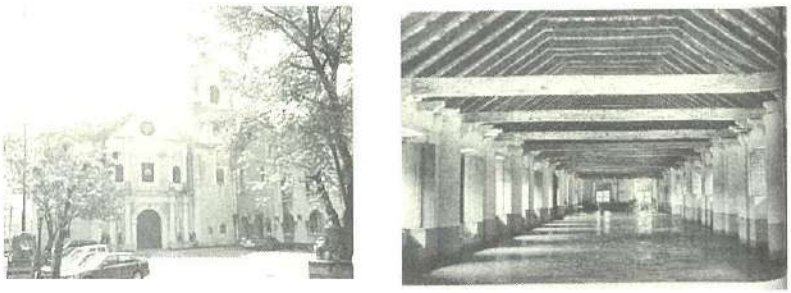
As for materials and systems of construction of these heritage structures, those built prior to the arrival of the Spanish colonizers in the Philippines (before the 1500s) employed indigenous materials found in the area of construction. These buildings used wood, grass reeds and thatch, and vines as building materials.

Buildings built during the Spanish period (1500s-late 1800s) employed stone masonry walls (brick, coralline limestone, stone) that were consolidated with lime. They were built solely or in combination with wood, grass reed and thatch, or metal roofing. These buildings use wood in their roof and floor framing systems, as panels for walls and floors, as windows and doors and as carved decorative features.



Wood components of Luza house, Bohol province

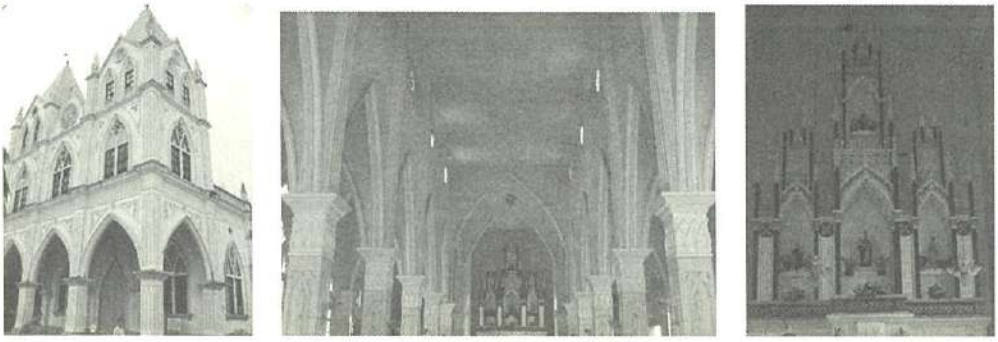
(Upper wall shell, doors, windows, floors, ceiling, roof framing sytems, etc. made of wood)



Roof Truss system of San Agustin Church, Manila, a UNESCO World Heritage Site

And those structures built during the American period employed the reinforced concrete system of construction. Materials used for these buildings were cement and reinforcing bars, wood for roof and

floor framing systems and for interior and exterior wall panels, doors and windows, and for carved decorative features.

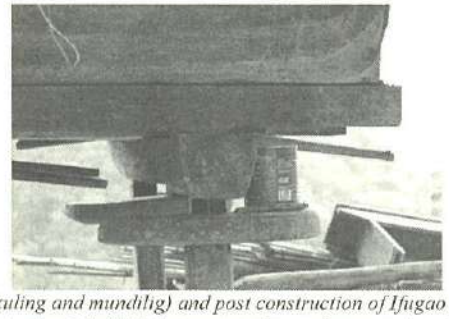


Calape Church, Bohol Province, 20th Century

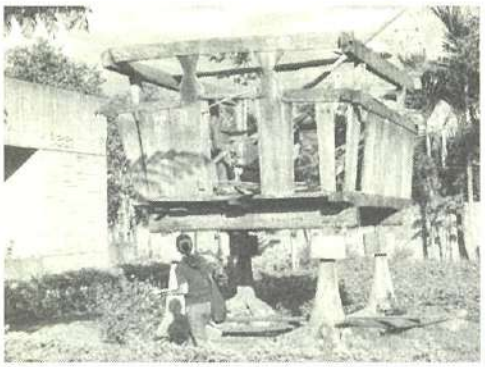
Vernacular buildings in the Philippines, like those of pre-Hispanic types, similarly use indigenous materials such as wood, reeds, rattan vines and thatch. Wood is used in posts, framing systems for the floor and roof, as wall and floor panels and as doors and windows.

Vernacular architecture in the Philippines in general is characterized by having most of the members made of wood. The post-beam system of construction is widely used. The shell and structural frame (columns/posts, floor and roof framing systems) are carved out of wood and assembled together using the mortise and tenon method of assemblage. Grass materials (reeds) are used for the ceiling, while thatch is used for roofing. Rattan vines are also used to tie assembled members together. Like Japanese vernacular wooden buildings, in the Philippines vernacular buildings could therefore also be disassembled and reassembled for repair and restoration, as they also use the mortise and tenon method of assemblage.

In particular, the vernacular houses of the Ifugao in the region of the rice terraces of the Philippine Cordilleras could be assembled and reassembled as needed. This is most useful when performing conservation and repair work on its wooden members, or in some cases, when the building has to be moved from one site to another. The Ifugao house is so designed that its wooden parts are assembled together using the mortise and tenon type of construction. Repair work is therefore facilitated as these parts can be disassembled to permit the repair or replacement of the deteriorated wooden members, and re-assembled, after repair work has been completed.



Beam (kuling and mundilig) and post construction of Ifugao house
The circular disk (lidi) that protects house from vermin attack



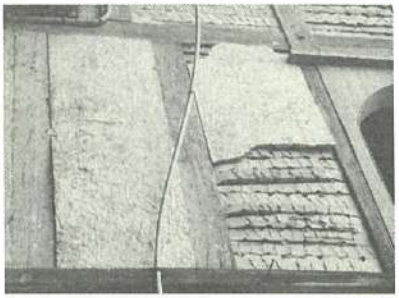
Ifugao house shell

Mortise and Tenon method of assemblage

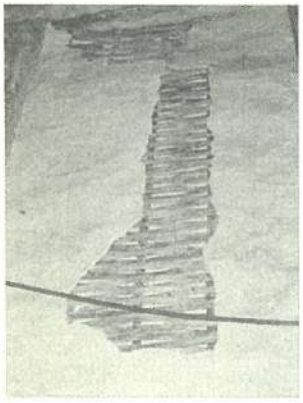
Other vernacular houses in the Philippines employ the same type of construction method as the Ifugao house. These are the houses of the Finaryon or Binaryon of the Kalingas in the Philippine Cordilleras, and the Maranao house in Mindanao. These houses employ the same type of wood construction technique, and like that of the Ifugao, can also be disassembled and re-assembled as needed in undertaking partial repair work.

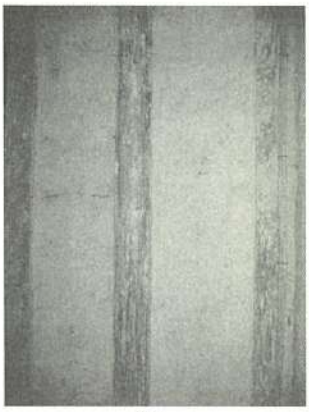
As mentioned, Spanish period buildings (1500s–late 1800s) in the Philippines cover religious, civic and domestic types. They employ the use of stone masonry walls (brick, coralline limestone, stone) consolidated with lime, built solely or in combination with wood, grass reed and thatch, or metal roofing. Wood components of these buildings are found in the upper floor framing systems, in such parts as the floor, the floor joints, the beams, the trusses and rafters, the purlins, the roof joists and beams. They are also seen as interior and exterior wood members of wall panels, stairs, railings and ballusters, windows and transoms, interior carvings and cut-outs that separate walls, and as the ceiling material.

In Spanish period buildings, a system of construction known as the *tabique pampango* is found, which is similar to the wattle and daub system of construction. In Japan, the wattle and daub is widely used in tangible cultural properties as a wall system. Examples of these are found in the walls of temple and shrine sites and historic buildings such as houses and palaces. As in the Philippines, Japan's wattle and daub wall construction uses bamboo or wood slats as interior frames to accommodate plastering by either earth or lime mortar.



Tabique pampango *with wood slats frame in Loboc church, Bohol Province*





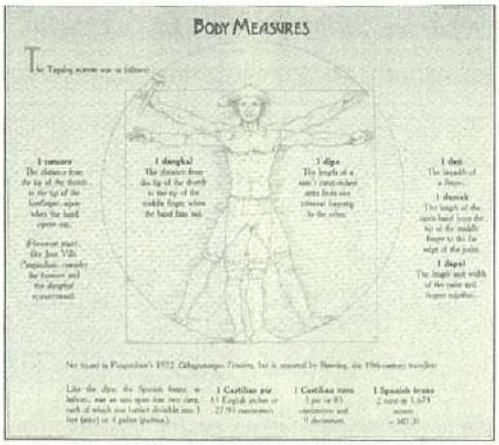
(1) (2)

Tabique pampango *with bamboo slats (1) and wood (2) frame in Baclayon church, Bohol Province*

There are features characteristic to Philippine Spanish Colonial period architecture not found in Japanese architecture. These are seen in the design of the buildings, particularly in the layout of spaces, in the type of material used, in the manner that the material (even if it may be of same type as in Japanese architecture) is processed during construction, in the building philosophy, and in the concept behind building. As mentioned, these differences are primarily attributed to the differences in the cultures of the two countries, in the influences that may have affected the development of their architecture, and in the difference in their environmental conditions, particularly their geographical locations that have in turn affected the climatic, geologic, and biologic characteristics of these places.

In the cultural context as related to architecture and design, the manner in which a traditional Japanese house is designed is based on the traditional measurement of the dimensions of a *tatami* mat, which is based in turn on the measurement of a Japanese human body. In the Philippines, the anthropometrics of the human body is also the point of reference on which Spanish period buildings based their system of measurement for design. Human body measurements are the modes for the dimension system employed in building construction of this period. The Castillian *pie* and *vara* and the Spanish *braza* were used for measurement. One Castillian *pie* is equivalent to 2.95 cm and one Castillian *vara* is equivalent to 3 pies or 83.9 cm, while one Spanish *braza* is equivalent to 2 *vara* or 1.671 meters.

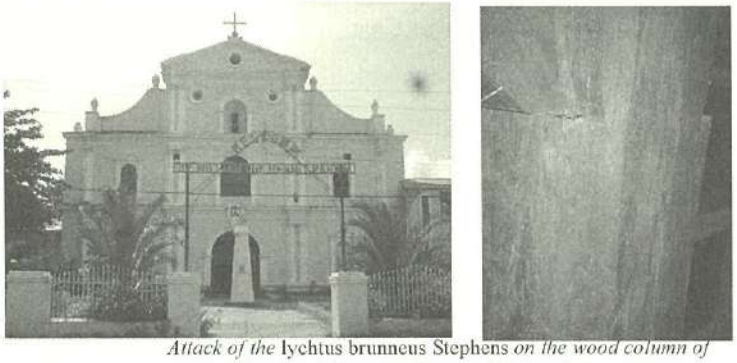
Traditional manner of measurement in Philippine vernacular and colonial buildings likewise employed various terminology such as the *dangkal*, which is the distance of the tip of thumb to the tip of the middle finger (with the hand fanned out), and *dipa*, which is the length of man's outstretched arm measured from one extreme fingertip to the other. Other words in the vernacular used as means of measurement are the *tumuro, dati, damak, dapal*.



Anthropometrics of the Human Body
Photo from Philippine Ancestral House book

COMPARATIVE ANALYSIS OF DETERIORATION PROBLEMS AND CONSERVATION APPROACHES

Like in Japan, deterioration of wooden structures in the Philippines can be divided into major types as follows: that which is caused by (1) biological agents such as those of (1a) floral origin (algae, mosses, lichens) and of (1b) faunal origin (wood-boring insects such as the formosan subterranean termite (*Coptotermes formosanus*), and the *lychtus brunneus Stephens* or *bokbok* in the Philippine vernacular); (2) that which is caused by water; and (3) that which is caused by exposure to extreme weather conditions. Another cause of deterioration is the intrinsic factor of a wooden member when poor quality wood or badly processed wood are used for construction. Extrinsic factors such as the presence of water in wood due to external agents (roof leakage, cracks on walls allowing water seepage into the structure and the aggravation of floral infestation) has also been observed as a universal problem.



Attack of the lychtus brunneus Stephens *on the wood column of Magsingal Church, a National Cultural Treasure*

Since the Philippines has only two pronounced seasons, the rainy and the dry season, its wooden structures do not experience extreme movement in its wooden fabric caused by extreme climate change conditions. In Japan, movement in the wooden fabric is similarly not pronounced, as it also

has a mild temperate climate which does not go to extremes, except in rare conditions, even though Japan has four pronounced seasons of summer, fall, winter and spring.

In the Philippines, wood deterioration as caused by the above-mentioned biologic media is normally augmented when there is water seepage into the wooden structure and/or member. This is normally due to a leak in the roof system or a crack in the wall, thereby allowing water to flow down a structure's wooden members. In such cases, immediate repair is recommended as the action necessary to address the problem. It is unfortunate, however, that because of a scarcity of resources, some or most wood problem cases in the Philippines are addressed in a reactive manner, thereby undertaking repair works only when the wood is already in an extreme state deterioration. The consequent action and ultimate solution would be replacement of the wooden member, which is, by this point, in a very bad state of deterioration. In Japan, repair works are periodically undertaken to monitor the state of conservation of the wooden buildings and to ensure their protection for future generations.

Like in Japan, when deterioration of wooden structures or parts of the structure's wooden members takes place, in the Philippines the immediate solution is normally to the replace the deteriorated wooden member. Dismantling the components or parts of the structure to allow for repair is thereby undertaken. However, when such necessary dismantling work occurs, heritage conservation architects, assigned to the work in the Philippines, are normally very careful so that there is minimal intervention undertaken that could negatively affect the other healthy or sound parts of the structure when the process of dismantling is carried out.

In the Philippines, consolidation of wooden members, by such means as the application of synthetic resins, is normally undertaken in the repair of old structures, but this is carefully being considered when conservation or restoration of cultural properties are undertaken. This is because of the effects of the synthetic resin material on the physical appearance of the wood after application work, as synthetic resins normally turn out to have a different color. Another prime consideration made regarding the use of such material is the possible harmful effect it might have on other parts of the wooden member that have not deteriorated, as synthetic resins are rigid when they harden, and have different thermal coefficient properties than wood.

Unlike Japan, the use of carbon fiber material for restoration purposes has yet to be explored in the consolidation of deteriorated wooden members in the Philippines. This is because such material, if available, is very expensive.

Likewise in the Philippines, when chemicals are to be applied on wood members which have deteriorated due to insects or floral attacks, these chemicals are first and foremost studied before such actions are taken. However, since facilities such as laboratories for determining the effects of

chemicals on cultural properties are scarce in this country, and are limited to university facilities and to some government agencies, sometimes there is hesitation to use such materials until information ensuring the safety of the cultural property is available. The delay caused in seeking the information needed to ascertain the safety of use of such chemicals ultimately leads to the solution of replacing the deteriorated member with new wood.

Similarly, because of the difference between the types of materials used in Philippine heritage structures and those of Japan, conservation approaches in the Philippines are different. In the Philippines, intervention with regard to cultural properties tends to be undertaken conservatively, and minimal intervention as espoused by Western concepts of conservation is given prime consideration. This is because the large majority of structures in the Philippines that are considered as monuments were built during the Spanish period, have the same materials (brick, stone and lime) and employ the same system of construction (masonry system) as those found in western countries. The Venice Charter, therefore, is considered in the application of conservation works in the Philippines.

In contrast to Japan, dismantling of masonry type architecture is carried out in the Philippines only in extreme circumstances. A good example of this was the recommendation of heritage specialists to dismantle the deteriorated parts of the façade of a church that has national significance. This church has limestone as the wall material, and the front façade is made with ornately carved limestone decorations. An earthquake caused damaged to the church façade, revealing major cracks and splits in its fabric, thereby allowing water seepage into the interior of the structure. Because of this deteriorating condition of the façade, the recommendation was to dismantle and reconstruct in its original condition. However, since heritage authorities are extremely wary of the negative effects of such dismantling, this has not been undertaken.

Therefore in cases when an important cultural property or historical monument is facing deterioration, Philippine authorities and heritage specialists alike are careful about the negative impact that could occur with dismantling or reconstruction work. Extreme care is most especially practiced in cases when the wall fabric is made of stone or brick, having ornate decorations of carvings or paintings that are integrated with this wall masonry fabric.

And when the material fabric of the building to be dismantled or reconstructed is of wood, and there are carved ornamentations that could be affected in the process of dismantling and or reassembling, again careful steps are taken prior to such actions. However, when the dismantling or the reconstruction is to be undertaken on vernacular architecture and its components, allowances are normally given, primarily because it is in the building tradition of wooden vernacular architecture in the Philippines that repairs and reconstruction are undertaken involving the dismantling/reassembling of parts or of the whole structure.

In the conservation of vernacular buildings in the Philippines, international statues of conservation have yet to be applied. The process of repair or restoration tends to be undertaken by employing the most efficient manner that could immediately address the problem of deterioration. And when resources are available (traditional materials for construction and able manpower to undertake the work), immediate replacement of the damaged parts is thereby instituted by the owner and his master carpenter.

Conservation work in the Philippines is undertaken, first and foremost with the premise that there should be prime consideration and deep understanding of the significance of the structure or building prior to any intervention work. Significance of the structure or building is based on what is internationally defined to be either of the following: architectural significance, cultural, traditional, archeological, scientific, anthropological, social, or spiritual significance, based on meanings, or on the character/period/style/author-architect-designer, etc. To be able to define the significance of heritage, documentation and research is given prime importance before any work is undertaken. Documentation is required before, during and after any intervention work, and monitoring and maintenance is highly encouraged in the process of utilization of the structure after intervention has been carried out. Documentation of the structure is similar to that of Japan, and the measuring of all parts is carried-out in a very detailed manner, similar to the documentation exercise performed at the Tanaka farmhouse undertaken in this training course.

However, when repair work is undertaken in vernacular architecture that has not been registered as an Important Cultural Property or is not protected by local ordinances, such work is sometimes undertaken without proper documentation. There are instances, however, where the owner, knowing the significance of his building, would consult a specialist before repair work is carried out. This work could either be in the traditional or contemporary manner, depending on the advice of such specialist.

COMPARATIVE ANALYSIS OF THE CONSERVATION PLANNING PROCESS

Conservation planning in the Philippines is similar to that of Japan's. The same process and framework is carried in the planning. Prior to any conservation work in the Philippines, prime importance is given to the formulation of conservation policies to serve as basis for any strategy, program(s) or project(s) that would have to be undertaken in the conduct of any conservation intervention. In the formulation of policies, the significance of the heritage is again given prime consideration, so that in the intervention work that would ensue, this significance will hold true even after intervention work has been carried out. This process ensures the continuity of significance, in terms of both the physical/tangible and the intangible values of the structure/site, all of which should be passed on to future generations. Therefore, significance is attributed to the authentic values that are

present in the structure/building, and in its present state/condition, regardless of whether it is still integrated or has been changed.

The Burra Charter or Australian ICOMOS Charter is being consulted in the conservation planning of heritage sites and structures.

The difference in conservation planning between Japan and the Philippines is the comprehensiveness of the Japanese method, which includes other items such as items as risk preparedness and disaster mitigation processes (fire and crime prevention, seismic safety, wind disaster prevention and prevention of other disasters), and the utilization (presentation, facility and equipment preparation and monitoring) of heritage after conservation work has been carried out.

It is important to note, however, that the Philippine government has recognized the importance of risk preparedness and disaster mitigation as important measures in ensuring protection of its cultural properties, and has in fact integrated these into the preparation of Conservation Management Plans for those properties that are being processed for nomination and inscription to the UNESCO World Heritage List. An example of this is the item on risk preparedness that was integrated into the Conservation Management Plan of the Batanes Cultural landscapes property.

In the Philippines, presentation of heritage after conservation intervention has been carried out is undertaken when resources are available. As for risk preparedness and disaster mitigation, this approach is also recognized by the Philippine government as an important approach to allow for better education about, and deeper interpretation and communication of, the value of heritage property to the public. The presentation of cultural property is also a means for promoting tourism, which aids in generating economic revenues for the cultural property itself and for the local communities protecting it.

In the Philippines, transmission of information about heritage to future generations is recognized to be an important action that ensures the continuity of traditions useful in heritage conservation and maintenance. The documentation work involved in generating information about heritage (both the intangible and tangible) is a task given prime importance by the government. Schools of living traditions have been developed and supported by the government, and it is through these that the transmission of traditional knowledge is carried-out. In Ifugao province, for example, traditions related to the agricultural cycle, that are slowly disappearing, have been recently revived in a resurgence of recognition by the government and public sector alike, that the only way that the rice terraces and the practices linked with the agricultural cycle could be conserved and maintained is to bring them back and teach them to the next generations. The nurturing of knowledge holders, elders who possess information about Ifugao culture, is given prime consideration by both the national and

local governments and by the private sector. As these elders are slowly disappearing because of old age, an able set of healthy Ifugao youth has been keeping track of the information that these elders hold, through the conduct of research and documentation work fully supported by both the government and the private sector.

COMPARATIVE ANALYSIS OF CHALLENGES IN CONSERVATION

Challenges experienced in heritage conservation in the Philippines are primarily attributed to the lack of resources necessary to sustain conservation activities. The desire to conserve heritage properties in the Philippines and in Japan is high, and this spirit is greatly influenced by the high valuing of heritage by the government and by the people. The difference lies in the resources available for conserving and maintaining heritage.

In Japan, the government has allocated a good amount of its resources for heritage conservation. In the Philippines, only selected sites are given priority and these are those that have been classified in the highest bracket, as having national and international significance.

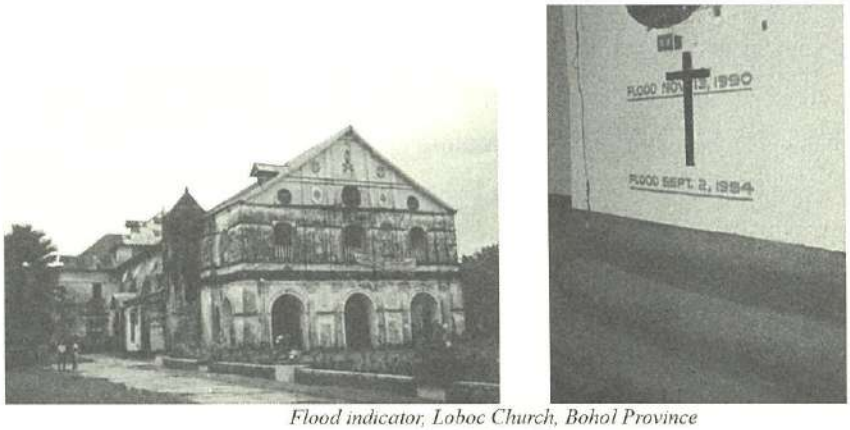
In the field of wood conservation, the challenges faced are also related to the lack of resources to sustain conservation activities. In particular, there is a scarcity of good wood for conservation repair work for Philippine heritage structures. Because of the total logging ban in the Philippines, good quality wood for replacement of decayed wooden members is no longer available and the alternative measures for use in wood consolidation are also very limited. As mentioned earlier, the use of synthetic resins has been employed in new construction and in the repair of non-heritage old buildings. Heritage specialists are hesitant to use them as a consolidating material for wooden heritage, primarily due to their negative effect to the wood members. The use of carbon fibers as an alternative consolidating material has yet to be explored in this country. Carbon fiber could be a good alternative to synthetic resins, and a good solution in addressing issue of wood scarcity.

Another challenge faced by both countries in the conservation of wooden heritage is the dearth of able manpower who can perform traditional wood construction. In Japan, the government is trying to address this by developing such organizations as the JACAM, which could be a good source of this able manpower. In the Philippines, carpenters are focused on the construction of new buildings, and because of the dearth of wood for construction, these carpenters are slowly re-focusing their skills by using composite wood members that are available in the market, instead of good solid timbers that have been predominantly used in traditional buildings. In some provinces of the Philippines where vernacular architecture abounds, carpenters still exist and they are adept at the skills of traditional building. However, as less and less vernacular buildings are being built, there has been a tendency for carpenters to change their work, thereby abandoning their knowledge of traditional building.

There is a general concern in Japan and the countries of Asia and the Pacific about the extent to which wood in heritage structures are being attacked by insects, and by macro and micro flora. This is because these agents are continuously harming heritage structures up to the present and the methods to stop them are becoming less and less available due of concerns of their harmful effect to the environment and to human beings. The effects of these biological agents on heritage structures is therefore a challenge worth mentioning, as the chemicals for the treatment of wood are limited in the Philippines. Most of the available ones are being used for wood protection in non-heritage structures, and their use in heritage buildings has yet to be explored.

Risk preparedness and disaster mitigation systems employed in Japan are efficient methods that help ensure the protection of heritage. In the Philippines, these methods are also employed but in isolated cases. Mostly, their application is normally focused on all structures, heritage and non-heritage alike. Therefore, when disasters occur to heritage structures as such fires, they are treated like any non-heritage structure using whatever fire fighting methods available to address the disaster, whether harmful or appropriate to heritage.

Flood awareness systems also exist as a system of risk preparedness in the Philippines. Some form of monitoring and documentation of this kind of disaster to protect heritage structures has also been employed. However, due to the nature of floods, minimal intervention to protect heritage can be exercised when this happens, and the best thing to do is to remove the movable heritage items up to higher areas, so that they will not be affected by flood.



Flood indicator, Loboc Church, Bohol Province
a National Cultural Treasures

The different approaches to conservation and the challenges faced by Japan and the Philippines, outlined in the above report, represent examples of contextual conservation shaped by the cultural differences of the two countries. Despite these differences in conservation approaches, in face of challenges that both countries are experiencing in the field of conservation, their governments and

conservation specialists alike strive hard to succeed in ensuring the protection of their valuable heritage, in authentic and integrated form, so that future generations can use, appreciate and interpret them in the same manner as today.

Samoa

Vaveao Vavao TOA

INTRODUCTION

First of all I would like to convey my great thanks to the ACCU Nara staff in cooperation with ICCROM on putting together and making this training program possible, so that other Asian and Pacific countries could share the richness and uniqueness of the Japanese architectural methods and knowledge on preservation and restoration of wooden structures. Also important were the ideas and philosophies shared and discussed among the participants from around the Asian/Pacific region. Because of the differences between the societies and communities that we belong to, this made the outcome of this training interesting in terms of the ideas, techniques and methods related to the topic of training.

Regardless of our origins, I myself believe that what I have learned here was satisfying and will be very helpful in carrying out my work in Samoa, and I also feel that every participant gained a lot of new experiences and challenges that they too will find useful in their fields of work.

WHAT I HAVE LEARNED AND HOPE TO INTRODUCE AND DEVELOP IN SAMOA THROUGH OUR CULTURE DIVISION

Set out policies and guidelines to protect wooden structures. At the moment, the culture division of Samoa has yet to finalize the cultural policy of the country. Because I have learned about the importance of cultural heritage such as wooden structures, with every lecture stressing the value of such buildings to the beliefs and social interests of community in the past and continuing into the future, as a member of the policy planning committee I would hope to adopt methods for conserving and preserving vernacular wooden structures as important cultural properties, together with their natural landscaping. To add life to these wooden structures, I would prefer measures of preservation and restoration as applied at Shirakawa village, because in the rural parts of Samoa, the traditional way of life is still strong and practiced by villagers. However, with time will come change, and the people will be influence by modern ways; this is where Dr. Challis set an example in his address, concerning a building in New Zealand which the government later recognized to be of historical importance and nominated as a World Heritage site, but were rejected because of recent reconstruction on one side.

It would not be easy to get the villagers' approval, but I believe through consultations and effective communication we could open the minds of the people to realize how important it is to maintain their culture with pride.

Strongly focus on a risk preparedness plan for the purpose of preserving and restoring cultural heritage wooden structures. It was interesting to learn how well Japan has prepared for the safety and the protection of their important cultural heritage and their world heritage sites from natural hazards such as earthquakes. Risk preparedness plans are also made against fire and human activities such as theft.

With regard to my country, we do not usually have earthquakes as serious those experienced by Japan, but we are often hit by tropical cyclones which damage all areas of the country. They affect our way of living and the economy of the island, but most of all they have destroyed most of our traditional vernacular houses and important historical buildings.

As mentioned, people now have the feeling of wanting to change their lifestyles, because of what they have experienced. For example, many traditional buildings have not survived the cyclones because of weakness in their roofs, requiring the whole process of re-roofing to take place, making the people think of replacing such building with western style houses.

The Japanese fire prevention method is also admirable because of the advanced automatic fire sensors which can detect fire in its early stages so that measures for prevention can take place immediately. At my work site, which is housed in an important historical building, we do have a small fire extinguisher, and detector that is only for the part of the building in which the museum is located and not the rest of the building, which is occupied by the Justice department. I strongly feel this is not enough and that we should develop and consider other possible ways similar to the Japanese fire detectors or water guns which surround each of the vernacular houses in Shirakawa village and Toshodaiji temple.

In the rural areas of Samoa, traditional houses form a common scene. It is impossible for the villagers to get help from the fire department when fire occurs, due to the distance of these villages from the fire department, which is located in the urban areas of Apia.

Movable and immovable methods (relocation of structures). All observations and lectures involved in this training were very effective and efficient, and the breadth and richness of what each lecturer has contributed each participant's field of work is difficult to imagine.

From observations of and information about the success of the Meiji-Mura project, and how it is famous for restoring and preserving important cultural properties as well as relocating them into one place, I find it really an interesting process. In fact, this process can be adopted by our ministry to preserve and restore our historical buildings and vernacular structures. As you see, our country is located in the middle of the vast Pacific Ocean and we are at risk from the rising sea level. Most of our important heritage buildings, including the museum, are located in coastal areas where they are

often flooded with seawater when the weather is unpredictably rough. The idea of relocating could apply to our situation if things get worse, and this would be a challenge because the location of the museum building really plays a significant role in our political history, as it reminds all Samoans that just beside the doorstep of this building a very important political leader was shot when protesting for the freedom of our country.

Processes of dismantling and applying additional reinforcement. Through knowledge gained from observation and the information provided by several lecturers, the process of dismantling is understood to be rather difficult and needing a great deal of time to complete. Japanese architects are very committed people, however, who work together with expert carpenters. The results of this process can be very positive when careful observation is carried out by teams of conservators, working alongside architects, to assure that the original building when reassembled will become much stronger with additional reinforcement, with good prospects for maintaining the authenticity of the building.

In the case of my country this is an absolutely new method for local architecture. I have never experienced the use of such methods by our local architects and carpenters.

We have a similar process which was applied in the restoration of one of our historical buildings, the museum of Robert Louis Stevenson. This restoration process was done in a manner in which the building itself could return to its original appearance when it was home to the famous Robert Louis Stevenson and his family. As a result it was successful, although in this case it is obvious that we lost the authenticity of the building, but still the restoration of the building was important to the people.

In my own view, I feel that maintaining the authenticity of all wooden buildings is impossible. But if we also take no action to restore them we would loose them. That is why I think Mr. Nishi Kazuhiko mentioned the subject and talked about the limitations or the boundaries of wooden structures when it comes to authenticity.

Roofing styles of wooden structures. Wood is always the main element used in our traditional construction. For roofing material, thatch is always used in our vernacular houses as it suits the climate of our country, but it is also one of the materials used by the Japanese on some of their houses. There are differences between the materials used, and I guess it all depends on the availability of materials in our respective environments, but what I found to be very interesting is the thickness of the thatch applied to the roof. This is a point of weakness in our structures, where we could use the ideas and methods of the Japanese. In applying thatch to our roofs we always consider thin layers as the best, but seeing the methods of Japan made me reconsider our understanding of what is best.

Methods used in surveys. To give an overview of the Japanese methods of making surveys, I can say that they are done in a very comprehensive way, to which any country of the Asian/Pacific region can refer to insure that the process of restoring and preserving is conducted at a high level of quality. Before any measures are applied to buildings or to areas of historical or important cultural heritage, close observations and research are required. This method needs to be strongly considered in our country, in the field of restoring our important historical and cultural buildings. Photographing the structure before and after the period of restoration is another aspect of making a survey which we could use, as well as other kinds of documentation in these surveys for the purpose of future reference. I believe we lacked these skills when early extension construction to expand the museum took place, as no documentation has been found. Documentation of recent repair work is available, but important documents of earlier construction work will never be retrieved, and it is a great loss for us, all because of the lack of these methods of surveying.

Pests control methods. Termites and other pests are always a threat to our historical wooden structures such as the museum. Every three to four months a pest control team is called in on holidays or weekends to spray for termites and other pests such as cockroaches, ants and others. However, this process is applied only to the part of the building in which the museum is housed, making it very difficult to avoid pests coming from other parts of the building. Paint is also applied if necessary, but our methods do not compare with the various advanced and comprehensive methods used by experts in Japan to overcome and control pests, which cause deterioration to their important cultural heritage wooden structures.

All methods of pest prevention could be applied in my country, such as treatment of wood, soil treatment, fumigation, and extermination without chemicals. However, suitable training is required for the staff in order to carry out these methods. The lack of availability of some chemicals may keep us from taking preventive action using these methods as introduced in this training.

Dendrochronology. Dendrochronology is very helpful in determining the date and age of wood. However, the equipment used in this process is advanced and it is obvious that a great amount of money is required in order to purchase it, but as we have a limited budget we can only imagine applying this method to our historical wooden buildings.

CONCLUSION

In conclusion, I believe this training was worthwhile for me with regard to my work and for my dear country. It is an opportunity not to be missed by a country like Samoa, which is underdeveloped and needs training for its people so they can contribute to the preservation and restoration of our wooden structures, because what was learned and absorbed from this training can help us realize the

importance of restoration and preservation of our cultural and historical wooden buildings.

Not all the ideas and techniques would be applicable in our country, which is why we will take only what can be applied. However, this training has broadened my knowledge and made me realize how important it is to consider wooden structures from all sides, meaning not only the architectural point of view but those of the surveyor, paint experts, dendrochronology experts, conservators, planners, fire preparedness experts, natural hazard preparedness experts, experienced carpenters, pest preparedness experts etc.

The contributions made by all those who are involved in the field of restoration and preservation of wooden structures, and who shared with us their experience, have not only contributed greatly to their country Japan but also contributed greatly to the countries of all participants.

Once again, I thank the ACCU Nara office, ICCROM and the government of Japan for offering this successful and useful training. I pray that the program will continue successfully and be a blessing for the participating countries.

Soifua.

Sri Lanka

Sujeeva Kaushalyani PEIRIS DERANIYAGALA

The 2007 training course on Cultural Heritage Protection in the Asia-Pacific Region, conducted by the Asia/Pacific Cultural Centre [ACCU, Nara], was especially relevant to me and Sri Lanka as it mainly focused on the restoration of wooden structures. The lecture series, practical sessions, and site visits gave us considerable exposure to the practices current in Japan.

During the country report presentations we gained more knowledge on the various contexts in 14 countries, and the application of different technologies and materials to suit each country's situation. It was revealed that 90% of the problems related to wooden cultural properties in the Asian region is more or less common to all countries. A wide array of interesting subjects on conservation philosophy, definitions, techniques, methodology, research, legislature, skills and expertise, problems, solutions, etc. were addressed during the session and it fed us new information while refreshing what we already knew. It was an ideal opportunity to share our experiences and ideas about how to adapt our knowledge to suit our individual situations.

The lectures can be divided into the five broad categories of legal and administrative issues, wooden architecture, preservation methods technology and materials, project planning and implementation including risk preparedness and management, and future tasks.

International charters and Japanese legislation were discussed fully with regard to their applications for cultural property preservation in Japan. The Japanese system of designation of cultural properties is particularly attractive to me as there are many such properties that need urgent attention in Sri Lanka. The discussions were very useful for refreshing our knowledge of how to adapt such measures to suit other Asian contexts, and where those Asian systems should differ.

The Sri Lankan situation is different from the Japanese system of preserving cultural properties. In Sri Lanka there are no methods for registering or designation. All tangible cultural properties including the built heritage that are over 100 years old automatically get protection under the Antiquities Ordinance. For these properties, the Department of Archaeology is the authoritative power, with the Director General of Archaeology being the legal custodian on behalf of the entire nation. The Standing Orders of the Department are the basic guidelines for exploration, excavation, and conservation activities. In addition there are other supplementary acts and bylaws like the Cultural Properties Act, the Central Cultural Fund Act, etc., to strengthen the Antiquities Ordinance.

Buildings not 100 years old have to comply with normal urban or provincial council laws. This is

where the Japanese system becomes more effective. Even structures and other tangible properties that are not so old can be protected under the Japanese system, whereas such architecturally and historically valuable structures and historic landscapes are neglected in Sri Lanka. There is no law to protect cultural landscapes in Sri Lanka as yet. There are many such landscapes, intangible assets, life styles, historic places, and scenic areas that need recognition. There are private residences and other structures with historic, architectural and artistic value, which are not even inventoried and thus do not get any kind of government intervention in their restoration activities. Most vulnerable are the private houses belonging to the colonial period. There are many Dutch period and English period vernacular and public structures in every major city and in the North and East, where they are threatened with destruction due to the ongoing civil war in the region.

Privately owned buildings are very difficult to preserve as the government is not able to provide assistance other than through legal provisions. As legal actions alone can not save them, there should be an understanding between the owners and the state for the preservation activities to be successful. It would be useful if a registration and designation system for cultural properties could be adapted to save endangered buildings.

In conservation activities, the architects' role is very important, and a proper approach and attitude is very essential for the work to be successful. There are little over 100 conservation architects in Japan and they have formed into an organization. The Conference of Japanese Conservation Architects is held annually to discuss their work, techniques, materials, problems and solutions. In Sri Lanka it is not a specialized field, but qualified architects get involved in the work and with time they adjust to the conservation field. The ICOMOS Sri Lanka organization has been able to fill the need to some extent, but it would be more meaningful if architects involved in the conservation field could get together to form an organization, and it would also provide an ideal platform to discuss their work, and solve many problems that prevail in the field at present.

Planning regulations and effectiveness in forming buffer zones to ease administrative matters were discussed during the lectures. In Sri Lanka the existing practice is to have buffer zones around certain heritage sites restricting new developments to a considerable extent. For example along the major streets in Kandy, people cannot build new structures unless they are compatible to the existing architecture. This rigidity in planning regulations angers citizens and shop owners, as the cost is comparatively high and it requires special skills to build. Due to this reason, some are inclined to harm or burn down old buildings, and in such instances we as the entire population lose those cultural properties unnecessarily.

When the master plan for the World Heritage city of Kandy was being prepared, these facts were taken into consideration, and the citizens given the following concessions. If they keep the old façade intact:

1. they can add an additional storey or two, set back a specified distance from the road;
2. they are free from having to pay municipal taxes;
3. the house will be fully documented with architectural plans, and a plaque indicating that is a cultural property will be displayed on the front;
4. the Municipal Council will assist the owners in periodic renovations, etc.

Likewise, the Galle Heritage Foundation will look after preservation and new construction within the World Heritage Site of Galle Fort.

During these lectures need for new approaches in existing legislation for conservation was elaborated, and it was also stressed that the Asian context of heritage is different from that of the West, and our theories and principles should cater to Asian needs. But for successful implementation of all these laws and regulations, there should be mutual agreement between the citizens and the authorities. Regular dialogue between the two parties, and building awareness among general public regarding our cultural properties, are needed.

Lectures on wooden architecture and technology in Japan and the Asian region were extremely absorbing. Wooden buildings dominate most ancient structures in Asia. Details of different wooden structures in chronological order and their conservation efforts were discussed in detail.

The history of Sri Lanka goes back beyond the 5th century B.C., and all its World Heritage Sites date from the 3rd century B.C. to the 16th century A.D. The early and medieval period structures, like stupas and statues in Anuradhapura and Polonnaruva, are mostly brick or stone. There is evidence for the use of timber in structures in the Anuradhapura period, but the data are vague. These ancient secular and palace structures met a rather bleak fate when compared to ancient structures in Japan. When the kingdoms shifted towards the wet zone away from ancient capitals, wilderness covered and shielded them from people. By the time of re-discovery, they were already "dead monuments" belonging to a bygone era. When it comes to conservation of those ancient stone and brick structures, the Sri Lankan system does not go beyond conserving the existing situation by strengthening the brick or stone parts and restoring timber parts only if they are still intact. Conjectural reconstruction of timberwork is never practiced if there is no evidence.

At present most pre-colonial period (pre-17th century) timber buildings are concentrated in the Kandyan region as temple structures and ancient monastic establishments. Over time they have undergone periodical renovations with alterations to suit the prevailing condition and requirements. Unlike the situation in Japan, they were not subjected to total dismantling and re-building processes. The custodians were satisfied with necessary repairs to the damaged structural or other members, with or without alterations. During such processes the original wooden parts may have become plaster or

brick work. For example, most of the wooden pillars that supported beams and walls of *tampita viharas* (temples on pillars) have been replaced with brickwork, and these in time may converted to a rubble-retaining wall. As they were living monuments, people accepted such changes in design or structure and adapted to them, and never questioned their authenticity. When it comes to conservation, the accepted method in Sri Lanka is restoration based on existing evidence or the findings of excavations. If there is evidence for periodic additions and alterations, the conservation team decides the phase that should be adhered to in the present use of the structure.

During the three-day on-site training at the Tanaka Family House, we learned about the traditional vernacular houses in Japan. It was a fascinating way to learn about the building technology, through measured drawings, and we had to measure every structural member of the house, and draw floor plans and cross sections. The method applied and the attention to minute details was very intriguing and rewarding, for that way we learned very thoroughly. Another assignment was to identify types of wood and their differences, and it was useful to know about the characteristics of Japanese timber species.

The visit to the Nara palace reconstruction site and the Toshodaiji temple main hall site further revealed the Japanese approach towards conservation, mainly based on the Nara Document of Authenticity. These two massive timber reconstructions are replications of those of the ancient period, and have to be rebuilt every 200 years. Most important wooden structures in Japan are similarly subjected to total dismantling and rebuilding once every 200 years. By doing so, the Japanese actually make sure that their traditions, skills, materials and architecture are handed down to future generations.

In Sri Lanka as well, techniques of carpentry and woodworking are handed from senior to younger generations. Students in carpentry train under a senior carpenter and with time become competent. The CCF carpenters have become very competent over the years, a success achieved by the institution. But it is becoming very difficult to find good carpenters for sensitive work like conservation. The use of traditional tools and equipment is also decreasing, as the younger generation is attracted to modern tools.

The scarcity of good timber suitable for the conservation of wooden structures is becoming a major problem. The forest cover in Sri Lanka is below 20% of the total land area. In Sri Lanka, timber is one of the costliest building materials, and sometimes conservation activities are affected due to the unavailability of timber. Japan has paid admirable attention to this aspect and taken steps to protect their forests, ensuring the supply of natural resources needed for the conservation of wooden buildings, such as timber and thatching materials.

Another problem with wooden buildings is insect (mostly termites) damage, which is the most common problem to the Asian region. All participants shared their knowledge on the subject and specially the Nepali method of mixing linseed oil with kerosene as a prevention method may suitable for other countries, as it is also a cheap one. Fumigation is still the most common method used to exterminate insects in Japan, but they employ the most advanced technology in use. Most Asian countries cannot adopt this method other than for small items like books.

The Meiji-mura open air museum of architecture was a novel approach to conservation, where old threatened buildings are rebuilt at one site. I experienced the same approach in the Netherlands, where an already vanished fishing community was being portrayed by actors with old houses rebuilt at a museum area. When the buildings are threatened in their original site, this may be the second best way of preserving them. It will at least save the building if not its surroundings. But I feel that for any building, its ambience is vital, as it gains its identity in relation to its setting.

Japan uses very efficient and advanced methods of project planning and implementation, mainly due to the financial resources ready at hand. Our site visits to the Imai-cho preservation zone in Kashihara city in Nara prefecture, and the historic area of Takayama city in Gifu prefecture enhanced this impression. The surveying method for private residences and urban landscapes in Imai-cho was similar to the survey we did in Sri Lanka for the World Heritage city of Kandy. This trip to Imai-cho was a good opportunity to gain knowledge on preservation approaches and techniques. The total preserved area is approximately 18 hectares, and there are around 1000 houses along the streets. It has been comprehensively conserved with consideration for every aspect, even the roads. Similarly, the historic area of Takayama was a merchants' quarter, with all buildings lined along the street grid of the area. This area has many similarities with Kandy. It also has a major shrine at its apex and an annual festival like Kandy's Esala Perahera. Both of these historic areas were conserved with community support.

In the Sri Lankan situation, a master plan was prepared for the World Heritage city of Kandy, but its implementation stage has not been carried out yet. One obstacle is that Kandy's vernacular houses, religious places, public buildings, shops, etc., are all mixed up and congested, and thus a small area like Imai-cho could not be separated. It would be worthwhile if the Kandy Municipal Council and the Urban Development Authority could initiate a preservation bid along one street on an experimental basis. Similarly, there is a plan for the World Heritage site of Galle Fort, to relocate incompatible public activities out of the fort, and preserve the historic sector. At present the Government of the Netherlands is providing financial assistance to carry out some major conservation like the Dutch Warehouse and Ramparts.

In both Japanese examples it was evident that the community support was a decisive factor for

successful preservation. In Kandy as well, a dialogue between the people and the authorities concerned was initiated, and through this we have been able to solve many problems. When we select a cultural environment for preservation, we should do so with its intangible cultural heritage, ambience, and context in mind, and to some extent there should be control of new developments. Cultural heritage in Sri Lanka, as in the general case for Asia, is always blended with the lifestyle, religion, myths, and rituals of the people who support it, and continues to change slightly in ways that escape our perception over time. Therefore it is very hard to draw a line limiting peoples' involvement with their inheritance, for it gains its "life" from the people.

Japan is prone to many natural hazards like earthquakes, fires, tsunamis, typhoons, etc. Therefore the Japanese always plan for risk preparedness and management. Our visits to Kobe, Takayama, Shirakawa-go village, etc., highlighted the preparations against fire and earthquakes, the two most common hazards in Japan. In Imai-cho, the Hida historic area in Takayama, and Shirakawa-go village, there are large water tanks or pools ready to be used in a fire situation. In addition, there are water guns and isolated fire extinguishes at every important place. Drains with running water are another feature used to control fire damages to timber buildings (for example, in the Toshodiji temple restored buildings, Imai-cho, and Takayama). Takayama city has organized small community groups of five family units to monitor the condition of buildings and fire risk regularly. In Kobe, where there was a massive earthquake in 1995, all the buildings have extra measures to mitigate such future damages. Special structural mechanisms have been introduced to important buildings to reduce horizontal movements and vibrations of the quake.

To me this was a revealing experience because Sri Lanka's risk preparations are really at zero level. Until the tsunami devastation in December 2004, Sri Lankans were complacent about natural hazards, as we live in a zone that is free of earthquakes or volcanic eruptions, or even bush fires. Floods and occasional cyclones were the only hazards we knew of other than manmade ones. There were no reported incidents of fire in historic timber buildings during the past 100 years. All our hazards were from intentional acts of men involved in war or terrorist activities.

During the 2004 tsunami, the whole coastline and especially the World Heritage site of Galle was seriously affected. All conserved underwater heritage sites and artifacts were damaged, and most of them had to be retrieved from sea again. But the more frightening fact is that even now there are no suitable risk preparedness or management methods to mitigate such calamities in the future. It is high time to make an evaluation of the situation, for the fault line near Sumatra is becoming an active zone and Sri Lanka may experience earthquakes in future.

The importance of revitalizing traditional lifestyles and industries was appreciated during our tour to the Sawanotsuru sake brewery, also in city of Kobe. There were around 300 such breweries prior to

the quake, but around 90% of them were destroyed. In order to revitalize the age-old life style, the authorities and owners got together and a new complex has been built along with a museum. It should also be mentioned here that this new building complex is equipped with new technology for withstanding earthquakes. But the most exceptional eco-cultural preservation bid was Shirakawa-go in Gifu. This World Heritage site has around 150 traditional thatch-roofed *gasshō* style houses within 45 hectares. These houses were originally built for silkworm cultivation some 300 years ago, but after the World War II, this occupation was abandoned. Originally there were around 1,800 houses, but due to the war and dam construction across the Shōgawa river, the number began to dwindle. Then the community itself grasped the importance of their unique *gasshō* style and got together to save it. The people formed an association, whose principles are that no one should sell, rent, or destroy their houses, to protect the housing style. The commitment to safeguard these old houses, and their willingness to reside in old-fashioned houses, should also be appreciated.

There have been similar drives to conserve the intangible culture and lifestyles of people in Sri Lanka, but some of them failed because they were done in a hasty manner, without studying the actual lifestyles and problems. Another reason was that authorities were complacent after the relocation and did not think it vital to have regular a monitoring system. One such example is the relocation of cashew nut sellers of Bataleeya. At Kalapura, Gadaladeniya, the traditional Kandyan jewelry and brass casters were virtually abandoned after relocation. There are several such traditional craft villages like the Talagune mat weavers, pottery makers, lacquer work at Matale, traditional masks and puppets at Ambalangoda, cane crafts, etc., and also other intangible assets on the island, which need urgent attention. The traditional housing style of the Tamil people is unique, built with natural materials in their surroundings. There would be many more heritage sites in war-prone areas in the North and East, but unfortunately these areas are inaccessible.

In all three of these Japanese examples, community support and dedication of the authorities to preserve them are very much evident. This should be a good example for future endeavors in Sri Lanka where there are several such small traditional settlements in danger.

The lecture on future tasks in the preservation of cultural heritage succeeded in showing us that the cultural heritage of the world at large lies in the hands of the younger generation of conservators, whose actions may become vital for its survival.

CONCLUSION

It was a great opportunity for me to participate in the 2007 ACCU course on Wooden Cultural Heritage, because it was very refreshing, informative and practical, and mostly it helped me to live closer to ancient timber buildings, one of my favorite subjects. I was particularly interested in the risk

preparedness, project planning, and implementation aspects. The lectures on risk preparedness were especially eye-openers for me, as we are complacent regarding natural hazards or even man made ones in Sri Lanka.

The country report presentations offered an ideal platform for exchanging our experiences, where 14 different perspectives on issues related to conservation field were discussed at length. It gave us a fair amount of information on each situation.

It was evident from most of our site visits that Japanese authorities involved in conservation have been able to get maximum community support. In the examples of Shirakawa-go village and Takayama city, it initially came from the community itself! The people grasped the grim situation of their vanishing heritage and came forward to form a conservation drive. During his discussions, Dr. Aiden Challis aptly quoted what a Maori chief once expressed: that heritage belongs to all people -*"but first it is ours!"*

It is obvious that in the case of wooden cultural heritage, minimum intervention may not be sufficient to save the building. If this approach is consistently applied to timber structures, there may not be many buildings left in the world to admire.

In that sense, this course has revealed an aspect of reconstruction which is new to Sri Lanka. Our timber buildings under go periodic repairs, but they are never subjected to a total dismantlement like those in Japan. Actually, there are two paradoxes in Sri Lanka regarding this. Restoration of the "dead" ruins in ancient capitals of Anuradhapura and Polonnaruva to their past glory is unacceptable to most. But people appreciate periodic renovations, re-painting or even additions to "living" monuments! So I think it is a very subjective matter as to what should be the limit of intervention in cultural properties especially in the Asian region, where most of the important cultural properties are associated with culture, religion, and the people's life style which these properties support. As the eminent art historian Dr. Ananda Coomaraswami said, *"art is nothing tangible."*

ACKNOWLEGMENT

It was a great pleasure to participate in the 2007 training course on Preservation and Restoration of Wooden Structures conducted by the Asia/Pacific Cultural Centre for UNESCO. I have been able to gain knowledge related to the subject, especially new information, approaches, and technology. The whole program was meticulously arranged and conducted, and the ACCU office in Nara should be specially commended for a job well done!

I am grateful for the Government of Japan, ICCROM, Nara Prefectural Government and ACCU (Nara Office) for giving me this opportunity to participate in this year's program. I must mention Dr.

Yasushi Nishimura, Director of ACCU, Mr. Isao Nakai, Director of its International Cooperation Division, and Ms. Yasuko Otani of the ACCU office, as well as Mr. Eisuke Nishikawa, Ms. Maki Yoshida and Ms. Itaya Tomomi, tutors at the ACCU. Very special gratitude is due to Ms. Chiyako Hata, the interpreter for the program, because it was through her that we were able to learn! I would like to thank all staff members of the ACCU (Nara Office), who worked behind the curtains to make us feel at home.

I pay tribute to all the lecturers who came from all parts of Japan, plus Dr. Gamini Wijesuriya of ICCROM, and Dr. Aidan Challis of the New Zealand Historic Places Trust, for giving their valuable time for us.

I am also grateful to the Central Cultural Fund, my institution and the government of Sri Lanka for sending me to Nara for this course. Finally I must pay my gratitude to Dr. Roland Silva, founder and Director General of the Central Cultural Fund, and Past President of ICOMOS, for reviving the field of conservation and placing great value on the cultural heritage of Sri Lanka.

Thailand

Naruporn SAOWANIT

1. Introduction

Wood is the most common and basic construction material for every culture in the Asia/Pacific region. It is used in many kinds of architecture, from the houses of ordinary people to the palaces of kings. However, one property of this material is that it is not very durable. Only a few countries in the Asia/Pacific region have much long-standing architectural heritage which can be dated to more than 1,000 years ago, and thus have long experience in the restoration and conservation of wooden architectural heritage, such as Japan.

The training course on Cultural Heritage Protection in the Asia/Pacific Region - Preservation and Restoration of Wooden Structures (18 September to 19 October 2007, Nara, Japan), organized by the Cultural Heritage Protection Cooperation Office, Asia/Pacific Cultural Centre for UNESCO (ACCU), presented much information about the conservation of wooden architectural heritage, focusing on case studies in Japan along with the sharing of experience among the participants from 14 countries in the Asia/Pacific region. From various specialists belonging to many organizations and institutes, all participants obtained diverse knowledge and comprehensive information, which can be summarized by topic as follows.

2. Theoretical Perspectives: Philosophy, Systems, and Techniques for the Conservation of Cultural Heritage

Most of the theoretical lectures in this training course emphasized on the philosophy of, the systems for, and the conservation of culture heritage. After a brief introduction to World Heritage sites in the city of Nara in the first week, an overview of the international aspects of conservation was given, such as conventions and charters relating to cultural heritage, and introductions were made to the wooden architectural heritage of the Asia/Pacific region, and the designation system for cultural heritage in Japan. It was appropriate to have these lectures at the beginning of the training course to provide a basic understanding for the subject about the meaning of "cultural heritage," and also for orienting all of the participants, who came from various fields, statuses, and experiences.

Other important lectures, which helped participants to understand the characteristics of Japanese wooden architectural heritage and conservation philosophy, provided in-depth knowledge of the Japanese's traditional architecture, and traditional and recent techniques of construction and conservation. These lectures were very informative and relevant to the training course for the remaining weeks, which also saw many lectures in specific technical fields such as the prevention of termite damage to wooden structures, an introduction to conservation science for wooden architecture, and dendrochronological science.

3. Practical Training and On-Site Lectures

Although many case studies were covered in each lecture at the ACCU office, providing information which was new for every participant and explained in terms of universal values, particularly with regard to architectural characteristics and structural details, all of this information was nevertheless encountered only on the projection screen and on paper.

3.1 Practical Training. All practical training and on-site lectures provided opportunities for the participants to learn through real structural observations. The main practical trainings were in basic methods for making restoration plans by making drawings for measurement, and a survey on painting and planning for painting restoration. Both types of training gave concrete ideas by assigning participants tasks in which they themselves would use the methods and processes current in Japan for analyzing physical elements of the cultural heritage at real sites, such as the Tanaka farmhouse and the Niukawakami shrine.

3.2 On-Site Lectures. The on-site lectures provided a great opportunity for participants to visit many architectural heritage sites, both in the city of Nara, such as the Heijo palace and Toshodaiji temple, and especially outside of Nara. Most of the on-site studies were villages of vernacular houses and townscapes which are the important conservation areas, such as Imai-cho in Kashihara, the Meiji-mura museum in Aichi, and Hida Takayama and Shirakawa-go in Gifu. All of these areas were the highlight of the field observations, and very good case studies. They presented examples of the thought processes — how meticulously Japanese conservative workers think about their cultural properties. Many of the details of systematic conservation, such as the long-term master plan or risk preparedness, are difficult to observe in other Asia/Pacific countries.

4. Sharing Experiences: Presentations and Discussions

4.1 Participants' presentations. Before the training course began, I had thought it would be very difficult to find subject matter to use in my country report and my presentation. The reason is because the training course's content is about architectural conservation, but I come from the field of architectural design and have very little experience in conservation. Finally, however, I decided to present what I know. But I found in the presentation program that the diversity of the participants' backgrounds was very valuable. In our group we had not only conservation architects, but also persons serving in the roles of historian, engineer, and scientist. This diversity gave us a chance to share each other's experiences and opinions in a way that could extend and develop our own attitudes and viewpoints. It is not just about the conservation experience, but also the cultural experience in each country.

4.2 Discussions. In many lectures and observations, the lecturers led the participants in discussing many issues related to the content of each lecture, both among the participants and also with the lecturer. It was very kind to give us the respect of equal status with skilful persons in each field. Especially in last few days of the program, participants had the important chance to discuss the background of the nominating system for the World Heritage. This issue awakened in us a concern

about the value inside each cultural property. The real meaning of the term "World Heritage" is not a status, like the rank of feudal lords, but an intrinsic universal value which gives meaning to people, not only in one country but also to the whole world.

5. Lessons from the Training Course and Applications for Thailand

From this training course, I received much new knowledge and obtained many ideas. With regard to technical issues, Japanese conservative architects and engineers use many techniques in restoration works for solving problems such as the deterioration of materials, termites, and fire prevention. These are ordinary problems which are found in every part of the Asia-Pacific region. For my country, the new important challenge is the seismic problem. Earthquakes within the Southeast Asian region have become more commonplace since the 2004 tsunami. Especially for the mainland areas, old theories and databases cannot be used for preparedness. There is urgent need for standard techniques, to provide reinforcement for seismic problems, to be adapted for implementation in Thailand. Another science that very interesting is dendrochronology. In future, I hope it will also be implemented in Thailand for conservation work.

With regard to theoretical issues, the identification and registration system for cultural heritage is the first thing that shows many differences between Japan and Thailand. This provides important lessons that our government should think about, because the identification system in Thailand has considerable problems in terms of concepts, which makes for confusion in conservation work. The comprehensive documentation system is another thing that will provide a good lesson for our country. Apart from this, I found two aspects of restoration and conservation in Japan to be most impressive. First, they do the best in every part of the work, from the smallest detail to the largest, with extreme care. Second is the respect for the original knowledge and information inherent in every heritage element. It makes conservation not only a kind of structural work, but also a work of art which is filled with spiritual meaning.

However, the most important lesson for me is not what they have produced, but how they think and create. The thing which makes a sustainable production is not the product, but process. Nothing is perfect in the beginning, but everything develops with time. What matters is how we care about our work and our heritage.

6. Conclusion

For me, coming from the design field and having little experience in restoration and conservation, this training course has been a great opportunity for increasing my knowledge and experience. Even though my job is quite removed from the field of restoration and conservation, I hope that all the lessons and experience I have received can be implemented in my work, or at least in some of it. However, the most use full idea that I have received from this training course is represented in the sentence by Coomaraswamy: "Art is nothing tangible." This sentence reminds me to be certain of the status and value of my work in term of conservation. The universal value in

architecture is not the antiquity of the material but the knowledge and spiritual information inside. Nothing lasts forever, even our structural heritage. Eventually, materials must decay. But being concerned about how to conserve the original knowledge, and transfer it to the next generation, is the best way of sustainable restoration, and conservation of the cultural heritage.

Finally, I would like to thank to the ACCU, who organized this training course and gave us the opportunity to gain this great experience, and to create networks of relationships between many countries. By means of such relationships we can share our cultures with each other, and the world will then become smaller, because through learning about difference and diversity, unity can happen.

Vietnam

DO Huu Triet

1. Introduction

I would like to thank the ACCU and Japanese government for providing me this splendid opportunity to participate in the training course on Cultural Heritage Protection in the Asian/Pacific Region – Preservation and Restoration of Wooden Structures (18 Sep. – 19. Oct.2007). During the training course at the ACCU office, in on-site practice sessions and in lecture presentations, I gained important knowledge of the Japanese conservation system for cultural properties, and also learned useful skills for research and for preparing for the protection of world heritage.

I work in the Experiment and Preservation Department of the Hue Monument Conservation Center, Vietnam. I have ten years' experience in the preservation and research of traditional materials and techniques. In my country, we face many problems of conservation in terms of techniques, management, and policy. The conservation work is really difficult, and always challenging for the conservator. In this training course I encountered many related problems that are very close to mine, which helps enhance my understanding and knowledge.

This report mainly discusses how to apply the knowledge from the training course to the conservation and preservation of wooden structures in the Hue Monuments. I would like to present my impressions and my thinking about the training course, and also indicate those ideas that I got from the lectures and the other participants that will be useful for me in conservation work in my country. However, due to the limits of this report, I will only focus on the following topics, which are closely related to my job.

- New materials and technologies for preservation, and the role of scientific studies.
- How to keep and develop traditional techniques and materials.

2. About the training course

- **Lectures at the ACCU office and on-site practical training**

All lecturers who spoke at the ACCU office have experience in the preservation and restoration of important cultural properties. Although most lectures focused on aspects of Japanese conservation, such as traditional Japanese wooden architecture, scientific applications, and Japanese conservation guidelines, all participants could understand and relate these topics to cases of conservation in our own countries. I was impressed with the master plan topic, which was useful for me in gaining a broad understanding of the role of conservation, and for preparing my own plan to carry out conservation work in the future.

The practical training and on-site lectures were very interesting for me and enhanced my skills in actual conservation. They provided a good chance for all participants to gain experience and understanding of the basics of conservation to apply in our own work.

The practical survey on painting made a strong impression on me. Most of the participants made mistakes in surveying the colors of the paintings. And from these mistakes, we learned more about skills in observation, and more about historical and religious painting. This practical training made me think about traditional painting techniques, about the colors of painting, and about respecting what humans believe. It also showed the value of culture, of giving the present generation information for understanding the customs and beliefs of people in the past. I feel the past is connected with the present through cultural products, and the preservation of paintings at the Niukawakami shrine showed me the feeling of religious activity in the past. Maintaining the original paintings revealed outstanding aspects about them that stuck in my mind, which also means that cultural values were being preserved and conveyed in their totality.

However, I thought about how to keep such paintings in their current condition for a long time, and what the best present preservation method would be. This practical on-site session did not provide enough time for me to ask and obtain answers to these questions, because I had to share the expert's time with other participants. I will take it as a personal responsibility to deal with this matter in the future.

Another practical on-site session that was useful for me was the three days of training at the Tanaka farm house, which helped me understand many things. As I had previously practiced the method of surveying cultural structures, it was not so unfamiliar to me, however, from the on-site lecture I recognized the standard of the research method. It is the module of the building that surprised me, the traditional method of constructing the building in a system which everybody could understand easily, and was also useful for the researcher to understand the traditional techniques of the past.

The module has two main meanings. The first is an understanding of the system of measurement in Japan in the past, through which we can understand the mathematical and logical thinking of the carpenter and the artisan. The size of the tatami mat is also an especially interesting topic: why did the Japanese people chose this size mat as a standard module? The second meaning is what is revealed about the regular customs and habits of the Japanese people. In my opinion, these regular customs form one of the most important elements helping make Japan both beautiful and a developed country in the world.

- **Participants' presentations and discussions**

We come from different countries, each country having its own characteristic culture, social system, and conditions of conservation. However, we could share our experiences and thinking together because we have the same purpose, which enhances our capacity for conservation. On the last day, we discussed those ideas that are useful and could be applied in our conservation. There were many good ideas that I would like to list, and will explain some in detail.

– *Documentation and storage of information.* Much information has been kept from the distant past, which is now very useful for conservation research. Many documents are needed for the present and for the future. For example, the dendrochronological method began more than about twenty years ago in Japan. This method needed to have a master database, making the database required the

evidence of timber, along with data on wooden buildings such as the time they were built, the length of time for storing the timber, the time of restoration work, etc. This information was obtained through the result of much research, along with evidence from historical documentation.

– *Dendrochronology*. This method can identify the date and age of felling of timber used in historical buildings. It is very useful for conservation, but it would also be difficult for many countries to develop the ability to conduct dendrochronological analysis.

– *Making the best use of resources*. The materials needed for conservation work are very important now. The Japanese have long had a policy and strategy for keeping materials available for conservation.

– *Surveying method*. This should become standard for the conservation architect. Observation skills are very important for the conservation researcher, especially that of looking for traces to understand subjectively the experience of other periods.

– *Risk management*. For disasters such as earthquakes, fire, storms, and snow.

– *Fire and earthquake system*. These are very necessary for protecting cultural properties.

– *Dismantling*. Total dismantling is a method used for repairing wooden historic buildings. It is applied to most buildings repaired in Japan, and is also used in Vietnam. It provides benefits for research, in looking for past information, and also helps conservation work be carried out completely. However, we need to be careful to avoid the losing the value of culture properties.

– *Repairing*. The Japanese have appreciated the value of cultural properties, so they tried to preserve wooden members as much as possible with a consolidated steel frame. This method is very easy to understand and carry out now, but in the past it was very difficult, and therefore it demonstrates the Japanese consciousness about conservation.

3. My impressions and thoughts

- **New materials and technology for preservation and the role of scientific studies**

Preservation is the primary mission of protection for cultural properties in the world. New technologies should be developed and information about them provided to all conservators, although traditional conservation techniques should also be maintained.

We know that cultural properties are the heritage of humanity throughout the world; they should be protected for the present and for the future. If traditional methods cannot be applied, but new technologies and also new materials can be devised for keeping and protecting cultural properties over longer periods of time so that their historical and cultural value remains, then this should be done.

Perhaps there will not be complete agreement of opinion on this matter, because some are afraid that the new methods will be applied too hurriedly, but all still understand the need to have better techniques for the protection of cultural properties. And some may also be afraid of losing the value of historical experience and traditional techniques, which also contain cultural value.

In response to this, we have looked at the matter from the scientist's way of thinking. They

always want the new materials that they have researched or developed to be applied for conservation. Most of them want to demonstrate the positive characteristics of such materials, and refuse discussion about the negative aspects of new materials, or discuss them only reluctantly. They should not be judged for their attitude too hurriedly; it is only normal for everyone to want appreciation for the hard-earned results of research that has been conducted over a long period of time.

Therefore, the conservation work needs to have scientific experts who will responsibly consider and apply scientific results for the protection of cultural properties. The scientist can demonstrate the positive and negative aspects of the materials, and can support the conservation work by adjusting the physical and chemical properties of materials. This type of work needs laboratory equipment, and also needs to have the conservator understand both the science and conservation.

On the other hand, the scientist also needs to have knowledge of traditional materials in order to compare their nature to that of new materials, and thereby understand in what case to apply the new material.

- How to keep and develop traditional work and materials

Above I have focused on the role of the science conservator; one of their tasks is to maintain traditional work skills. How can this be done?

In Vietnam and also in many developing countries, traditional work is being lost day by day. In my opinion, keeping traditional work skills is not only necessary for conservation, but they are also cultural properties by themselves. The value of traditional work is part of the value of culture and of past ways of living. To keep and develop the traditional methods of work, I think we need three factors.

1. *Government policy.* In Vietnam, the policy of supporting traditional work has been carried out from a few years ago, but it is not really strong, and some traditional groups acting separately can not develop their work. Therefore, they need more support from government, in the form of loans, promotion, tax relief, and support in exporting.
2. *Research support and training for the young.* The responsibility of the researcher is to understand traditional jobs, not only the techniques and materials but also the thinking and habits of the traditional worker. The researcher needs to have sympathy for their condition, especially the financial condition of the traditional family.

   In addition to the researcher's need to study careful the techniques and materials of traditional jobs, he must also study the cultural value of those jobs. Then the researcher has the responsibility to train young people to maintain the traditional jobs.
3. *Respect from the community.* Public recognition is very important for traditional workers. They must feel that they have a good position in society. We must respect them because they are living cultural property, and they contribute to conservation work.

4. Conclusion

The training course on Cultural Heritage Protection in the Asia/Pacific Region – Preservation

and Restoration of Wooden Structures (18 Sep. – 19 Oct. 2007) was very useful for all participants. I think that after the training course, all participants were enhanced in their knowledge, and will carry out their conservation work at higher standards. Many new methods and techniques for conservation could be learned from the lectures and experts. On the other hand, experience in cultural property management, and educating society to understand the value of heritage, are also important for us. These topics, and my thinking that I have written in this report, are matters I often consider. It is difficult for me to solve them immediately and chose the best way for conservation in my country. But now these matters may become clearer by transferring the philosophy of conservation gained from the knowledge in all of the lectures.

4. Acknowledgment

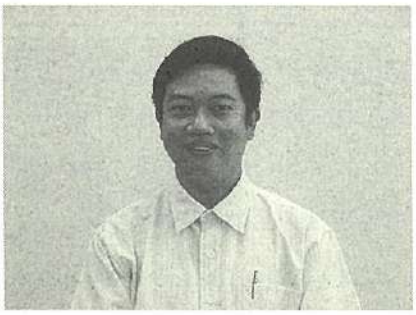
I would like to acknowledge all the lecturers and on-site experts from many institutes, universities, and worksites who provided their time, experience and knowledge, which were very important for the success of the training course. It has enhanced my capacity in terms of personal skills, and knowledge of conservation.

I would like to thank to the Director of ACCU office and all the staff for the wonderful organization during the training course. I would like to express my gratitude to the government of Japan and Vietnam for supporting my worthwhile stay in Japan.

I also would like to thank all of the participants who shared with me their experiences and knowledge, and helped me during the training course.

V Appendix

A. List of Participants



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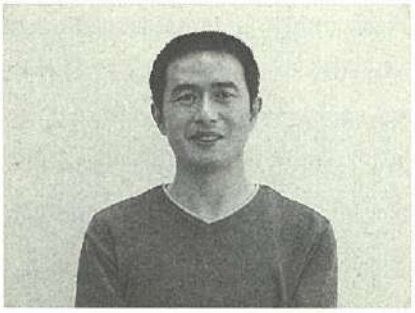

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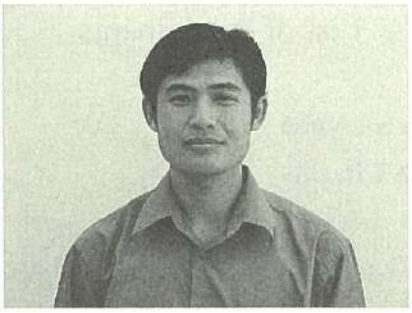

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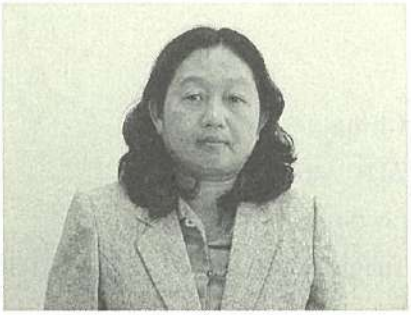

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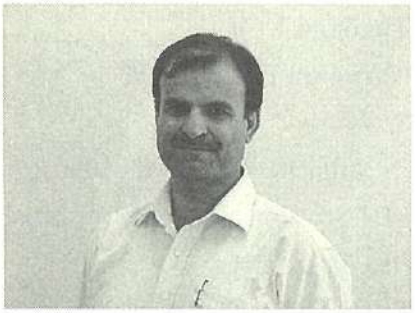

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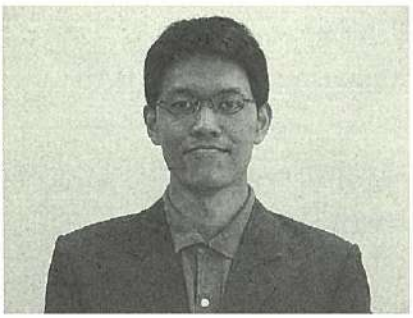

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