Training Report
on
Cultural Heritage Protection

Training Course for Researchers in Charge of Cultural Heritage Protection in Asia and the Pacific 2012 - Indonesia -

12 June-12 July, 2012, Nara, Japan

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

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

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The on-site lecture in Horyu-ji Area, Nara

Mr Kobayashi (right) explained how to prepare traditional wall clay at Himeji-jo Castle.

An explanation on how the fallen chimney by the Great Hanshin Earthquake was restored.

At the west pagoda in Yakushi-ji Temple

Adjusting a shutter speed and an aperture value

Practical training of photography at Gango-ji Temple

Scale drawing in Tanaka Family Residence

Practicing *yari-ganna,* a spear plane

A lecture by Mr Hayashi at NNRICP

The closing ceremony at the ACCU Nara office

Preface

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

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

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

ACCU Nara has learned that one of the most urgent issues currently facing Indonesia is a shortage of trained conservation architects who can conserve groups of traditional wooden buildings as historic landscapes for better utilization of them, and therefore we have invited three researchers into the Individual Training Course 2012 for providing them with basic and practical techniques on recording/documentation of wooden structures for preservation of townscape and historic villages. They belong to Ministry of Education and Culture, being engaged in cultural heritage protection in Indonesia. This programme was also organised so as to provide them with opportunities to be exposed to as many preservation districts for groups of traditional buildings, townscapes in Nara, Kyoto and Kobe as possible. They saw with their own eyes how heritage architecture or vernacular houses were preserved and managed in Japan. It was our pleasure that they worked with us as assistants at the regional workshop held in October 2012 in Indonesia and we enjoyed the reunion.

Finally, we would like to express our sincere appreciation to Agency for Cultural Affairs, Japan (*Bunkacho*); Nara National Research Institute for Cultural Properties; Imperial Household Agency; Nara National Museum; Todai-ji Temple; Gango-ji Temple; Nara Prefectural Board of Education; Nara Municipal Board of Education; Kyoto City Board of Education; Kashihara City Board of Education; Hyogo Prefectural Board of Education; Kobe City Board of Education; and Himeji Municipality for their cooperation and support.

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

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1. General Information

1. Organisers

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

2. Background

The Republic of Indonesia comprises numerous islands with a number of ethnic groups which have produced diverse cultural properties rooted in unique cultures of their own. There exist not only many stone structures including Borobudur Temple, but also abundant wooden architecture such as old mosques and vernacular houses, which need research study for preservation.

Ministry of Education and Culture recently realized that it would be the matters of urgency to conserve groups of traditional wooden buildings as historic landscapes for better utilization of them. In addition, Indonesia is regularly hit by natural disasters and they have to prepare for that to protect cultural heritage. For that purpose, the capacity building of conservation architects becomes the urgent issues, because there are not sufficient numbers of experts in Indonesia to conserve wooden heritage except some areas.

Based on this current situation in Indonesia and in response to a request from Directorate of Cultural Heritage and Museum, ACCU Nara has decided to invite young officials who are to engage in conservation work of wooden heritage in Indonesia into the individual training course.

3. Date and Venues

Date: 12 June (Tue.) to 12 July (Thur.) 2012. [31 days]
Venues: Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU Nara); Facilities and museums of cooperating organisations.

4. Objective of the Training Course

A sequence of the individual training course aims at mainly providing participants with the basic knowledge and practical technique in Japan concerning to measures for survey and preservation of the historic buildings which make up significant parts of the townscape and villages, and methods for conservation management and utilization of the townscape and villages as a whole, which will accordingly contribute to the protection of cultural heritage in Indonesia.

5. Training Curriculum

- Introduction to Recording/Documentation of Wooden Structures
- Introduction to Restoration Techniques of Historic Building
- Introduction to Preservation of Townscape and Historic Villages
- Practical Works of Recording/Documentation of Wooden Structures and Townscape
- Restoration Plan for Wooden Structures
- Practical Works of Restoration of Historic Building
- Practical Works on Preservation of Townscape and Historic Villages
- Risk Management of Cultural Heritage

6. Participants

Muhammad Tang (Mr)
Conservation of Archaeological Heritage Office of Makassar
Date of Birth: 23 November 1975 (Age 36)

Prita Wikantyasning (Ms)
Directorate of Cultural Heritage and Museum, Ministry of Education and Culture
Date of Birth: 30 November 1976 (Age 35)

Azahar Purwanto (Mr)
Conservation of Archaeological Heritage Office of Samarinda
Date of Birth: 10 August 1986 (Age 25)

7. Process of Invitation

Dr Surya Helmi, Director of Cultural Heritage and Museum, Ministry of Education and Culture, recommended three applicants suitable for the above mentioned invitation programme as participants. Then ACCU Nara Office has determined to invite three applicants as participants through close examination.

8. Others (Past achievement to accept participants)

Since 2000 when the above-mentioned invitation programme started, 44 participants from 15 countries have been accepted.

9. Certificate

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

10. Language

English and Indonesian are main working languages of the course.

11. Expenses

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

(1) Travel expenses:
Each participant will be provided an economy-class return air ticket between the international airport nearest to their residence and Kansai International Airport (KIX), and domestic transportation costs between KIX and their accommodations in Nara.

(2) Living expenses:
Participants will be provided daily subsistence allowances during the training course, beginning from 11 June (Mon.) to 13 July (Fri.) 2012. Arrangements and payment for accommodations will be made by ACCU Nara.

12. Secretariat

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2. Programme Schedule

Date			9:30-12:30	13:30-16:30	Venue
June	12	Tue.	Opening Ceremony (11:00-)	Guidance to the Programme	ACCU Nara
	13	Wed.	On-site Lecture: Historic Monuments of Ancient Nara, World Heritage Site I		Todai-ji Temple, Kasuga-taisha Shrine and Kofuku-ji Temple, Nara City
	14	Thu.	Japanese Wooden Structures	Policy Measures for Protecting Architectural Heritage	NNRICP
	15	Fri.	Preservation of Townscapes and Rural Settlement	Protection System of Cultural Landscapes	NNRICP
	16	Sat.			
	17	Sun.			
	18	Mon.	Documentation and Restoration Plan of Wooden Structures		ACCU Nara
	19	Tue.	Practical Training: Recording of Wooden Structures I		Tanaka Family Residence, Nara City
	20	Wed.	Practical Training: Recording of Wooden Structures II		
	21	Thu.	Practical Training: Planning for Restoration and Management Policy		
	22	Fri.	On-site Lecture: Practical Works on Townscape Preservation I		Imai-cho, Kashihara City
	23	Sat.			
	24	Sun.			
	25	Mon.	Recording of Wooden Structures and Townscapes (Photography)	Photograph Data Management	NNRICP
	26	Tue.	Practical Training: Recording of Wooden Structures (Photography)		Tanaka Family Residence, Nara City
	27	Wed.	Practical Training: Recording of Townscapes (Photography)		Nara-machi, Nara City
	28	Thu.	On-site Lecture: Himeji-jo, World Heritage Site	On-site Lecture: Practical Works on Restoration of Historic Buildings I	Himeji-jo Castle, Himeji City
	29	Fri.	Risk Management of Cultural Heritage I	On-site Lecture: Practical Works on Townscape Preservation II	Kobe City
	30	Sat.	On-site Lecture: Japanese Carpentary Tools	On-site Lecture: Risk Management of Cultural Heritage II	Kobe City
July	1	Sun.			
	2	Mon.	On-site Lecture: Practical Works on Restoration of Historic Buildings II		Yakushi-ji Temple and Toshodai-ji Temple, Nara City.
	3	Tue.	Dendrochronology	Nature of Wood and its Deterioration	NNRICP
	4	Wed.	Risk Management of Cultural Heritage III	Rescue Operations for Cultural Properties in Practice	NNRICP
	5	Thu.	Identification of Unearthed Architectural Members	On-site Lecture: Practical Works on Restoration of Historic Buildings III	Asuka Historical Museum / Tanzan-jinja Shrine
	6	Fri.	On-site Lecture: Buddhist Monuments in the Horyu-ji Area, World Heritage Site		Horyu-ji Temple
	7	Sat.			
	8	Sun.			
	9	Mon.	On-site Lecture: Historic Monuments of Ancient Kyoto, World Heritage Site		Kiyomizu-dera Temple, etc., Kyoto City.
	10	Tue.	On-site Lecture: Historic Monuments of Ancient Nara, World Heritage Site II	Practical Works in Museum	Shoso-in / Nara National Museum
	11	Wed.	Writing Final Report		ACCU Nara
	12	Thu.	Submission of Final Report / Colsing Ceremony		ACCU Nara

ACCU Nara: Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO
NNRICP: Nara National Research Institute for Cultural Properties

II. Summary of Lectures

Summary of Lectures

12 June (Tue.)

■ Opening Ceremony / Guidance to the Programme

The opening ceremony began with a welcome message by Mr Nishimura, Director of ACCU Nara. He addressed that many cultural heritage sites of timber construction still remained standing in Nara and he hoped that the participants would fully interact with people in the local community who have been making efforts to conserve them, and learn how to conserve wooden structures. He concluded that he would look forward to seeing all the participants doing their best for this coming month. At the self-introduction session, Ms Prita Wikantyasning wished to see many world heritage sites and learn a lot from them; Mr Muhammad Tang expressed his determination to work hard in Japan; and Mr Azahar Purwanto said that he would like to study about world heritage sites in Japan as an architect.

At the orientation session, ACCU staff explained following topics:

- Geographical explanation of Nara
- Explanation of the seminar outline and schedule
- Confirmation of the meeting times and places for the first week

Opening Ceremony at the ACCU Nara office

Orientation

13 June (Wed.)

■ On-site Lecture: Historic Monuments of Ancient Nara, World Heritage Site I <IMANISHI Yoshio / Nara City>

At Kofuku-ji Temple, Mr Imanishi explained about the use of concrete to reduce costs when the *kidan* (foundation platform) for the *kairo* (corridor) and the *chumon* (middle gate) were restored, with an explanation on the laws related to the construction of new structures at a site designated as a cultural heritage. These topics attracted the Indonesian participants' interest; they were to establish laws regarding the conservation of structures in their country.

Subsequently, they visited the Kofuku-ji National Treasure Museum, Kasuga Taisha Shrine, Todai-ji Temple (the Nandai-mon [great south gate] and the Daibutsu-den [great Buddha hall]).

- Daibutsu-den was originally much larger than it is today.

A lecture at Todai-ji Temple

Moreover, although the hall's pillars were originally simply tree trunks, today the pillars are covered with wooden plates and they are bound together with metal rings.

- In previous restoration work carried out on the Nandai-mon, H-bar steel rods were used for some parts that were less visible, but this would not be the case today. It was explained that the principle of repair works today was to avoid damage to the original materials as much as possible.

A lecture by Mr Imanishi

14 June (Thur.)

■ **Japanese Wooden Structures / Policy Measures for Protecting Architectural Heritage** <HAYASHI Yoshihiko / NNRICP>

Legal system regarding the designation of cultural properties

- An explanation regarding the classification of Japanese cultural properties was given, and along with that, an outline was presented concerning some systems for architectural and urban heritages (important cultural properties, registered tangible cultural properties, and groups of traditional buildings).

At Heijo Palace Site

Changes in Japanese architecture by the period

- Along with Buddhism, new architectural techniques were introduced into Japan (in the 6th century). Subsequently, after the system of dispatching Japanese missions to Tang China was abolished, a Japanese architectural style was established and then continued to flourish until the 12th century, when another new technique was introduced into the country.
- *Daibutsu-you* (great Buddha style): a new architectural technique introduced from the southern part of China to Japan, and used for the reconstruction of the Daibutsu-den after it was destroyed by fire (12th century and later).
- *Zenshu-you* (Zen style): an architectural technique style introduced from the northern part of China to Japan, with this introduction being simultaneous with that of Zen doctrine (12th century and later).
- Castle construction began at the end of the 16th century and the beginning of the 17th century.

At Heijo Palace Site

Ancient architecture

- Outline of Horyu-ji Temple, the Toto (east pagoda) of Yakushi-ji Temple, the Kondo (golden hall) of Toshodai-ji Temple, and the Ho-o-do (phoenix hall) of Byodoin
- It was explained that the tiles were replaced every 100 to 150 years;
- When repairing, a brand was put on a concealed part of each newly used component in order to distinguish new components from old ones; and
- As for the roof of the Kondo at Toshodai-ji Temple, since the restoration to the original style would require another restoration in a short period of time, a strong structure was employed for the roof.

Shrine architecture

- A shrine is reconstructed every 20 to 30 years. In most cases, people who were engaged in the

previous reconstruction are still alive when the shrine requires another reconstruction, enabling the relevant architectural style to be passed down to the next generation in its original form.
- Outlines regarding residential architecture, private housing architecture (farmers' houses and tradesmen's houses), modern architecture, and modernization heritage (railway, dock, etc.).

Afterwards, they visited the restored first Daigoku-den Hall and received an explanation about three types of seismic isolation structures employed under the foundation platforms of the hall. This was followed by a visit to a museum, where they observed a reconstructed model of the Heijo Palace, unearthed articles from the Heijo Palace ruins, and other valuable items.

15 June (Fri.)

■ **Preservation of Townscapes and Rural Settlement** <HAYASHI Yoshihiko / NNRICP>

Conserving streets and town landscapes:

- An outline of the system of the designation of conservation areas featuring important traditional structures, as well as an explanation of types of such conservation areas.
- An explanation on differences between *buke-machi* (samurai residential area), *shoka-machi* (merchant residential area), *shukuba-machi* (accommodation area), *minato-machi* (port area), *chaya-machi* (entertainment area), and other areas.
- How to conserve the twonscape: an outline of how to designate a district as a conservation area featuring important traditional structures. Although new structures are found in such a conservation area, their designs are considered carefully in order to ensure harmony with the old streets.
- Designation as a conservation area featuring important traditional structures requires the consent of local residents. The designation is made by the relevant local government. Additionally, the local government needs to establish regulations on the area.
- The participants asked many questions regarding subsidy and tax systems for a conservation area featuring important traditional structures and also learned about measures to prevent the effects of disasters.

■ **Protection System of Cultural Landscapes** <EDANI Hiroko / NNRICP>

Cultural landscape conservation and related system

- Cultural landscapes in Japan: Landscapes which have evolved together with the living or the way of life and geo-cultural features of a region, and which are indispensable for understanding the living or the way of life of the Japanese people
- Attitudes toward cultural landscapes in the world and Japan: "Cultural landscape" is considered to exist in between cultural heritage and natural heritage and is regarded as a collaborative work involving both nature and humans.

A lecture by Ms Edani

- How to promote research and conservation efforts, based on an example of the tea industry in Uji.
- An explanation on management problems and future challenges, based on the successful example of Ichinoseki-hondera Temple, which had gained popularity as a sightseeing destination.
- Additionally, following topics were examined: a consensus formation process among local residents and other persons concerned; the development of a maintenance method; the transformation into an independent-minded community; how to hand down the relevant landscape to the next generation; and other related problems.
- The participants said that such a cultural landscape was a new concept for them, and that it would take some time for everyone to understand it properly.

18 June (Mon.)

■ **Documentation and Restoration Plan of Wooden Structures** <NAKAMURA Nobuo / ACCU Nara>

Mr Nakamura lectured on following topics:

- **Outline of structures in Nara Prefecture**
  An explanation about temple architecture, shrine architecture, priests' living quarters in Buddhist temples, private housing architecture, farmers' houses, modern architecture, and conservation areas featuring important traditional structures, based on examples of each category.

A lecture by Mr Nakamura

- **Outline of designated cultural properties in Nara Prefecture**
  Some 27% of nationally designated structures are located in Nara Prefecture, and the percentage of old structures is high in the prefecture. In addition, approximately three-fourths of such structures are temples or shrines.
- **Structure of Japanese wooden buildings**
  How to construct a foundation platform, how to make a pillar, how to build a private housing structure, how to connect parts, and necessary techniques
- **Explanation on repair work of the roof of the Dai-Kodo (large hall) of Horyuji Temple**
  PPT presentations on the entire process of the restoration work: a cover building was constructed to protect the existing structure when its tiles were removed and replaced with new ones.
- **Repair project of Morimura residence in Kashihara City**
  An explanation about the eight-year project to repair the Morimura residence: how to repair the residence's pillars and other parts deteriorated by rain leakage.

The participants asked many questions regarding the subsidy system, maintenance system, and the cultural properties designation system.

19 June (Tue.)

■ **Practical Training: Recording of Wooden Structures I** <YAMAGUCHI Isamu and NAKAMURA Nobuo / Tanaka Family Residence, Nara City>

Outline of the former Tanaka residence

In 1982, this residence was designated as a cultural property by Nara City, and then the ownership was transferred to the city. In 1990, the residence was relocated to where it stands now. This residence is unique in that it features characteristics of both farmers' houses and tradesmen's houses.

Two-dimensional sketch

- Prior to beginning a two-dimensional sketching session, the lecturer provided the participants with some advice, such as the importance of careful observation to ensure a correct record, and the importance of locating the center of the object to be drawn at the center of the paper on which the two-dimensional sketch was to be drawn.
- The lecturer reviewed their works and commented as follows: although it was difficult to draw a door pocket, the participants drew it well; they should have drawn a pillar in a wall; and they could not draw thick pillars and slim pillars well enough to present their individual characteristics and it was important to observe objects very carefully when drawing them.

A lectured by Mr Yamaguchi in Tanaka Family Residence

Practical drawing

Scale drawing in Tanaka Family Residence

20 June (Wed.)

■ **Practical Training: Recording of Wooden Structures II** <YAMAGUCHI Isamu and NAKAMURA Nobuo / Tanaka Family Residence, Nara City>

Two-dimensional surveying measurement

- Lecturers advised to make correct measurements without fail in the case that the measurements would be used for drawing a sketch, and to make records clearly enough to ensure that anyone

seeing the records could understand which parts were measured.

- The participants put their measurement figures in red on the best sketch that they had drawn the previous day.
- Reviewing their works, the lecturer commented that their measurements were too detailed and it would be better to make a rough measurement first, and that it would be also better to measure the width of the threshold; they had drawn the roof part very well but it was a pity that they had not drawn the structural materials, and that it would be better to draw the entire object a little more accurately.
- As for the cross-sectional surveying measurement, the lecturer advised them to make more accurate measurements of the thickness of the beam and the transverse members, using the kamoi (a narrow board continuing around the entire room) as the standard.

21 June (Thur.)

Practical Training: Planning for Restoration and Management Policy <YAMAGUCHI Isamu and NAKAMURA Nobuo / Tanaka Family Residence, Nara City>

- Continuing of the previous day's cross-sectional surveying measurement (the heights of the ceiling part and the roof). They were advised to measure the heights with the transverse members as the horizontal standard.
- Explanations about the heartwood (also called *akami* [red part]), often used as pillars, and the sapwood (also called *shirata* [white part]), as well as about the characteristics of Japanese cedars, Japanese cypresses, pine trees, and other varieties of trees. The participants asked many questions about the quality of such trees.
- One of the participants asked, if the original part had a bent shape, whether a material with a similar shape should be selected at the time of the replacement. To this question, the lecturer replied that, although, in principle, a material from the same tree variety and with a similar shape should be selected for replacement, it was difficult to find such materials in reality. The lecturer continued that especially in Japan today, it was difficult to find high quality pine trees and the timber was not so durable, sometimes leading to replacement with Japanese cedar.

A lecture by Mr Nakamura

Practical training of floor plan sketch

Practical training of *suri-hon*

- At the quality research, the participants received an explanation about characteristics of Japanese cypresses, pine trees, and Japanese cedars.
- The participants learned about *suri-hon*, a technique used for examining tool marks. In conducting *suri-hon*, very thin traditional Japanese paper is placed and fixed on the relevant object, and then rubbed with carbon paper so that the tool marks on the object are clearly identified.
- According to the lecturer, although the participants did *suri-hon* well, some marks were not clear

enough, because the pressing was inadequate. Moreover, the lecturer advised them that when they took a photograph of the result of their *suri-hon*, a ruler should be placed beside it so that the size of the relevant object would be clarified, and also advised them to provide information including the date, the place, which part of the object had undergone *suri-hon*, and who had conducted the suri-hon on the original *suri-hon* result.

- The participants asked why old tools that had been used at the time of the original construction were not used at the time of repair, whether it was necessary to examine all tool marks, and whether chemical agents were used for the purposes of decay protection and reinforcement. The lecturer replied that while it was not common to use such old tools because they were expensive, if it was judged that it would be better to repair the relevant item in an old style, the old tools were sometimes used and that there were cases where all tool marks had been examined and that there were also cases where chemical agents had been used for the foundation part of the relevant object.

Restoration of the former Tanaka residence

- Explanation with PPT about the situations before and after the repair work
- The participants asked why the rainwater pipes and the lighting featured different designs from those at the time of the original construction and the lecturer answered that such items were not used, according to a deliberate policy. If old-style equipment was installed, some people might think that it was actually installed there even at the time of the original construction.

A lecture in Imai-cho

22 June (Fri.)

■ **On-site Lecture: Practical Works on Townscape Preservation I** <HIURA Yasuo and NAKAGAWA Tomoyuki / Imai-cho, Kashihara City>

At Imai-cho, Mr Terada, Director of the preservation office, explained on Kashihara City's historical background: "Kashihara City, where Fujiwara Palace was constructed, was the center of ancient Japan. Additionally, this city is very unique in Japan in that the street landscapes of the Edo period are conserved in very good condition. It is very significant to hold lectures here in Imai-machi. I hope that all the participants will learn a lot here".

Lectures by Mr Nakagawa:

- Explanation on Imai-cho's historical developments, and how the community prospered as a commercial center, as well as an outline of the processes to the conservation of the community
- Outline of traditional tradesmen's houses in Imai-cho. Featuring a floor-plan often found in traditional Japanese merchants' houses, the tradesmen's houses in Imai-cho are characterized by the fact that they are one-story houses or have a mezzanine floor, which they stand side by side, and their walls are flush with each other. As a result, unity in appearance is observed among the buildings.
- Explanation on a subsidy system for a repair project. In 1983, Kashihara City established its own subsidy system.

In 1993, the city began to receive subsidies provided by the national and prefectural governments for a conservation area featuring important traditional structures. The burden rate among the national government, the prefectural government, and the city is 50%, 10%, and 40%, respectively.

- Landscape conservation work: installing electric cables underground, and conducting landscaping works for the appearance of the fronts of residences in the relevant area
- In the landscape conservation work, while the public sector is responsible for tangible elements, such as infrastructures, the private sector is responsible for intangible elements (Imai-cho Disaster Effects Prevention Association, Imai-cho Street Landscape Conservation Association, NPO Imai-cho Street Landscape Restoration Network).

A lecture at HANAIRAKA

A lecture by Mr Hiura

At the end of the lecture, the participants asked about protection from insects, such as white ants. The lecturer replied that chemical agents were used, parts damaged by white ants were removed and then reinforced, and good ventilation was ensured to allow the wind to go under the floor smoothly in order to protect structures from white ants.

Under the guidance of Mr MORIMOTO Ikuhiro, on the first floor of HANAIRAKA, the participants observed a model of tradesmen's houses, and learned about characteristics of tradesmen's houses in Imai. Afterwards, they visited the streets of the community: Kawai residence → Imai Townscape Scenery Preservation Office → Kometani residence → Imanishi residence → Shonen-ji Temple → Minamiguchi (south gate) site.

25 June (Mon.)

■ **Recording of Wooden Structures and Townscapes (Photography) / Photograph Data Management** <SUGIMOTO Kazuki / NNRICP>

The lecturer asked the participants about photography in Indonesia and how much knowledge the participants had regarding photography. In Indonesia, film is still used, produced by Fuji and Kodak. However, the mainstream is digital cameras and photographs taken in earlier times are scanned to be saved as data.

- Explanation on film varieties (35 mm, 4 x 5, 6 x 6, 6 x 7, 5 x 7 inches, 8 x 10 inches), as well as on negatives and positives. Compared with small-format films, large-format films can record more detailed information more accurately, making large-format films more suitable for taking photographs of cultural properties. Concerning photographic records of cultural properties, it is necessary to consider the best method to capture as much information as possible.
- As for digital cameras, it is important to note that such data can be saved only for one decade or so. This is because the method used to read the data becomes antiquated and incompatible to new

software. In this regard, when taking photographs to record a cultural property, it is necessary to use a monochrome film, which does not lose its colors.
- Lens distortion correction method: Lens distortion can be corrected by using a 4 x 5 camera with movements. It is necessary to check an actual photograph of the relevant structure and identify the necessary correction.

Shutter speed and diaphragm
- Explanation on ISO and ASA, followed by practical training on the use of Polaroid film and regarding the depth of field
- It was confirmed that background images become clearer by closing the diaphragm. The participants learned that, to this end, it was necessary to reduce the shutter speed and how to calculate correct exposure and many other points.
- All three participants tried taking photographs.

Hues
- It was confirmed that even if objects had the same color tone, a different light source imparted quite a different color tone to them.
- Since the color development of an object depends on the light source, true color tone cannot be presented. In this regard, when taking a photograph of an object, it is necessary to place a gray scale beside the object, making it possible to correct the color of the photograph to give the true color.




Practical training of photography

26 June (Tue.)

■ **Practical Training: Recording of Wooden Structures (Photography)** <SUGIMOTO Kazuki / Tanaka Family Residence, Nara City>

Review of the previous day's lecture

The main points are as follows:

1) using the best technologies available today

2) ensuring that images will never deteriorate semi-permanently, and

3) taking advantages of photography and taking photographs of what cannot be recorded in a form of a drawing.

- An explanation about how to assemble a camera, how to set parts and camera equipment, how to use an exposure meter, and effects of using such a meter.
- As for shooting, it was important to select an appropriate angle, object, and shooting point.

Practical photograph shooting training at Tanaka Family Residence

Practical photography training inside the former Tanaka residence
First, participants received an explanation about the typical floor plan and other characteristics of a traditional Japanese house such as the former Tanaka residence. Next, they learned an appropriate angle and a shooting point. It was explained that it was necessary to take a photograph that clearly showed why the photograph was taken. It was also explained that a drawing indicated where the relevant object was located and that it was important for a photograph to present what could not be depicted by such a drawing. Mr Sugimoto gave practical instructions on how to eliminate shadows, how to use a strobe, and many other points, at different spots in the residence. The participants tried taking photographs several times. They were instructed to set a camera in a straight position when taking a photograph of a structure, in order to avoid the structure from being recorded at an angle. Recognizing the benefit of these instructions, they began to enjoy the practical photography training.

27 June (Wed.)

- **Practical Training: Recording of Townscapes (Photography)** <SUGIMOTO Kazuki/ Nara-machi, Nara City>

- At the practical photography training, the participants used a 4 x 5 camera and a digital camera.
- Using an exposure meter, they also learned the techniques necessary to take photographs outdoors.
- They adjusted shutter speed and diaphragm settings, and checked the finish with Polaroid film.

Although they could not adjust exposure appropriately at first, by following the lecturer's instructions, they gradually became able to achieve correct exposures.

Practical photograph shooting training at Nara-machi area:
The participants learned appropriate photograph angles, how to use a strobe to ensure that dark parts under house eaves were shown in photographs, how to adjust the diaphragm settings and shutter speed, and many other points.

After the training, the lecturer asked the participants for comments regarding the training in order to check how well they understood what they had learned. Based on these comments, the lecturer and the participants reviewed the training as follows:

- The lecturer first explained about the mechanism of a digital camera. Subsequently, using the images that they had shot during the training, the participants reviewed what they had learned (camera movements, the use of artificial lighting, etc.).
- The lecturer explained how to save digital data and advised the participants to use a camera with

raw data and to save the data in TIFF (Tagged Image File Format), because JPEG is used for compression and TIFF for non-compression.

Practical training of photography at Gango-ji Temple and Nara-machi

28 June (Thur.)

■ **On-site Lecture: Himeji-jo, World Heritage Site/ Practical Works on Restoration of Historic Buildings I** <KOBAYASHI Masaharu / Himeji-jo Castle, Himeji City>

Himeji Castle, designated both as a World Heritage and a national treasure, is repaired in a 30-year cycle. The current repair work includes plastering the outer walls, replacing the roof tiles with new ones, and enhancing resistance to earthquakes. This repair work is scheduled to take five years. The participants asked why the cultural property now under repair work remains open to the public. The lecturer explained that the purpose was to provide opportunities for the general public to understand the importance of the cultural property. The lecturer continued that comprehensive safety measures

A lecture by Mr Kobayashi

The on-site lecture at Himeji-jo Castle

were taken for the opening of the castle to the public. The participants were happy to see the actual repair work on site.

29 June (Fri.)

■ **Risk Management of Cultural Heritage I** <MURAKAMI Yasumichi / Kobe City>

Cultural properties conservation system at the time of the occurrence of the Great Hanshin Earthquake and the Great East Japan Earthquake

While watching a video of the Great Hanshin Earthquake in 1995, the participants received an explanation about what would happen at the time of the occurrence of an earthquake.

A lecture by Mr Murakami

An explanation on how to examine the distortion of this building

In an emergency situation, a person in charge of a cultural property is forced to respond to the situation, even if the situation is not directly relevant to the cultural property. In this regard, it is necessary to appoint in advance a multiple number of staff members to take care of the cultural property, and to establish other necessary systems (including how to obtain support from other prefectures). Risk management here involves considering what should be done if those responsible for the cultural property are not available. It is necessary to establish a cross-regional network and build up a scenario describing what to do and how to do it at the time of a disaster.

The initial response is to take a record of what type of damage has been done and to identify the situation. To do so, an appropriate law is necessary. At the time of the Great Hanshin Earthquake, however, there was no such law in place. As a result, the national government was advised to ensure that a disaster response system included aspects of what should be done for cultural properties, which has resulted in the successful establishment of such a system. The participants said that, also in Indonesia, they were considering the establishment of an appropriate system concerning what to do about cultural properties at the time of a disaster.

- It is important to imagine what an earthquake may be like and what types of damages may be caused by such a disaster (and to forecast impacts on traffic systems, logistics, and cultural properties). Following the occurrence of an earthquake in Niigata Prefecture, 60 persons rushed to the scene to provide support for the reconstruction of damaged objects, based on the experience of the Great Hanshin Earthquake.
- When promoting structure reconstruction, it is necessary to place a priority on the mental impact that the relevant damaged structure has on people, rather than on an economic impact. However, there is a problem that it is difficult to ensure availability of people who can judge mental impact aspects at the time of a disaster.



A lecture by Mr Murakami (left) and Ms Higashi (right) at Moegi House


A lecture at Weather Cock House

- It is particularly important to cooperate with a region that is seldom hit by an earthquake. It is necessary to practice preparing damage situation survey forms during normal times. If such a practice is often conducted even in a region that is seldom hit by a disaster, it means that experts in any region will become capable of preparing the form. A seminar is held once a year to share necessary information.

■ **On-site Lecture: Practical Works on Townscape Preservation II** <MAEDA Yoshihisa and HIGASHI Kazue / Kobe City>

Weather Cock House and Moegi House (conservation area featuring important traditional structures in Kitano)

An explanation was given on repair work of the two important cultural properties seriously damaged by the Great Hanshin Earthquake.

- Since there were always sightseers visiting the properties, it was necessary to promote the repair works with due consideration to safety; it was necessary to ensure that nobody would be injured in the event of a disaster. (The properties are brick buildings and each of the walls is connected by wire to prevent them from collapsing and fragmenting.)
- The policy of the repair works was decided by a review committee comprising architects, academics, and administrative staff members.
- It is necessary to make three drawings, comprising the current situation, the post-repair situation, and the repair plan. It is important to ensure that the drawings present their concepts clearly enough even for a third party to understand them. If the details of past repairs are presented, the time and efforts required for a preliminary survey will be reduced.
- Different countries require different repair policies. It is necessary for Indonesia to establish a method that is most suitable for local requirements.

30 June (Sat.)

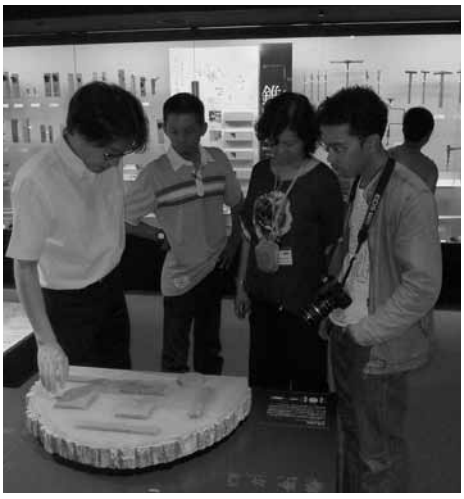
■ **On-site Lecture: Japanese Carpentry Tools** <NISHIYAMA Marcelo and KITAMURA Tomonori / Kobe City>

Participants visited Takenaka Carpentry Tools Museum and watched a DVD showing carpentry methods in Japan and a video of the reconstruction of a traditional ethnic house on Sumbawa Island, Indonesia at the seminar room. They tried using *yari-ganna*, a spear plane and *dai-gannna*, a smoothing plane under the guidance of Mr Kitamura.

An explanation was given about items exhibited at Takenaka Carpentry Tools Museum.

- The museum has systematically collected wooden carpentry tools from all over the world, including


Practicing *yari-ganna*, a spear plane


A lecture by Mr Nishiyama

Indonesia.
- It is now very difficult to obtain traditional tools from Indonesia; such tools are mostly unavailable.
- The museum features easy-to-understand explanations on how to assemble and connect Japanese architectural components, as well as a wide range of exhibitions from various types of trees to processing tools.

■ **On-site Lecture: Risk Management of Cultural Heritage II** <MURAKAMI Yasumichi / Kobe City>

At Sawanotsuru Museum:
- After observing a base-isolating device, the participants watched a video about sake brewing.
- Since a wooden structure is too light for a base-isolating device to demonstrate effective performance, the brewery's base is constructed of concrete to ensure that the entire building has sufficient weight.
- The brewery is repaired every 60 years. In case the person in charge of repair work cannot pass down what has been done in the work to the next generation, a report on the repair work is made so that anyone can understand what was done previously.


A lecture at Sawanotsuru Museum

2 July (Mon.)

■ **On-site Lecture: Practical Works on Restoration of Historic Buildings II** <NAKAMURA Nobuo and YAMADA Hiroshi / Yakushi-ji Temple and Toshodai-ji Temple, Nara Pref.>

It was explained that at Yakushi-ji Temple, the Saito (west pagoda) burnt down in 1528 and was reconstructed in 1981 based on the results of excavation research. The Toto (east pagoda) was dismantled and repaired in 1900, although the handrails in the pagoda are damaged and the root of the central pillar is rotten. These parts need to be repaired.

It was also explained that a 3D image analysis was being conducted to simulate how the pagodas would hake at the time of an earthquake and how the central pillars would move. After receiving the lecture, the participants went up to the temporary roof to take a close look at the Toto. They also observed the pagoda's suien (a flame-shaped adornment at the top of a pagoda) and hoju (place to

enshrine ashes and bone fragments of Buddha), which had been removed from the pagoda for repair. They asked why a base-isolating device was not installed in the base part. The lecturer replied that while it was common to install such a device in a restored building, the first priority for old structures was to maintain their originality. Although reinforcement work was conducted, a base-isolating device was not installed.

Toshodai-ji Temple:
The Kondo (golden hall) was constructed in around 780, this structure is approximately 50 years more recent than the Toto of Yakushiji Temple. The Great Repair Work in the Heisei Period was conducted for 10 years from 2000. The participants asked about the differences between the past and the present in terms of attitudes toward what should be done in repair work. In the past, new technologies available at the time were used in repair works, while now the emphasis is placed on restoring the relevant structure to its original condition.

A lecture by Mr Nakamura

3 July (Tue.)

■ **Dendrochronology** <OKOCHI Takayuki / NNRICP>

Explanation of an outline of dendrochronology:

- What is the position of dendrochronology in the entire academic field? Connecting with a wide variety of fields, such as geology, meteorology, and forestry planning, dendrochronology is never merely a sub-category of archaeology and architecture.
- What are the processes of dendrochronology? An outline was presented regarding the old-style measurement of tree-rings using a microscope, today's digital measurement, and the preparation of the related pattern graph.
- How is dendrochronology applied to archaeological materials? An explanation was given regarding kidori (the dividing of timber into various sizes needed for the construction of a structure). The kidori produces the following three types of parts: 1) parts with bark attached, 2) parts that contain sapwood, and 3) central parts. The first and second types are materials that can be used for dating.
- The lecturer presented examples where archaeological materials had been used for dating, such as the wooden water wall of Saidai-ji Temple and Horyu-ji Temple.
- The lecturer concluded with an explanation about various devices.

■ **Nature of Wood and its Deterioration** < KOHDZUMA Yohsei /NNRICP>

The participants introduced themselves and presented information on Indonesia followed by the explanation from the lecturer that Southeast Asia had some problems with the conservation of wooden items and that if the conservation was conducted well in the region, it would help the conservation of all the wooden items in the world.

A lecture by Mr Okochi

A lecture by Mr Kohdzuma

- An outline of trees was presented: the tree growth, the tree structure, cell walls, the substance called fibril, the tree-ring development, and other topics.
- The participants asked whether there had been any case where the application of a chemical agent to a wooden item at the time of conservation and repair work had resulted in a failure. The lecturer replied that there had been a case where the adhesiveness of a chemical agent had been so strong that the wooden item to be reconstructed had been broken, as well as a case where an adhesive agent had become white and could not be removed. The lecturer explained that an agent to be used for repairing a structure needed to have reversibility.

4 July (Wed.)

■ **Risk Management of Cultural Heritage III** <WAKITA Yoshihisa / NNRICP>

Street landscape heritage management in historic Padang area

- It is important to discuss an area's historical value and propose the establishment of detailed systems and the creation of a community where residents can conserve it while continuing to live there.
- It is also important to establish countermeasures to prevent effects of disasters and promote voluntary activities. In this case, it is necessary to form a consensus in a local community (to ensure that all the residents in the community recognize that it is necessary for them to take actions to conserve the community.)
- Post-disaster survey: A survey was conducted to identify the damage inflicted by the earthquake on each structure and the damage was mapped. The survey was carried out not just for cultural properties but for the entire street landscape.
- It is necessary to consider important points to conserve the appearance of entire streets. It is important to establish a legal system to prevent the construction of structures that will mar the appearance of the streets, and to raise residents' awareness.
- The lecturer presented an outline of a street landscape conservation project in Padang, which had been seriously damaged by a disaster, and then asked whether it was possible to conserve street landscapes in Indonesia. The participants replied that since Indonesia was a multi-ethnic society, people in the same region had different ideas, and that without economic incentives, conservation would be difficult; it might be possible to conserve street landscapes in a small unit at first, and subsequently enlarge the scale; and if an economic effect on the sightseeing industry or other sectors was demonstrated in a model case, the awareness of the importance of conserving street landscapes would be raised among people in the country.
- The participants explained that in Toraja (Sulawesi Island), the residents were highly aware of the

importance of conserving their community, enabling groups of traditional structures to remain and also referred to examples of Sumbawa Island, Lombok Island, and Yogyakarta, places where community creation to attract sightseers is promoted. However, they continued that there were some cases where individual persons' opinions had large influence, giving rise to harmful effects, so the current situation in Indonesia is difficult.

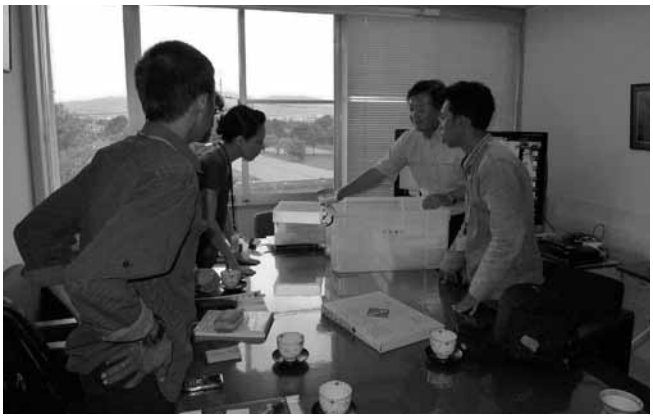
- The lecturer presented a report on the current situation of Padang. It is desirable to promote a street landscape conservation project in the affected area with local residents involved in the project. Since there are no regulations, however, residents are building their homes one after another at their own discretion. The lecturer underlined that one of the important things in conserving street landscapes was to raise local residents' awareness and to take necessary actions to do so and it was desirable for Indonesia to establish its own legal system that would be most suitable for the country to conserve its street landscapes.

■ **Rescue Operations for Cultural Properties in Practice** <MATSUI Akira /NNRICP>

An outline was presented regarding the damaged cultural properties relief committee established by the Agency for Cultural Affairs of Japan to provide support for cultural properties affected by tsunamis following the Great East Japan Earthquake. It was explained that the National Institutes for Cultural Heritage and some other organizations related to cultural properties and arts had played a major role in the committee and that the headquarters had been established in the affected area and a rescue team had been organized. To form a rescue system promptly at the time of a natural disaster or a human-made disaster, it is necessary to establish a rescue structure for cultural properties at normal times. There are problems regarding jurisdictional boundaries between movable cultural properties, buried

A lecture by Mr Wakita

With the lecturer



A lecture by Mr Matsui

cultural properties, intangible traditional cultural properties, structures, nature histories, places of scenic beauty, natural monuments, etc. It is necessary to consider how to overcome this vertically-divided administrative system for management of cultural properties and to organize an appropriate rescue system.

5 July (Thur.)

■ **Identification of Unearthed Architectural Members** <NARITA Satoshi / Asuka Historical Museum>

At Asuka Historical Museum, an outline regarding cultural properties in and around Asuka was presented, followed by an explanation of the excavation of building components of Yamada Temple. At the temple, a corridor from the 7th century was excavated in good condition. One of the main reasons for this is that the temple was built on a damp ground. At Horyu-ji Temple, a corridor built in the Nara period still exists. Compared with this corridor, the height of the corridor of Yamada Temple, which is older than that of Horyu-ji Temple, is lower.

- Wooden parts treated for conservation gained some weight and that reinforcement was necessary to support such parts if they were to be exhibited in an assembled condition.
- The participants visited the museum's storehouse and then Yamada Temple, while hearing an explanation about the temple.


A lecture by Mr Narita

■ **On-site Lecture: Practical Works on Restoration of Historic Buildings III** <TACHI Toshihide / Tanzan-jinja Shrine >

Tanzan-Jinja Shrine

- An outline of the repair work was given on site.
- The participants were curious about the subsidy percentage for the repair work. The burden rate of the owner is decided with consideration given to the shrine's revenue and tax rate. In case of repair work for a private residence, nearly 90% of the necessary cost is covered by subsidy.
- They were surprised to find that there were many analogue and manual drawings for the reconstruction work; they had thought that all the drawings would have been made using the latest software

A lecture by Mr Tachi at Tanzan-jinja Shrine

An explanation on the restoration of a pillar

6 July (Fri.)

- **On-site Lecture: Buddhist Monuments in the Horyu-ji Area, World Heritage Site**
  < MIKITA Hideo / Horyu-ji Temple>

The Sai-in Garan:

- The temple's Chumon (inner gate) is rare in that the length of its beam is five *ken* (one *ken* = approx. six feet), while the length of an ordinary beam is four *ken*. Although there is no established theory explaining this length, some people think that the length might indicate that the Chumon acts as the gate both to the Kondo (golden hall) and the Goju-no-to (five-story pagoda).
- Reinforcement was made in the Kamakura period. Also, repair work was conducted in the Meiji period and wooden plugs and pillars were replaced.

The principle of today's repair is to restore the relevant item to its original condition, although this does not hold true of damaged items.

- An explanation about other structures in the precinct, such as the Higashi-muro, the Syoryo-in, the Jiki-do, and the Hoso-dono; they also visited the Daihozo-in.

The Saien-do and the Yakushi-bo:

- At the repair site of the Yakushi-bo, the participants received an explanation of *hikiya*, which is an architectural technique by which a structure is relocated without being dismantled. Removed parts are repaired in a workshop built at a different site.
- The workshop's scaffolds are built with wooden poles, not with steel pipes, largely for the purpose

A lecture by Mr Mikita in the Horyu-ji area

of the conservation of traditional working methods.
- Before conducting *hikiya*, all the tiles of the relevant structure are removed and the tiles are divided into those which are usable and unusable.

The Rakan-do:
- An explanation was presented about discolored (whitened) parts of the Rakan-do as an example of failure in using a synthetic resin for repair.
- The participants visited the wall repair site where barrel-shaped clay clods were piled up (a *neko-zumi* method).

The Yume-dono:
- The visit to Horyuji Temple concluded with an explanation about the E-dono, the Shari-den, the Shoro, and the Denpo-do.

Hoki-ji Temple:
- Visit to the Sanju-no-to (three-story pagoda)

9 July (Mon.)

■ **On-site Lecture: Historic Monuments of Ancient Kyoto, World Heritage Site** <OKAMOTAO Kimihide / Kiyomizu-dera Temple and the Asakura-do Hall, Kyoto City.>

Kiyomizu-dera Temple and the local repair office:
- An explanation about repair of door fittings and an outline of the mechanisms of tools and door fittings, as well as what had been done in the previous repair work conducted in the Showa period.
- Lectures on the replacement of tiles. At the Asakura-do Hall, *doibuki*, a shingle bed of clay tiles, was laid. A sawara cypress plate was manually processed.
- By examining the trace of past repair works, those in charge of repair strived to restore the structure to its original condition to the extent possible.
- The visit to the Asakura-do Hall was followed by a visit to the main hall of Kiyomizu-dera Temple.

A lecture by Mr Okamoto in Kiyomizu-dera Temple

■ **On-site Lecture: Historic Monuments of Ancient Kyoto, World Heritage Site** <Sugimoto Hiroshi / Uji City>

Byodo-in Ho-o-do:
- Repair work is to begin in September and will include replacing the roof and repainting the pillars.
- Paint degradation experiments were begun about 10 years ago to select an appropriate paint.
- The visit to Byodo-in Ho-o-do was followed by a visit to the temple's museum.


A lecture by Mr Sugimoto at Byodo-in Ho-o-do

10 July (Tue.)

■ **On-site Lecture: Historic Monuments of Ancient Nara, World Heritage Site II** <NARUSE Masakazu and KUME Mamoru / Shoso-in Shrine>

The Shoso-in Repository:

- In 1962, a modern repository was newly erected, where treasures are stored with the humidity maintained at 60%. The repository is opened twice a year, in October and November, in order to check for any problems.
- The purpose of the current repair work is to replace the roof tiles. The total number of the tiles is 36,000. Almost no tiles from the Nara period remain. The oldest ones are from the Kamakura period. Some 99 years ago, a full dismantling and repair process was conducted and the work took 10 months. Large-scale repair work was also conducted in 1693. During this repair work, reinforcement was added using metal materials.
- A photograph of one of the structure's pillars was taken 99 years ago, and it shows a tree node on the surface of the pillar. The comparison of the position of the node in the photograph with that observed today indicates that the pillar was cut by approximately 20 cm 99 years ago.



The scaffolding structure for restoration

A lecture by Mr Naruse and Kume

■ **On-site Lecture: Practical Works in Museum** <IWATO Akiko, TANIGUCHI Kosei and MIYAZAKI Motoko / Nara National Museum>

Nara National Museum: the Hassoan (Eight Window Hermitage) Teahouse:

- Outline of the Hassoan: This teahouse was originally built in the garden of the Daijoin sub-temple of Kofuku-ji Temple in the middle Edo period. The teahouse is renowned for featuring the multiple-window style favored by the Edo-period tea connoisseur Furuta Oribe. The teahouse was relocated to its current site in 1892.
- While observing the inside of the teahouse, they received a detailed explanation about its structure.

At the Conservation Center

Visit to the Conservation Center:

Outline of the institute: This institute was founded in 2002 to restore and conserve national treasures and important cultural properties as well as to conduct related research and studies. The institute invites experts with experience on the restoration of national treasures and important cultural properties, such as sculptures, paintings, written materials, and lacquer ware. The participants visited an art workshop, a cultural properties conservation facility, and the Kitamura Workshop, all of which are located on the premises of the institute.

A lecture by Ms Miyazaki at the Buddihist Art Library

Buddhist Art Library:

Building: Completed in 1902, the building was made of wood and roofed with pantiles (a type of corrugated roof tile) and used Western-style architecture techniques, although the exterior was primarily of Japanese style. The overall image of the building was modeled on the Byodoin Ho-o-do in Uji, Kyoto. The building is highly regarded as representative of modern Japanese architecture from the mid-Meiji period. In 1983, the building was registered as a national important cultural property.

Buddihist Art Library

Seismic strengthening repair work:

An explanation was provided regarding the seismic strengthening work conducted from October in 2009 to March 2011 and concerning restoration work conducted at the time of the seismic strengthening work in order to enhance the historical value of the inside of the structure. The colors of newly reinforced parts were deliberately changed from the original colors in order to enable the new and original parts to be distinguished clearly. Moreover, the restoration work was conducted with consideration given to practicality, leading to the improvement of the reading room and the seminar room, as well as to the reinforcement of the floor construction of the library room.

At Nara National Museum's exhibition rooms, participants

In front of Nara National Museum

observed the latest earthquake-proof exhibition cases. An explanation of the buildings of Ritual Bronzes Gallery and Nara Buddhist Sculpture Hall was given. The buildings themselves are designated as important cultural properties.

11 July (Wed.)

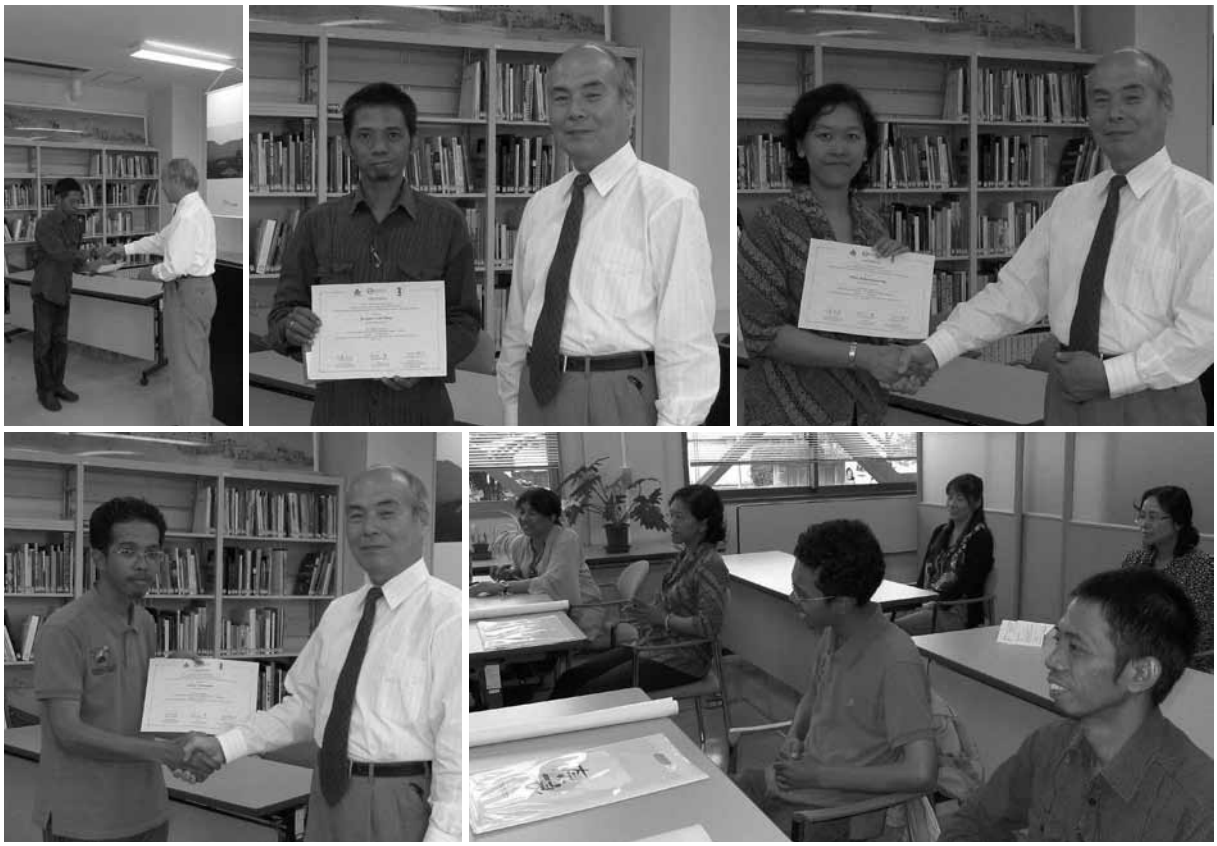
■ **Writing Final Report**

The participants prepared their reports of the training programme.

12 July (Thur.)

■ **Closing Ceremony**

The participants submitted their reports and a closing ceremony was held. Mr Nishimura, Director of ACCU Nara awarded a certificate of completion with a word of appreciation for their hard work and wished they would impart their knowledge and experience to their colleagues and friends in Indonesia. He was pleased by the participants' hard work during this seminar, held for a long period of time here in Japan. Although they visited many buildings, they were permitted to visit some of them as a special exception. Actually, such buildings normally do not accept even Japanese visitors. Not all the things that the participants observed during the seminar may be practically useful to them. Some ingenuity is necessary and he hoped that after returning to Indonesia, they would demonstrate ingenuity to adapt what they have learned for optimum suitability to their country. Additionally, he would like three of them to tell the people around them about what they have learned during this seminar and to speak to many people about Japanese climate, food, and many other aspects. Although the seminar was now over, he was sure to meet them again somewhere in the world. Then each participant addressed a short speech and expressed their gratitude toward lecturers and ACCU Nara and missed memorable days in Japan.



The closing ceremony at the ACCU Nara office

III. Country Reports by Participants

Muhammad Tang
Conservation of Archaeological Heritage Office of Makassar
Ministry of Education and Culture

Building Modernity of *Tongkonan*[1] and *Alang*[2] in Toraja

The data in this paper is the result of a research report by the Conservation for Archaeological Heritage Office of Makassar, North Toraja Regency, in March 2012

Introduction

Tana Toraja is divided into two regencies: Tana Toraja Regency, with Makale as the capital, and North Toraja Regency, with Rantepao as the capital. Tana Toraja is located about 217 miles from Makassar, the capital city of South Sulawesi Province.

Generally, *tongkonan* can be found in traditional villages in Toraja. Some famous villages include Pallawa, Bori Parinding, Kande Api, Nanggala, Buntu Pune, Pala' Tokke, Londa, Kete' Kesu, Lemo and Tumakke. Besides these, there are still many other traditional villages which need more attention in terms of tourism and cultural development.

The tongkonan housing concept is inseparable from their cosmological understanding of the relationship between humans and the natural environment. In *tongkonan*, cosmological manifestation can be seen in the roof, or *tongkonan* (*ulu banua*), which is the upper world; the body, or *tongkonan* (*kale banua*) as the middle world; and the pillars, or *tongkonan* (*sulluk banua*) as the under world.

The existence of *tongkonan* is part of an inseparable chain, with *alang* functioning as rice storage, *rante simbuang* or *menhir* as a ceremonial commemorative structure for death, caves as corpse storage, farms as the source of life for the Toraja people, indigenous forest as the source of *tongkonan* and *alang* materials, and also fields for grazing buffalo. Those seven elements are common in the traditional village of Toraja society.

The *tongkonan* for the Toraja people is the center of their lives from every aspect. The *tongkonan* is the life of the Toraja people. This is the place where traditional rules are made. In terms of function, the *tongkonan* is a place for living, a place for carrying out traditional ceremonies, and also a mark of social status for the owner.

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[1] *Tongkonan* is the traditional house of the Toraja, with the use of wood and bamboo as its most characteristic feature.

[2] *Alang* is a traditional building which has same roof as the *tongkonan* and is used for rice storage.

A *tongkonan* is a unique traditional house, with features such as a curved roof. *Tongkonan structures*, with wood and bamboo as the basic materials, are masterpieces. *Tongkonan* and *alang* are always in the same location, with the *tongkonan* to the south of the *alang*.

In the modern period, there have been some changes in that substitute materials are now increasingly being used in some parts of the *tongkonan* and *alang.* The use of modern materials in *tongkonan* can be seen in the form of metal roofs to replace roofs made of bamboo, which are disguised to resemble bamboo boards on the *tarampak*. Similarly, in building *alang*, the bamboo roof has been converted into a metal roof, and the spherical wooden pillars made from *Banga* (a type of palm tree called *Nibung*) have been replaced with cast concrete.

Description of Objects

The structures from which data was collected are located in two regions in North Toraja Regency, namely, Marimbunna Tikala and Pala 'Tokke Regions.

a. Marimbunna Tikala Region

In the Marimbunna region, three *tongkonan* complexes and one *rante* were recorded, namely, the *Tongkonan To' Kayu* complex, *Tongkonan Tangarante* complex, *Tongkonan Panaran* complex and *Rante Tangarante*. Administratively, the four sites are located in the Village District of Tikala, North Toraja Regency.

1. *Tongkonan To' Kayu*

By using a Garmin GPSMap 60CSx, the geographic position is 02º 56'18.5"S and 119º 52' 53.1" E, at a height of 920 meters above sea level. In the *Tongkonan To' Kayu* complex there are two *tongkonan* buildings—*Nek' Kondo tongkonan* and *Kombong Lele tongkonan*—and seven *alang*, two of which were built as temporary structures with concrete pillars.

- *Nek Kondo tongkonan*

This *tongkonan* was founded in 1916 and then renovated in 1996 by the family that owned the *tongkonan*. Now the roof is made of metal and the *tarampak* (bamboo structure consisting of 3-7 layers constituting part of the roof structure is made of boards that are disguised to resemble bamboo. The walls of the *tongkonan* are featured with carved *Toraja*. On the walls to the left and right of each window there are two pieces, and at the front and rear there is only one window. There is a ladder positioned at the front of the tongkonan, on the right.

The spatial form of this *tongkonan* is called *Banua Tallu Lanta*', with three rooms which have different functions, namely *Sumbung* as a bedroom located in the south; *Sali* as a room with a floor that is lower by 40 cm and which used to serve as a bedroom, kitchen and dining room for

servants/slaves, and where corpses were placed for burial purposes; and *Tangdo* as the main room with the height of the floor equal to that of the *Sumbung*—this space is usually used as a resting place within a home.

The *tongkonan* has as many as 23 pillars. There are two *Tulak Somba* pillars located at the front and the rear of the *tongkonan*. The pedestals of the *Tulak Somba* pillars are 150 cm tall and made of cast concrete, and these are connected to wooden pillars covered with carvings. The *kabongo* does not have a visible buffalo head form mounted at the front of the *tongkonan*, however, the form of a chicken's head is usually mounted on top of the *kabongo*.

- *Kombong Lele tongkonan*

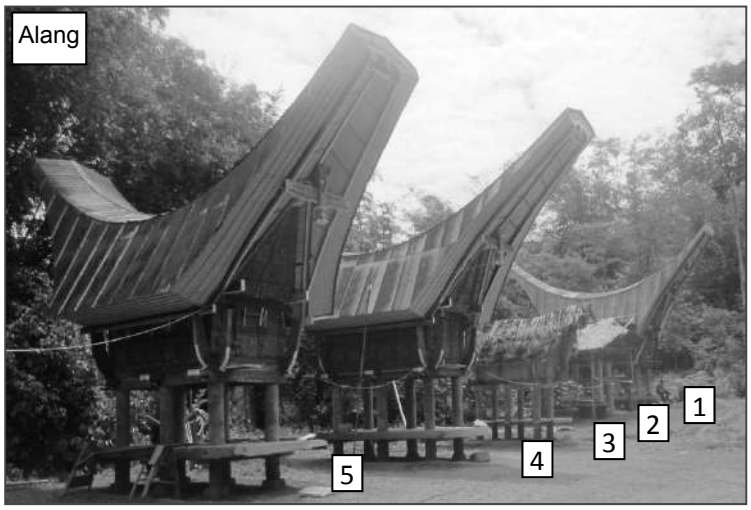
This *tongkonan* building is located to the west of the *Nek Kondo tongkonan*. Around the *Nek Kondo* and *Kombeong Lele tongkonan* there are three houses and a large boulder. While to the west of *the Kombong Lele tongkonan* there are two other structures that form part of the residence.

Kombong Lele tongkonan was built in 1830 and underwent a renovation, around 1978. The roof was replaced with a metal roof, but the color is outdated and the *tarampak* is still made of bamboo. The walls of the *tongkonan* are covered with *Toraja* carvings. Similarly, in the *Tulak Somba* pillars there are also carvings. This *tongkonan* has as many as 16 pillars and two *Tulak Somba* pillars at the front and rear. The spatial form comes under the category of *Banua Sang Borong* or *Sang Lanta* because it has no insulation and so all activities in the house are conducted in one room. Also, when viewed from the outside, the floor is flat from front to back. At the front there is additional space in the form of terraces that have been topped with metal, and above this terrace there is a statue of a buffalo head or *kabongo*. The ladder is positioned at the front, on the left side. The type of damage mainly seen is in the form of cracks and broken pillars due to weathering and termite infestation.

As for the *alang* buildings, there are seven buildings in the following order from east to west:

- Alang No. 1 was built between 1997 and 1998. The roof is made of metal in place of the bamboo roof. It has grass walls that are covered with carvings. The position of the door of this *alang* is located on the front right side. It has eight pillars made of *Banga* wood.
- Alang No. 2 is currently being renovated with reconstruction of its pillars in cast concrete.
- Alang No. 3 was built in 1938, with the original construction still remaining. The roof still has a bamboo structure and the ridge covered with bamboo slats, or *tarampak,* is also made from bamboo. The roof is covered with moss and ferns. The barn boards are still intact, although it has experienced weathering. No engravings can be seen. There are six pillars made from *Banga* wood. The floor seats are made of split bamboo.

- Alang No. 4. The condition remains stable and it has a new look, as it was rebuilt in 1995. The roof is made of a composition of metal; the body is filled with a fine grass. It has as many as six pillars made of *Banga* wood. The floor is composed of a board seating.
- Alang No. 5 was originally built in 1885 but it had been totally replaced, and now the building looks new.
- Alang No. 6 is now temporarily under construction with cast concrete pillars.
- Alang No. 7 was constructed in 1830 and is in pristine condition. The roofs still use bamboo material that has been largely sealed with plastic sheeting. The wallboards are intact without any engraving. There are as many as six pillars with a floor made of boards.



2. *Tangarante tongkonan*

Tangarante tongkonan is located at 02° 56' 16.68" S and 119° 52' 58.51"E, at a height of 904 meters above sea level, approximately 100 meters to the east of the *Rante Tangarante*. There are two *tongkonan* buildings—*Tangarante tongkonan* and *Nek Pendang tongkonan*—and five *alang* buildings.

- *Tangarante tongkonan*

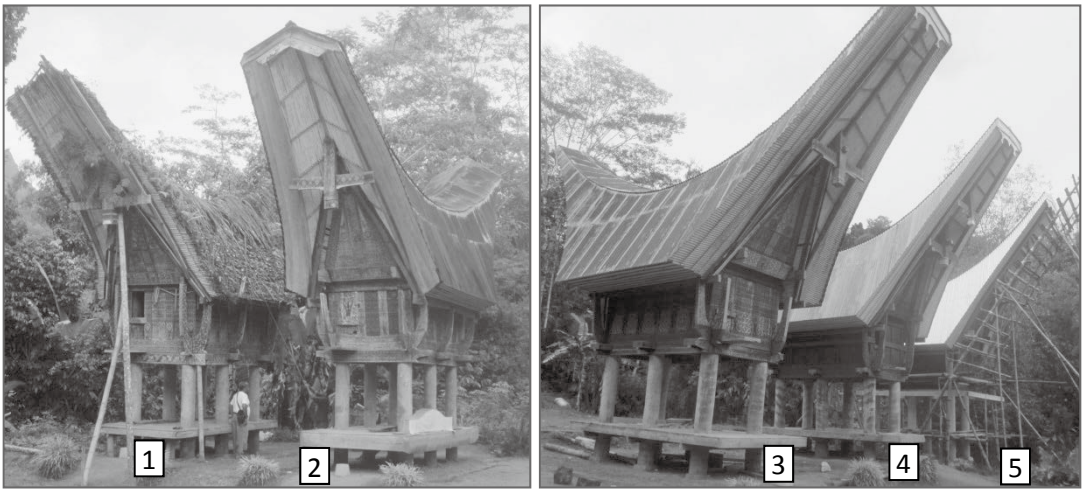
Tangarante tongkonan already has a metal roof with a *tarampak* composed of bamboo. There are carvings on the walls of the tongkonan but these are partially faded. Windows can be found on the side walls—eight in total. The spatial form is *Banua Tallu Lanta*', with *Sumbung*, *Sali* and *Tangdo* rooms. The ladder is located on the left side of the front of the *tongkonan*. There are as many as 23 pillars, with two *Tulak Somba* pillars at the front and the rear of the *tongkonan*. A unique feature is that the *Tulak Somba* pillars are round, and these are carved and covered with buffalo horns, amounting to about 45 horns. Since it cannot accommodate the *Tulak Somba* buffalo horns, some buffalo horns are mounted on the front of the *tongkonan* pillars. Building damage is already visible in parts of the *tongkonan*. This type of weathering damage is primarily on the body of the building and the pillars, with some pillars broken.

- *Nek Pendang Tongkonan*

This tongkonan building is still relatively new, although it is not known exactly when it was updated. A strong indication of its age is seen in the the use of a *tarampak* disguised to resemble a bamboo structure. The roof is made of metal. The body of the *tongkonan* is full of carved *Toraja*. Shape space has three rooms which are called *Sumbung, Sali* and *Tangdo*. At the front is a statue or a buffalo head, *Kabongo*. The *tongkonan* features 19 main pillars and eight pillars on the terrace, left and right. There are *Tulak Somba* pillars located at the front and rear. There are also pedestals pillars made of stone which form a rectangle.

There are five *alang* buildings in the *Tangarante Tongkonan* complex. The number sequence is from west to east.

- Alang No. 1, being in the same general condition of the old *alang*, still has the original roof of bamboo, with moss and ferns beginning to cover it. The edge of the roof has been destroyed, and the *tarampak* is made of bamboo. Figures are decoratively carved on the *alang*, however, the color engraving has begun to fade. The position of the ladder is at the front right side of the entrance. There are six pillars made of *banga* wood and the floor seats are made of wooden boards.
- Alang No. 2 has a metal roof and a clapboard *tarampak* on which have been carved diagonal stripes. The wall is also filled with a fine Toraja grass, although the color carvings have faded. There are six pillars and floorboard seats.
- Alang No. 3 is in approximately the same condition as *alang* No. 2, wherein the metal roof and clapboard *tarampak* are disguised to resemble bamboo. The wall also has carved *alang*.
- Alang No. 4 seems to have been created more recently as a new metal roof is still visible and the *tarampak* made of boards still seems new. Similarly, the wall with fine grass and pillars are all new.
- Alang No. 5 is in the process of being renovated. It is currently still at the stage of making engravings on the walls. The roof is made of metal, part of which resembles a *tarampak* bamboo structure. This is the only *alang* in the compound of *Tangarante Tongkonan* that has cast concrete pillars.



3. *Panaran Tongkonan*

The geographical position is 02° 56' 25.46" S and 119° 52' 59.48" E, at a height of 901 meters above sea level. In the *Panaran Tongkonan* complex are three *tongkonan* buildings—*Tandilino tongkonan*, *Pongsanda tongkonan* and *Nek Pekko tongkonan*—and four *alang*.

- *Tandilino Tongkonan*

Historically *tongkonan* was built in 1810 with the building being renewed in 1980. The roof is made of metal and has a bamboo *tarampak* structure. The walls are covered with carved *tongkonan Toraja*. The *tongkonan* building layout is *Banua Sang Lanta or Sang Borong* because it has no insulation and so it consists of one room only—in other words, there is a flat floor from front to rear. At the front there is a statue of a buffalo head or *kabongo*. There is a porch at the front with the addition of a metal roof. There are 22 pillars in total. The *Tulak Somba* pillar at the front is covered with buffalo horns.

- *Pongsanda Tongkonan*

Pongsanda Tongkonan was built in 1840, and it is now being replaced with a totally new building.

- *Nek Pekko Tongkonan*

This tongkonan was built in 1920 and renovations were done in 1976. The building has *tongkonan* additions on all sides and even the right side, which is the usual residence, has been made into the body of the *tongkonan*. So this has been covered with *tongkonan* residence. The roof is made of metal while the *tarampak* still has its original bamboo structure. The *tongkonan* also has body carvings, but these are already degraded so that the colors appear dull. The *Tulak Somba* pillar carvings are also faded. There is a crack in the middle of the *Tulak Somba* pillar. There is also a statue of a deer head mounted on the top of this pillar.

There are four *alang* buildings, described as follows in order from east to west:

- Alang No. 1 has a metal roof with a *tarampak* that resembles bamboo. The coarse body is composed of boards and looked to have dull and faded carvings, which are barely perceptible. There are six pillars there, with floor seats made of boards.
- Alangs Nos. 2, 3 and 4 have the same construction as alang No. 1, and they appeared to be in the same condition as new buildings. The roof is composed of metal and the *tarampak* composed of board resembles bamboo. The body of the structure is filled with reeds, with a carved Toraja. There are as many as six pillars made from wood from the *banga* tree.

4. *Rante Tangarante*

The *Rante Tangarante* complex is located at 02° 56' 16.79 "S and 119° 52' 56.81" E, at a height of 909 meters above sea level. The menhir are located approximately 100 meters west of the *Tongkonan Tangarante* complex. This menhir stone site has been cleaved out of a road that leads to the *Tongkonan To' Kayu* complex. The *rante,* which is a place for ceremonies, is on a flat site with a number of menhir stones—as many as 17 pieces—either standing upright or having fallen over. Menhir stone structures are semicircular with the tallest being 360 cm high, with a diameter of 70 cm.

Besides the three *tongkonan* complexes and *rante* above, there are also two locations where *patane* are placed. A *patane* is a burial container that is used instead of a cave, and is usually made by Toraja people who are well off financially. The *patane* site is located on the roadside between the *Tongkonan*

Tangarnate complex and the *Tongkonan Panaran* complex. Generally a *patane* resembles a *tongkonan,* or the model of a modern house is used.

b. Pala' Tokke Region

The *Pala' Tokke* region is about 6 km to the southeast of the city of Rantepao. This area can be reached by two-wheelers and four-wheel drive vehicles, because the road conditions are poor to reach the location of *menhir* stones and the cave *Pala' Tokke*. In the region of *Pala' Tokke* there are three objects, namely the *Tongkonan Pala' Tokke* complex, the *Rante Bamba Mengkepe* complex and the Liang or Cave of *Pala' Tokke*. Administratively, the third location is located in the Mengkepe Village North Toraja Regency.

A detailed description of cultural heritage in *Pala'tokke* is as follows:

1. *Tongkonan Pala'tokke* complex is located at 03° 00' 35.03" S and 119° 54' 47.55" E, at an altitude of 802 meters above sea level. There are two *tongkonan* houses, namely *Tongkonan Sura'* and *Tongkonan Garu'ga*. There are five *alang* buildings.

- Tongkonan Sura '

The condition of the building is relatively intact and stable. It has a metal roof and a *tarampak* made of bamboo. The *tongkonan* body is still original. Engraving on the body/walls of the *tongkonan* is present only in the front and on the *Tulak Somba* pillar. There are no engravings on the left, right and rear walls. The *tongkonan* spatial form is *Banua Tallu Lanta'*, and the rooms are *Sumbung, Sali and Tangdo*. The ladder is located at the front left.

There are as many as 37 t*ongkonan* pillars, with 27 main pillars, eight terrace pillars, and two *Tulak Somba* pillars. The pillar pedestals have cast concrete foundations. Visible damage is the type of damage that occurs mainly in the weathering of *tongkonan* boards and color fading on *tongkonan* carvings.

- *Tongkonan Garu'ga*

Tongkonan Garu'ga is located to the west of *tongkonan Sura'*. The general condition of the building is new. The roof is made of metal, and the *tarampak* is a bamboo structure. The walls of the *tongkonan* are covered with carvings. Similarly, there are carvings on the *Somba Tulak* pillars. The spatial form is *Banua Tallu Lanta'*, with the rooms *Sumbung, Sali and Tangdo*. There are as many as 41 pillars, with 31 main pillars, eight terrace pillars and

two Somba Tulak pillars. The pillar pedestals have cast concrete foundation. There is a *tongkonan* front porch, and the terrace walls are carved though the color has faded.

- *Alang*

There are five alang buildings arranged in the following sequence (east to west from the entrance):

-Alang No. 1: with metal roofing and a *tarampak* made of bamboo. The front wall is made of coarse carved board which is uncolored. The left and right walls and the back are plain with no engravings. There are as many as six pillars with the pedestals having cast concrete foundations.

-Alang No. 2: a new structure. It has a cast concrete floor covered with tiles, as well as eight pillars, cast with a layer of concrete and ceramic.

-Alang Nos. 3, 4, and 5: These are new buildings but they also feature the use of traditional materials on the roof, unless the roof is metal. The *tarampak* are made of bamboo. The body of each structure is covered with carved *alang*. Each structure has as many as six pillars.

2. Rante Bamba Mengkepe is located at 03° 00' 36.16" S and 119° 54' 44.96" E, at an altitude of 800

meters above sea level. Located about 50 meters to the west of *Tongkonan Pala 'tokke*. Located on land that is likely to ramps, with the lower surface of tongkonan location. There as many as 26 *menhir* stones. The tallest *menhir* is 220 cm high, 105 cm wide and 17 cm thick, and is flat-shaped and slopes at an angle. The smallest is 36 cm high, 25 cm wide and 25 cm thick, and is square shaped and upright. South of the *Rante* there are roads and paddy fields. The road heads toward the Cave of *Pala' Tokke*.

3. Cave (*liang*) of *Pala 'Tokke* is located at 03° 00' 42.29" S and 119° 54' 34.47" E, 837 meters above

sea level. Moving to westward along the road leads to the the *Pala' Tokke* cave. It's about 500 meters from the *rante* to the cave. At the end of the rice field and the hills there is a natural stone path leading to a neat cave. At the location of the Cave of *Pala' Tokke* one can see skulls and human bones. In these karst cliffs hanging graves, there are three wooden structures acting as a buffer which are attached to the rock cliff.

Early Condition of *Tongkonan* and *Alang*

Tongkonan have been adapted to suit the cool and fresh environment in Toraja. Indigenous forests as the source of *tongkonan* materials, providing various types of wood and bamboo for *tongkonan* and *alang* construction. The roof of a *tongkonan,* which is curve-shaped, is formed from bamboo and usually has nine layers of bamboo. The rooftop is covered with fragments of bamboo. This is called a *ulu banua* or roof top.

The body of a *tongkonan* called *Kalle Banua* is a piled of boards. These boards usually have a special carving of Toraja with red, black, white and yellow paint on it. The division of rooms depends on the type of *tongkonan*. Pillars made from *aru* wood are orderly piled. There is a center pillar which shores up the front and the back of the roof called *Tulak Sumba*. The front *Tulak Sumba* pillar is the place for a buffalo horn when a ceremony is being held.

Tongkonan which still uses traditional materials

The alang, better known as the barn, complements the *tongkonan* building. The main function of the *alang* is to store rice grass, and the storage area is located upstairs, while downstairs (*sali*) is a workplace, a place to sit during celebration ceremonies. The *alang* is always located on the northern side of the *tongkonan*, and a separate courtyard houses the *tongkonan* building facing north with a south-facing grassland called *Ulu Baba*.

The buildings generally have a single room with limited walls, floors, and roofs like the bamboo-like roofs of the *tongkonan*. The arch-shaped roof composed of bamboo is well laid out. The *alang* walls are made of boards. In the front wall, there is an *alang* door, but it does not have a fixed ladder, however one can be installed if required.

The building consists of *alang* pillars made of wood from Banga trees, and which are placed on stone pedestals. Banga is selected for the pillars because this type of wood is slippery when the skin is removed, so as not to allow animals such as rats climbing above the grass, which serves as the food basket of the Toraja.

Alang using traditional materials and metal

Changes Occurring

At some locations in North Toraja, there has been a change of use of building materials for *tongkonan*. This can also be seen in the Marimbunna Tikala and Pala' Tokke areas.

In both areas, *tongkonan* buildings that use bamboo for the roof no longer exist; this traditional material has been replaced with metal.

Similarly, in the *tarampak*, some boards have been disguised to resemble bamboo. The use of such boards as a substitute for bamboo can be seen at *Tongkonan Nek Nek Pendang* and *Tongkonan Nek Kondo* in the Marimbunna region.

In general, both regions have experienced a change in replacement materials over time. This can be seen in the metal roofs and the two *tongkonan* that use imitation bamboo board. There are several reasons for replacement of the material:

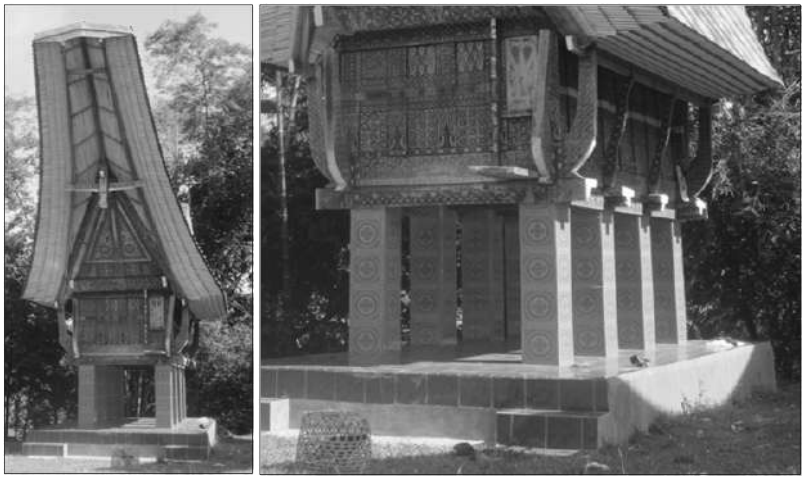
1. The use of metal roofing is more practical than using a bamboo roof. Similarly, the practice of disguising the *tarampak* board is considered easier, although a more complicated processing technology must be used at the time of installation.

2. In terms of cost, metal roofing is cheaper than using a bamboo roof. This is due to longer process necessary for the formation and installation of a bamboo roof.

There has also been a change in the type of construction materials for the *alang*. In the *alang* building within the *Tongkonan Pala 'Tokke* complex, it is obvious that cast concrete has been used at the bottom of the pillar and floor. Likewise on the roof, the grass has been replaced with metal roofing materials.

The same was seen in the *Tongkonan To' Kayu* complex, where there are two *alang* that have cast concrete pillars, while at the *Tongkonan Tangarante* complex there is one *alang* with cast concrete pillar construction.

The use of imitation bamboo boards for the *tarampak* structure is also seen with some *alang*, for example, four *alang* in the *Tongkonan Tangarante* complex and also four *alang* in the *Tongkonan Panaran* complex.



Alang in Pala' Tokke

Although there has been no change in terms of functionality, the replacement of traditional material with modern materials has changed the traditional values inherent in the culture of Toraja. The tendency to use these replacement materials for traditional buildings in Toraja today is due to several factors, including:

1. Indigenous forests as a source of raw materials for traditional buildings in Toraja are no longer able to provide the necessary raw materials. There is a conflict between the sustainability of tree planting and the need for building materials. The *Banga* tree (palm), which is used for *alang* pillars, although it is rarely cultivated in some places, can still be found.

2. Toraja society at present prefers materials that are practical, as it is easier and involves a shorter process. The materials are more easily obtained and at lower cost. This is one of the increasingly important considerations today.

In addition to the above factors, the main factor is actually the "commercialization" of Toraja to support the interests of the tourism program. Toraja society sees greater economic opportunities in the arrival of tourists, so they beautify themselves and their environment. A misperception that must be clarified again is that tourists do not want to visit modern buildings. The traditional values of Toraja society is the main attraction that must be preserved.

Proposed solutions to overcome this are:

1. Conducting environmental conservation to restore the function of the indigenous forest, by planting trees and thus providing building materials for *tongkonan* as well as sustainable grasslands. Tree planting can be done on a regular basis within a period of 5 or 10 years, according to the estimates of the expected age of the building and expected damage, and the need to replace it in 5 or 10 years. Thus, there is a balance between demand and the availability of materials.

2. Provide advocacy to Toraja society, by conducting an open dialogue among local governments, related agencies, traditional leaders and communities with the aim of providing an understanding of the importance of the traditional Toraja values that need to be preserved. In general, we want to achieve an increased awareness of Toraja society through broad participation in order to preserve the traditional values of Toraja.

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*PURA*S[1] in BALI

Bali is a region in Indonesia which has a unique culture that cannot be found elsewhere in the world. The Balinese philosophical principle *Tri Hita Karana* ("three causes of goodness"), promotes a harmonious relationship between the individual and the realms of the spirit (*parahyangan*), the human world (*pawongan*) and nature (*palemahan*). This abstract idea is given concrete realization in the lives of the Balinese through traditional buildings and also their worship buildings. Although the majority of Balinese have adopted modern culture in their lives, the habit of worshiping in traditional buildings still exists. The buildings or places for worshiping gods or spirits in Bali are called *Puras*.

Ancient Guidelines for Building *Puras* (Temples) in Bali

For building temples, the Balinese people strictly adhere to the guidelines which they have inherited from the ancients. The guidelines are *Tri Hita Karana*, *Tri Mandala*, *Tri Angga*, *Sanga Mandala*, Axis of Religion and Axis of the Earth.

The *Tri Hita Karana* principle for Balinese traditional buildings symbolize Atma (Soul), Angga (Physical), and Khaya (Power).

Tri Mandala (setting values) is divided between *Utama Mandala*, *Madya Mandala*, and *Nista Mandala*. *Utama Mandala* direction is to the mountains. *Madya Mandala* is the middle area between *Utama* and *Nista*, whereas *Nista Mandala* is seawards. *Utama Mandala* areas have magical value, so a *Utama Mandala* area is always selected for the location and layout of a *Pura*, providing a peaceful atmosphere that is so quiet and suitable for praying.

Tri Angga is a spatial division of values in traditional Balinese buildings, which are divided into a foot section, a body section, and a head section. It also called the three strata of humans.

[1] *Puras* are also called temples. It is a local name for a Balinese temple.

Sanga Mandala is used for determining the spatial position of the building in the layout. It can be configured as a chessboard with nine squares. *Sanga Mandala* is based on *Nawa Sanga,* which is the embodiment of eight gods for the wind directions and one god in the center.

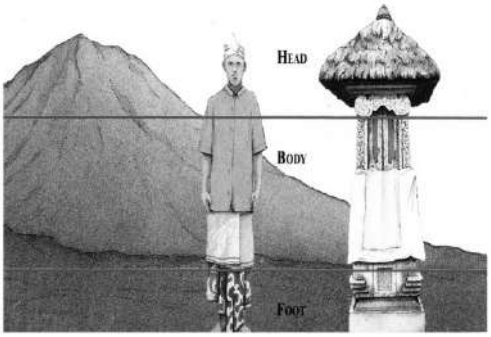

Fig. 1. Stratum divisions in the concept of *Tri Angga* (Source: Internet)

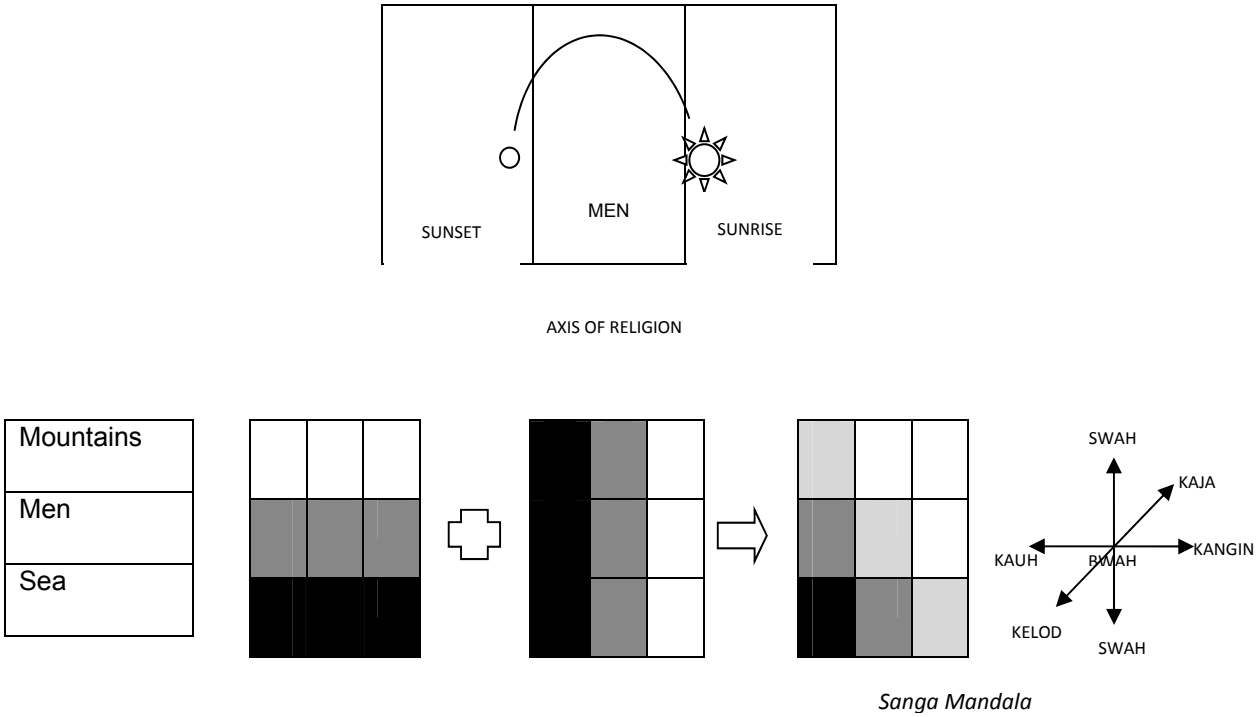

Fig. 2. *Sanga Mandala,* which is extracted from the Axis of the Earth and Axis of Religion (Source: Gelebet, I Nyoman, et.al., 1981/1982)

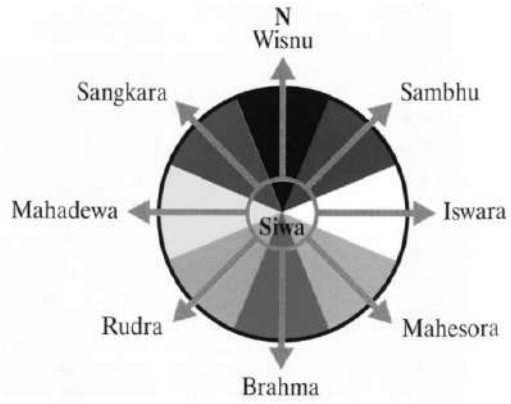

Fig. 3. *Nawa Sanga* wheel of Wind Direction Gods (Source: Internet)

The Axis of Religion and Axis of the Earth are subdivisions of the *Sanga Mandala* (see Fig. 2). The Axis of Religion is Kangin - Kauh, and the Axis of the Earth is *Kaja* - *Kelod*. In Balinese conception, there is a belief that the highest point of the mountain is the holiest place, and we know that mountains in Bali lie in the center of the island. So, in the northern part of Bali, *Kaja* direction is to the south (mountain area) and *Kelod* direction is to the north (seaward). Whereas in the southern part of Bali, *Kaja* direction is to the north (mountain area) and *Kelod* direction is to the south (seaward).

Types of *Pura*s and Space Divisions of *Puras*

Based on their function, *Puras* are divided into four types, namely: *Puras* for family, *Puras* for people in the same village, *Puras* for community groups with the same job, and *Puras* for people from entire territory. *Puras* for family located in a particular area of the house are also called *Sanggah* or *Pamerajan*. The size of the *Sanggah* or *Pamerajan* depends on the number of family members. *Puras* for people in the same village are called *Pura Kahyangan Tiga*. This kind of *Pura* is divided again into three types of *Pura*: *Pura Desa*, *Pura Puseh*, and *Pura Dalem*, which can be used for people from all castes in the same village. The three kinds of *Pura Kahyangan Tiga* are larger compared with *Puras* for family. *Puras* for community groups with the same job are also called *Pura Pengulu*. The last is *Puras* for people in the same territory. *Puras* of this type are larger and wider. They have division of space accordingt to function. Usually, they are divided into three zones or spaces as follows:

1. Front Zone, namely, *Jabaan* / *Jaba sisi*. This is the transition from the outside to the inside of the temple. The purpose of the *Jabaan* is to prepare for ceremonies.
2. Middle Zone, namely, *Jaba tengah*. This is the place for preparation and accompaniment of ceremonies.
3. Main Zone, namely, *Jeroan*. This is the place for worshiping Gods.

The more *Jeroan* its position, the more sacred a place it becomes. Smaller *Puras* sometimes contains only the *Jeroan* zone and the *Jabaan* zone. The position of *Jeroan* always head for *Kaja*, while the *Jabaan* always head for *Kelod*.

Fig. 4. Most common *Pura* site plan and its zone

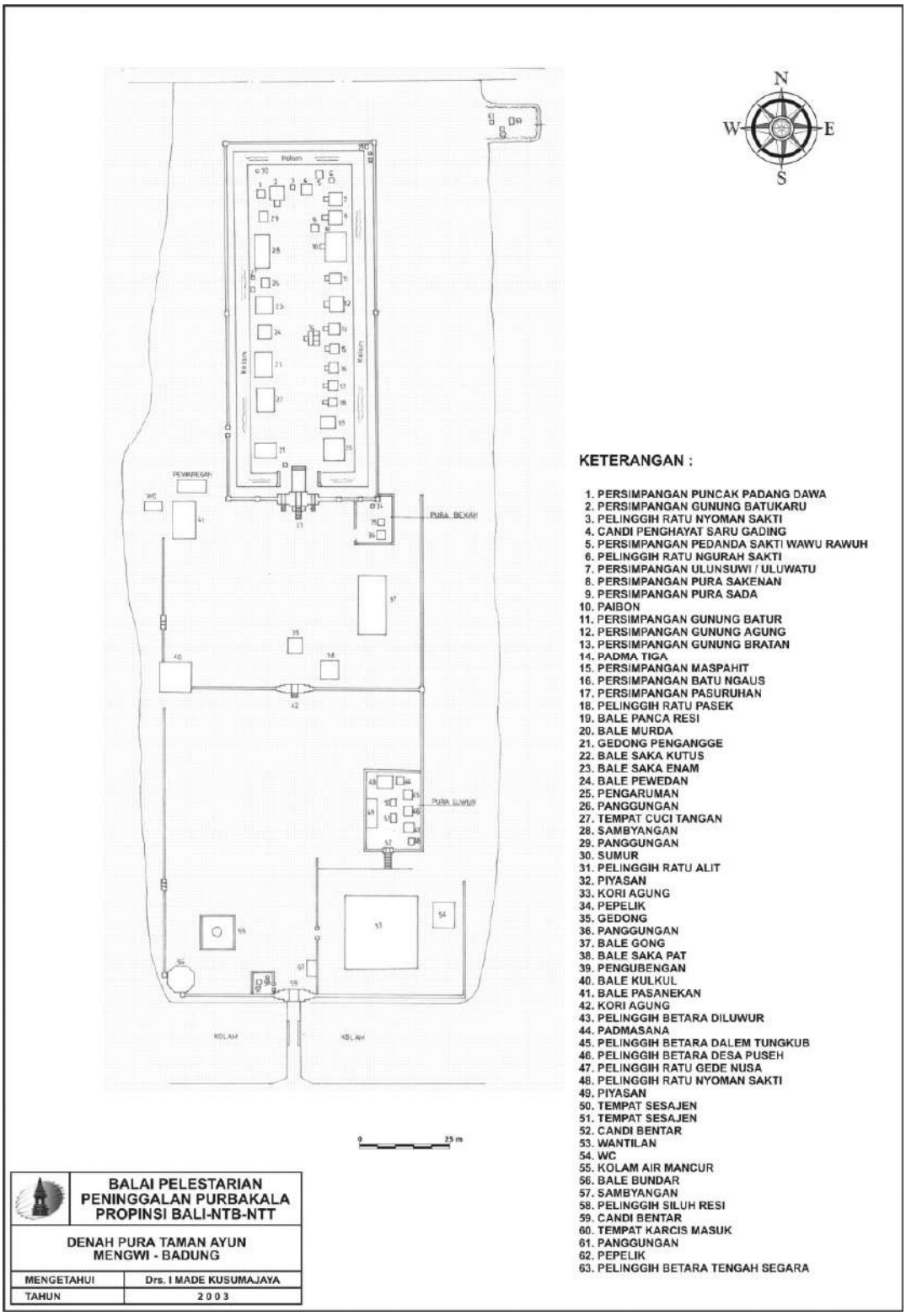

Fig. 5. Site plan of Pura Taman Ayun (Source: BP3 Bali document)

As we can see in Fig. 5, there are many kinds of buildings and structures inside a *Pura* complex. But there are a strict regulations for placing the buildings and *structures* inside *Pura* complex zones, depending on its function. For example, *Wantilan*[2] structures and *Candi Bentar* gates are always placed in the *Jabaan* zone. *Pelinggih*[3] structures, *Persimpangan*[4] structures and *Kori Agung* gates are always placed in the *Jeroan* zone.

Sometimes the regulations are not too strict for some structures. For example, *Bale Gong*[5] and *Bale Kulkul*[6] can be placed in the *Jabaan* zone or *Jaba Tengah* zone depending on how vast the *Pura* building complex is. If the *Pura* is large and divided into three zones, then *Bale Gong* and *Bale Kulkul* can be placed in the *Jaba Tengah*. However, if the *Pura* building complex is narrower and consists of only two zones, then *Bale Gong* and *Bale Kulkul* are placed in the *Jabaan*.

Fig. 6. Other complementary buildings and structures inside *Pura* Taman Ayun

In the information above, there are various types of *Puras* according to their function. But the main element of the *Pura* is the *Pelinggih* structure, because it embodies the spirit that is worshiped. Besides the *Pelinggih*, there are complementary buildings and structures in the *Pura* for completing preparations for the religious ceremonies. These are *Bale Pawedan*, *Bale Piyasan*, *Bale Gong*, and *Bale Pengambuhan*. For completing the *Pura* complex as a complete group of worship buildings and structures, there are the *Candi Bentar* gate, *Kori Agung* gate, *Bale Kulkul*, *Pewaregan*, *Wantilan*

[2] *Wantilan* is a place for public meetings. It is a structure with colonades and a roof, but without walls.

[3] *Pelinggih* is a permanent outdoor Balinese Shrine. For indoor purposes, they use *Plangkiran.* Those *shrines* embody the spirit that is worshiped.

[4] *Persimpangan* is also called *Penyawangan*. It is something (like mountains or sacred places) which has to be worshipped by the people at the *Pura*

[5] *Bale Gong* is the place for striking the Gong. A Gong is a traditional music instrument.

[6] *Bale Kulkul* is the place for striking the *Kulkul* or *Kentongan* (a drum made from bamboo or wood which is struck to sound an alarm.

structure, *Penyengker* walls and other structures built inside the complex. In general, buildings and structures inside the *Pura* have similar forms to the traditional Balinese house. However, because of its function for worshipping spirits, the forms of the buildings and structures are designed for this special purpose.

Forms of Worship Buildings and Structures inside the *Pura*

There are different names for the various worship buildings and structures. These buildings and structures are divided into five different forms, based on the purpose for making it and placing it inside the *Pura* complex. They are:

1. *Tugu* Form

   The Tugu has a square base which is approximately 0.60 x 0.60 metres, with a height of about 2 metres. It consists of three parts: head, body, and foot, tapering from the bottom toward the top with decorations. The head part has a niche to place the offerings. *Tugu*s are made from commonly found natural rocks (such as padas rocks or coral stones) or brick or other artificial stone, depending on the materials that surround the location of the *Pura*.

   This structure functions as a *Pelinggih*.

Fig. 7. A few examples of Tugu structures (Source: Internet)

2. *Candi* Form

   This type is generally similar to the *Tugu* with a square crown coil terraced in the head part. The crown head part decreases in diameter towards the top to form a conical shape. It also has a square base with sides. The monument has a form generally similar to the crown of the head coil using a rectangular or square, much smaller terraced upward. Building sketch a square-form, rectangular, or square, with sides approximately 1 fathom *alit*, 1 fathom *madya* or 1 fathom

agung. The building height ranges from 2 metres (as tall as *Tugu*) to 10 metres or even higher considering its aesthetic proportions.

The materials used for a *Candi* are natural rocks (such as padas rocks or coral stones), or bricks or other artificial stone with a few modifications in the interest of aesthetics. The construction method uses smooth adhesive and without coloured paint to coat the building. Based on its function, the *Candi* form is divided into two functions, namely:

a. Worship function

   Its form is like *Candi Rengat*. Because of its function for worshipping, the *Candi* form is placed at the *Jeroan*. However, because Bali is vulnerable to earthquakes, this form is rarely used and instead the *Meru* form is used.

b. Gate entrance function

   There are two types: *Candi Bentar* type (split-gate) and *Kori agung* type. The *Candi Bentar* type is used for the entrance from the outside into the *Jaba sisi* zone, and also into the *Jaba tengah* zone. For the entrance into the *Jeroan* zone from the *Jaba sisi*, the *Kori agung* type (arch-roofed) is used.

Fig. 8. *Candi* form as an entrance gate (*Candi Bentar* type) at *Pura* Ulun Danu Batur

Fig. 9. Another *Candi* form (*Kori Agung* type) as an entrance gate at Pura Taman Ayun

3. *Meru* Form

The *Meru* has a square base with sides of about 5 metres and a height that can reach 10 metres. It is divided into three parts: the head, formed by tiered (overlapping) roofs called a *Meru*, body, and foot. A *Meru* always has an odd number of roofs. The body section is used for placing worship offerings. *Merus* are made from natural stone or artificial stone in the foot. The body consists of walls that form a board room. The *Meru*-roof head tapers upwards. *Meru* roof construction is strengthened with pegs without nails or rope ties. Because of its construction, *Meru* form is more resistant to earthquakes than the *Candi* form. The *Meru* functions mainly as a *Pelinggih*. It also placed in the *Jeroan* zone

Fig.10. Left: Meru structures at Pura Batukaru (Source: Internet); Right: Meru structures at Pura Taman Ayun

4. *Padmasana* Form

The *Padmasana* form is more like the *Candi* form, with square base tapered towards the top. The sides are about 3 metres and the height is about 5 metres. It is divided into two parts: head and foot. However, the head part has no roof. *Padmasana* form includes elaborate design features such as *Bedawang nala*, *Garuda* and the Swan, which are based on Hindu mythological symbols.

Bedawang nala is a figure of a giant tortoise entwined by one or two dragons. *Garuda* and the Swan are positioned at the back of the *Padmasana* with their wings outstretched (flying position). The Padmasana is made from natural stone or can be made from bricks or artificial stone bound together with smooth adhesive bonding, and reinforced with wedges.

The Padmasana also serves as a *Pelinggih*.

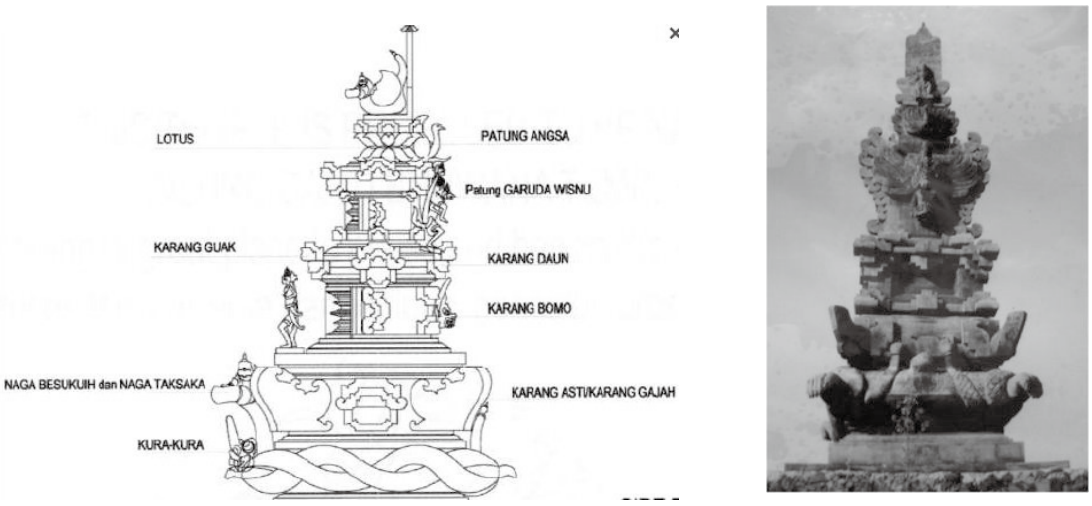

Fig. 11. *Padmasana* (source: internet)

5. *Gedong*

   Gedong form is similar to *Tugu* form. It consists of three parts: head, body and foot. But the head part is of wooden construction with a roof of reeds, palm or other covering materials. It has a square base with sides of about 1 metre and a height of about 3 metres. Varieties of *Gedong* form are *Gedong* form with twin cabin, *Gedong* form with tiered roofs (overlapping roofs), and other *Gedong* forms which are adapted to the purpose for which they are made and depend on the creativity of the craftsman.

   It also serves as a *Pelinggih*.

Figure 12. Examples of *Gedong* form (Source: internet)

Ornamentation of the *Pura*

The carved decorations on the *Pura* can serve as mere ornaments (decorative function), but also have their own meaning. The placement of decorative carvings on a portion of the building can be rated and thus identify the functionality and usability of the building. The color of the structures can also give its own meaning.

The types of ornaments on a *Pura*:

1. Flora Ornamentation

   There are several kinds of floral decoration and ornamentation that show symbolic values. Generally, a floral decorative ornament placed on a building displays an aesthetic element. But some are used as decorative fillers in paintings or sculptures depicting a puppet story, or legend, or even belief / religion. Floral ornaments generally use the original color of building materials, or use gold coloring on wood pole structures in the *Pura* building complex and also in the

decorative fabrics of the *Pura*. Placement is at the bottom of the structures and also depends on the type of floral decoration used and the width of the medium to be decorated.

2. Fauna Ornamentation

   This type of decoration is inspired from the story of legend and folklore puppet *Tantri*[7] of the animal world. In addition to functioning as mere ornaments, decorative fauna also serves as ritual symbols displayed in the form of statues, called Pratima. Decorative fauna like *Bedawang nala* in *Padmasana* form is categorized as Pratima. Fauna decorative ornaments are usually placed on baseboard joints in the form of the Garuda, Winged Lion, and other forms. This type of ornamentation usually uses the original color of the carved of sculpted material, or uses artificial colors that are nearly similar to the original color of the fauna. Decorative fauna on *Pura* is placed at the front gate entrance, on *Padmasana*, and also on some of the ceremony equipment.

3. Nature Ornamentation

   Decorative nature ornamentation is displayed in abstract form approaching the actual form. The kinds of nature elements (*Panca Mahabhuta*) that are used as decorative ornamentation are *apah* (liquid), *teja* (light), *bhayu* (wind), *akhasa* (air), and *bumi* (ground). Just like other ornamentation, decorations of this type also serve as a mere ornaments, and may also have a symbolic emphasis or more sense in a given field of the decorative. This type of ornament uses the original color of the materials that are used as media carvings or sculptures or paintings, and artificial colors very close to the original. Nature ornamentation is placed on top panels of the buildings or structures and also on decorative fabrics that are used in traditional ceremonies.

4. Religion and Belief Ornamentation

   This type of ornamentation is more symbolic and profoundly emphasizes the part of the building which has been given the decoration. Therefore, the use and placement of decorations on buildings or structures should follow the rules of certain ceremonies. This kind of ornament uses the original color of the materials that are used as media carvings or sculptures or paintings, and also certain colors to give a certain symbolic significance according to the rules of the religion or belief. Religion and Belief ornamention is placed on the main part of the building and other parts that deal with religion and belief according to their particular status and function.

[7] *Tantri* is a type of fable which teaches us about good and bad karma

Problems in Preserving the *Pura* as Cultural Heritage

There is no complete record or body of literature which reviews *Pura* specifically. Some of the existing literature regarding buildings in *Pura* complexes is based on information of the people who lived near the *Puras*.

Fig. 13. Conservation activities inside a *Pura*

The role of the *Pura* as a living heritage and a place for fulfilling the worship needs of the community, encourages the community to do any needed repairs. For example: Badung Regent reconstructed the damaged *Wantilan* structure in the *Pura* Taman Ayun temple complex in 2011. To prevent futher damage in other parts of the *Pura*, Badung Regent had to first consult BP3 Bali[8] as a technical consultant.

Fig. 14. Offerings ceremonies inside a Pura complex before and after conservation or restoration activity.

The majority of Balinese people realize the status of *Puras* as part of their cultural heritage. Therefore, before they repair[9] or build any building or structure inside a *Pura* area, first they will consult with BP3 Bali, so that the restoration does not violate any cultural heritage preservation laws or regulations[10].

However, for *Stupa* Pegulingan temple, *Pura* Mengening, *Pura* Gunung Kawi and any other *puras* that have been restored by Suaka Peninggalan Sejarah dan *Purbakala* Bali (now named BP3 Bali), BP3 Bali still monitors the condition of the buildings and also conserves movable heritage objects (such as the arca in *Puras*). As with the new construction of any new *Pura* by the people, they must arrange the relevant ceremonies and give offerings to God before and after the *Pura* restoration and arca conservation.

[8] BP3 Bali is an abbreviation of Balai Pelestarian Peninggalan Purbakala Bali. It is a branch of the conservation office of cultural heritage in Gianyar, Bali. The working areas of BP3 Bali are Bali, Nusa Tenggara Barat and Nusa Tenggara Timur.

[9] Structures that are made from wood sometimes have to be replaced periodically depending on their condition. If the structure is made from good quality wood, it will remain for 30 – 40 years. Ceremonies and offerings have to take place, before and after the replacement.

[10] The principle of restoration is to pay attention to authenticity of the forms, materials, worksmanship, layout, and its historical value. This is listed in the Government Regulation of Republic of Indonesia Number 10 Year 1993 on the implementation of Law Number 5 Year 1992 regarding Cultural Heritage Properties.

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Ministry of Education and Culture

Country Report: Bubungan Tinggi House in Martapura

I. Introduction

I.1 Background

The Bubungan Tinggi House is one of eleven types of traditional houses in South Borneo. In the hierarchy of traditional houses in South Borneo, the Bubungan Tinggi House is at the highest level, and served as the residence of the Kings in the Kesultanan Banjar period. This type of house was built by wealthy merchants after the end of the Kesultanan Banjar era because of their prestige value.

The Bubungan Tinggi House cannot be separated from the influence of the South Borneo geographical context, which features many rivers. Such houses are growing in number and are built at the edge of the river, causing rapid growth and exerting a strong influence on the structure of the house. However, such influence can exist in harmony, without affecting the main elements, such as the main form and the supporting elements. This influence is only evident in decorative chisel artwork and the contents of the house.

The Bubungan Tinggi House is entirely built using natural resources that exist in the South Kalimantan region itself. As is well known, the island of Borneo has abundant natural wealth, especially timber and forest products. The construction of a Bubungan Tinggi House is usually done with Ulin wood. It is used, for example, on the roof, for the shingles, beams, and other structural parts. One example of this is the Bubungan Tinggi House located in Teluk Selong Ulu Village in Martapura Regency.

I.2 History of the Traditional House

Movement of the sultanate to Martapura after the attack by Dutch colonizers, started a new chapter in the history of Kesultanan Banjar, and those who had knowledge of architecture from Kesultanan Banjar adopted the design because of its prestige value.

The Bubungan Tinggi House located in Teluk Selong Ulu Village in Martapura is said to have been built in 1867 by H. Muhammad Arif. He is known to have been a rich merchant of his time. As a result of the struggle against Dutch colonizers there are no other remaining heritage properties of this type in the region of Kesultanan Banjar. The Bubungan Tinggi House has a completeness of form and ornamentation, which is one of the reasons why this traditional house in Teluk Selong Ulu Village is always cited as a representative example.

Bubungan Tinggi House in Teluk Selong Ulu Village, Martapura Regency

Dokumentasi Balai Pelesatarian Peninggalan Purbakala Samarinda

In the years during the struggle for independence, the Bubungan Tinggi House in Teluk Selong Ulu Village in Martapura Regency was used by soldiers or TKR freedom fighters as a headquarters and training place. After the struggle ended, the house was abandoned by the occupants because the damage was getting worse and there were no funds for maintenance. Moreover, the majority of heirs to the property did not live in Martapura.

In 1989, the Department of Education and Culture through the Directorate of Heritage and Museums concluded that it was feasible to make this Bubungan Tinggi House eligible for restoration. This restoration included reconstruction under the rehabilitation category.

II. Contents

II. 1. Philosophical Aspect

The philosophy of the Bubungan Tinggi House cannot be separated from the origin of the Banjar. There are three ethnic groups, namely Banjar Kuala, Banjar Batang Banyu, and Banjar Pahuluan. The three ethnic groups actually originated from the native tribes who had converted to Islam and who were influenced by Malay culture through trade along the river.

In *Ngaju Religion: The Conception of God among a South Borneo People*, Dr. H Scharer in 1946 described the concept of divinity and belief. The Bubungan Tinggi House is associated with the culture of the Ngaju Kaharingan tribe, where nature is the macro, while the house is the microcosmic, and the centre is totemic. The roof of the Bubungan Tinggi House, majestically towering into the sky, is identified with sacred mountains in the world of the primeval mountain based on the Kaharingan religion. The ruler of this upperworld is the god Mahatala, depicted as a hornbill.

From the other side of the house, the Bubungan Tinggi House looks like an umbrella, which comes from a tribal ceremony of the native Ngaju tribe. Umbrellas also symbolize life and Mahatala

as the head god (Mahatala is the head god in the Kaharingan religion). The bottom part of the house symbolizes the underworld and is ruled by Djata/Tambun. Djata/Tambun is the wife of Mahatala.

To begin construction of a Bubungan Tinggi House there are several steps that must be completed, ranging from determining the location, and determining the exact day for beginning the development. If construction begins in the month of Safar (one of the months in the *Hijra* calendar), which is considered as a poor month, usually only the foundation is completed. The foundation will later be doused in chicken blood as part of the Banjar Tradition.

II. 2. Spatial Pattern

As a traditional house, the Bubungan Tinggi House has the same characteristics as others such as the Betang House or the Lamin House. Some of the important characteristics are:

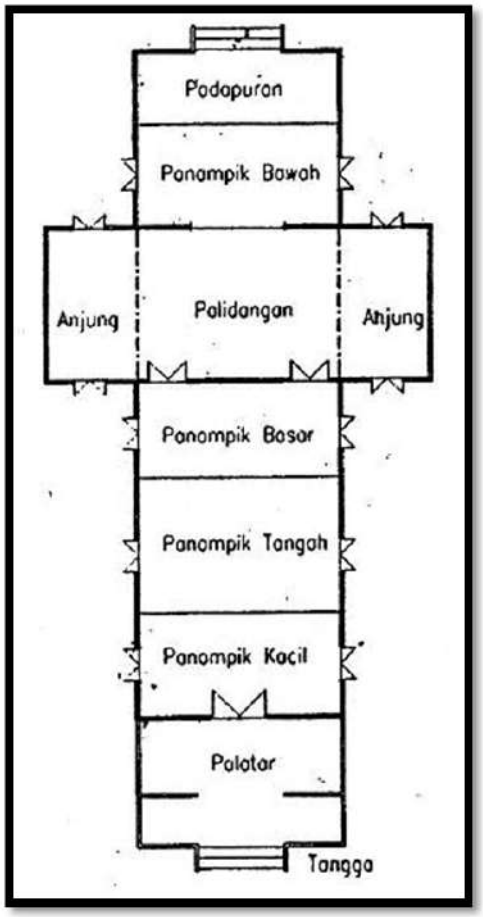
1. Symbolic
2. An emphasis on the roof
3. Ornamental
4. Decorative
5. Symmetrical

Differences in the spatial pattern can occur, as Bubungan Tinggi House has three types of space, that is, open space, half open space, and inside space.

- The open space consists of a yard or porch, which is divided again into surambimuka, and surambisambutan.

- The half-open space, surrounded by a constellation fence, called the Field Pamedangan.

- The inside space is divided into Pacira and Panurunan (Panampik Kacil), Paluaran (Panampik Basar), Paledangan (Panampik Panangah) consisting of Palidangan Dalam, Anjung Kanan and Anjung Kiwa, and Panampik Padu (kitchen).



Spatial Pattern of the BubunganTinggi House: http://id.wikipedia.org/wiki/Berkas:Denah_Rumah_Bubungan_Tinggi.JPG

The rooms consist of a number of tiered floors:

- Palatar (pavilion or patio), the front room, which is the first room after the entrance stairs. This room is a higher floor, surrounded by a constellation fence. Usually in this space there is a pair of long chairs. The Palatar is also called a Pamedangan.

- Panampik Kacil is a rather small room after entering through the front door of the Lawang Hadapan. The floor is higher than that of the Palatar. The threshold here is called Watun Sambutan.

- Panampik Basar or Ambin Sayup, the room facing the middle wall (Banjar: Tawing Halat). The floor surface is also higher than the previous floor. The floor used to be called Watun Jajakan, equal to the threshold of the floor for the Panampik Tangah. The room is big enough to use for a variety of family and community activities. If still short of space, that separates the Tawing Halat with the Palidangan can be opened. In the Palidangan, or sling, the space inside the house is adjacent to the Panampik Basar. The Palidangan floor level is equal to the level of the Panampik Basar. In the room the Palidangan has tall pillars supporting a high ridge (number 8 bars). Pole is called Tihang Pitugur or Tihang Guru. This room consists of a Paledangan Dalam and an Anjung Kiwa Anjung Kanan. The function of this space is similar to the Paluaran, but it is usually reserved for women. Here there are large cabinet fittings, a cabinet blind, kanap, and pitcher. The floor was given Hambal as a cushion.

- Panampik Dalam or Panampik Bawah, which is in a fairly large room with a floor surface is lower than the Palidangan floor and the same height as the Panampik floor surface. The floor threshold is also called Watun Jajakan.

- Anjung Kanan–Anjung Kiwa. The Anjung Kanan room is also equipped as a break room with makeup and accessories of worship. While Anjung Kiwa is a place to give birth and a place of care for the body. it also contains cabinets, beds, tables and other items.

- Padapuran or Padu, which is the last room at the rear of the building. The surface of the floor is also lower than the Panampi. The threshold floor is called a Watun cascade. Sometimes the Watun cascade is quite high in places that were given for ascending and descending stairs. The room is divided into sections: Padapurana tangan (a place for cooking) and grate (where dry wood fire), Pajijiban, and Pagaduran (a place to wash dishes or clothes).

II. 3. Material and Structure

Material

With all the natural resources in South Borneo, the material used for a Bubungan Tinggi House can be found in nature. Traditionally, there are six types of wood used for Bubungan Tinggi Houses, but

now this wood is very rare to found. The various wood species are classified according to their function. Among them are the following:

1. Galam wood and Kapur Naga wood. These two kinds of wood are usually used for the house foundation. The foundation is a vital part of a Bubungan Tinggi House. Bubungan Tinggi Houses are usually built in marshy and muddy areas, so the foundation must be strong and sturdy to avoid becoming rotten when it is buried in a marsh or in mud. Therefore, Galam or Kapur Naga wood is used. These two kinds of wood are unique. They can last for 70 years if buried in a marshy area, and 60 years in a dry area.
2. Ulin wood. This wood is known to be durable, water resistant, and heat resistant. Ulin wood is usually used for pillars, sticks, *gelagar* (bamboo split used as the base of a chair), pegs, floors, *watun barasuk*, doors and window frames, and roof rafters.
3. Lanan wood. This wood is usually used to build walls.
4. White resin wood. This wood is usually used for *gelagar*, *turustawing*, *balabat*, *titian tikus*, *bujuran sampaian*, and *riing*.
5. Metroxylonsagus leaves. They are used for the roof.
6. *Paring* (bamboo). This is used to build *palupuh halayung* walls and *hanau*. *Paring* is also used to build floors on *padus* or *pambayuans*.

Structure

The structure of a Bubungan Tinggi House consists entirely of wood. The geographical conditions lead to the adaptation to the swampy environment. Construction starts from the foundation and board installation, then up to the rafters. This forms a framework structure that is stable and rigid both vertically and laterally. The Bubungan Tinggi House is also a traditional and long-span building. A Bubungan Tinggi House should be able to remain stable on weak ground, with a different load on the front, middle and back of the house.

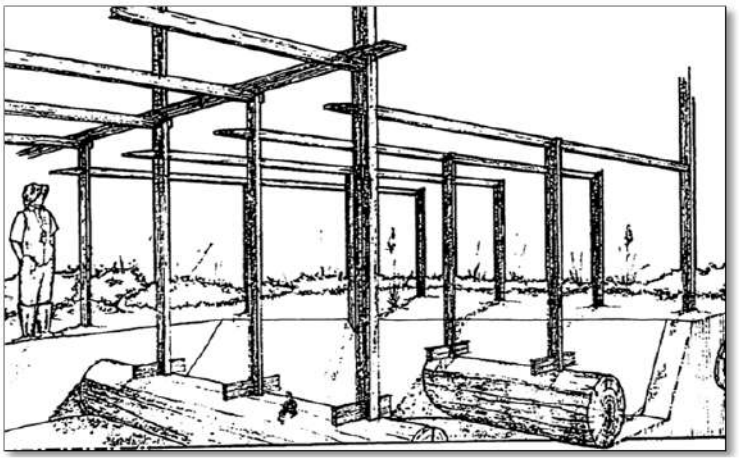
The high degree of difficulty and a good completion, utilizing the wisdom of local culture that is friendly to nature must have evolved long before the existence of the claim that the Bubungan Tinggi House was the residence of the Sultan. However, adaptation to the environment was carried out by local people with the presence of this Bubungan Tinggi House.

Foundation

The condition of wetlands or swamps in the coastal rivers caused a problem that required a solution: to make buildings stand up straight and rigid so that they can withstand the heavy loads imposed on buildings in wetlands, construction of the foundation is very important.

To distribute the weight of the building evenly, the foundation system used rods (logs). This foundation system using logs from a type of lime wood is placed as a cushion. The durability of the wood is certainly a consideration, naturally present in the preservation process of wood sunk into mud or a swamp. It has been proven that wood preserved in this way can last for hundreds of years. *Kacapuri* foundation was used to make the burden lighter in weight. This foundation system uses

smaller wood, generally Ulinwood or Galam wood, by doing preparation lengthwise and crossed the line of columns that will be installed.



Foundation system of a BubunganTinggi House

Anatomi Rumah Bubungan Tinggi

A *Kacapuri* foundation is also a foundation for building poles and sticks standing on it. Poles and sticks are installed to a depth of about 50 cm to increase the surface area of the poles resting on the foundation. Horizontal lateral rigidity has been created.

Poles and Stick

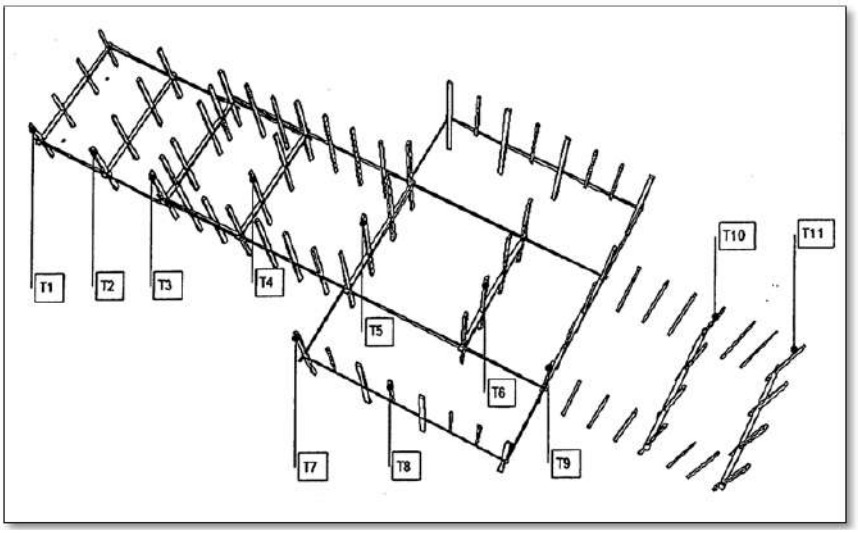
After installation of the foundation has been completed, the next process is the installation of poles and sticks. Poles and sticks are vertical structures that distribute the load from the roof to the foundation. The material usually used is Ulin wood, with a length of about 12 meters, a width of 20 cm, and a thickness of 20 cm. To build a Bubungan Tinggi House requires 60 poles. As for the sticks, the length of Ulin wood is about 5 meters with a thickness of 20 cm and a width of 20 cm. A Bubungan Tinggi house needs about 120 to 150 sticks.

Framework of a Bubungan Tinggi House

After installation of the poles and sticks has been completed, the next step is the framework of the Bubungan Tinggi House. The framework of a Banjar traditional house is quite unique because in addition to having a fairly elevated architecture, to measure the length and width, they use *depa* and feet lengths that fall on an odd number. The use of odd numbers is believed to have spiritual and sacred value. The parts of the framework are:

- Implant material, made of Ulin wood.
- Girders, made of Ulin wood, Belangiran, Resin White.
- Floorboards, made of Ulin 3 cm thick.
- Turus Tawing, made of wood resin.
- Watun Barasuk balokan, made of Ulin.
- Door and window frames, made of Ulin boards and beams.

- Bujuran Sampiran and curtains, made of Ulin or white damar wood.
- Balabad, made of white damar wood.
- Titian Tikus, made of white damar wood.
- Riing, made of wooden planks and white amber.
- Pole Orong-orong and noisy and Bones. The ridge is made of Ulin wood, lanan wood, and white damar wood.
- Rafters, made of Ulin wood or Resin White.



Pole Construction of a Bubungan Tinggi House

Anatomi Rumah Bubungan Tinggi

Construction of the center of a Bubungan Tinggi House can be classified into two activities: installation of the floor and installation of the walls. The floor usually rests on the main pillars, including floor beams into the holes in the main mast. Before the floor boards are installed, girder beams are mounted on the first floor beams. This is in addition to binding the main mast, and also ensuring a minimum width for the floor beams so that the floor does not flex. Once the floor beams and girder beams are installed, the next step is installation of the floor.

Boards used for flooring are made from Ulin wood, with a thickness of 2-3 cm. The installation includes two techniques, and the floor is fitted tightly and mounted between 0.25 cm and 0.50 cm. Most floors in the rooms in the Bubungan Tinggi House tightly fitted, except *Surambi Muka*, *Anjung Jurai Kiri*, *Pedapuran*, and *pelatar belakang*.

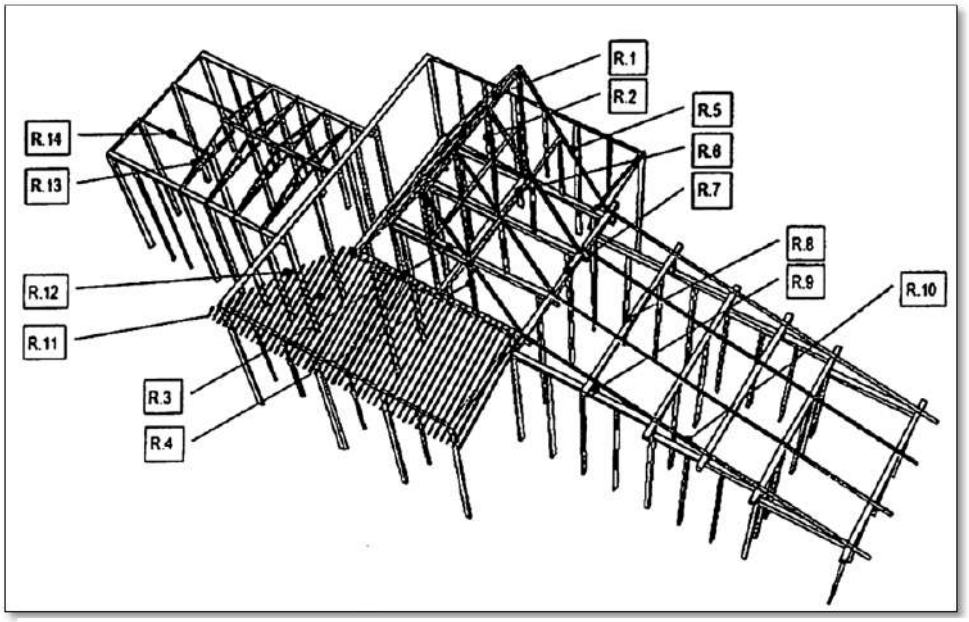
Building Cover

Once the floor is installed, we then proceed with installation of the building cover or walls of the Bubungan Tinggi House. The walls consist of boards that are placed in a standing position, so in addition to the pole, *Turus Tawing* and *Balabad* are necessary to assemble the boards. The material used in the wall is Ulinboard and *palupuh*. The side and rear, and the wall of the *Tawing Ḫalat* use

Ulinwood. In the *Anjung Kiwa, Anjung Kanan, Anjung Jurai* and *Ruang Padu*, *palupuh* is sometimes used as the walls of buildings.

Roof

After the floor and walls are installed, the next step is installation of the *hatap* (roof). The roof of a Bubungan Tinggi House actually consists of a number of different kinds of roofs. They are *atapbubungan* (this is the special character of the Bubungan Tinggi House), *atapsindanglangit* (the roof that extends from the foot of the *atapbubungan* to the courtyard), *ataphambinawan* (the roof that extends from the foot of the *atapbubungan* to the rear), and *atapanjung* (the roof that covers the *ajung* part).



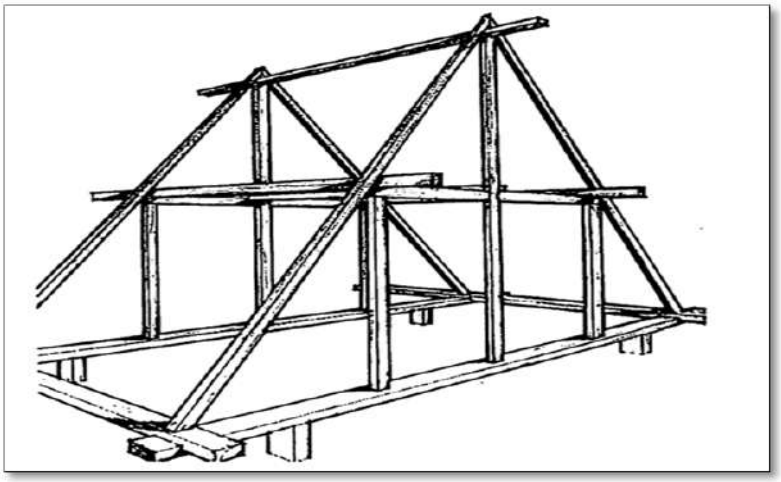
R1. Bubungan beam
R2. Orongorong pole
R3. Barrier beam of Peran beam
R4. Poles barries of Peran beam
R5. Easel of rafter
R6. Peran beam
R7. Kolang beam
R8. Gording beam
R9. Pedestal pole
R10. Rafter
R11. Rafter of Anjung
R12. Rafter of Anjung
R13. Easel wood of room
R14. Pedestal beam of *Padapuran room*

The *atapbubungan* form rises up high with a slant of 60°. This roof type is one of the differences between the Bubungan Tinggi House and other kinds of traditional houses in other areas. The material used to build the roof is *Metroxylon Sagus* leaves.

1. The first step in the process is construction of the roof frame.
2. Next is installation of the *kasau* and *usuk*.

3. Then, the *Metroxylon Sagus* leaves, which will be used as the roof, are arranged in layers and the midribs of the leaves are squeezed using a thumb-sized piece of bamboo.
4. Next, it is attached with rope, which is made from *Banban*.
5. After that, it is assembled. The assembly process starts from the bottom to the top, with the upper part of the leaves weighing down the lower part of the leaves underneath. Then it is tied together with *Banban* rope. This method ensures that the *Metroxylon Sagus* leaves will not be blown away easily by the wind and that the roof will not leak when the rain falls.
6. The next step is to place a weighted wooden assembly on the top of the *Metroxylon Sagus* leaves. On the top part (the peak), the weighted wood is made in the form of intersecting layers (*layang-layang*).

In the further development, use of *Metroxylon Sagus* leaves for house roofs is gradually decreasing. This is because *Metroxylon Sagus* roofs can very easily be blown away by the wind and Banjar society has become more aware that the environment where they live provides abundant Ulin wood, which has become the mainstay of Bubungan Tinggi House construction.

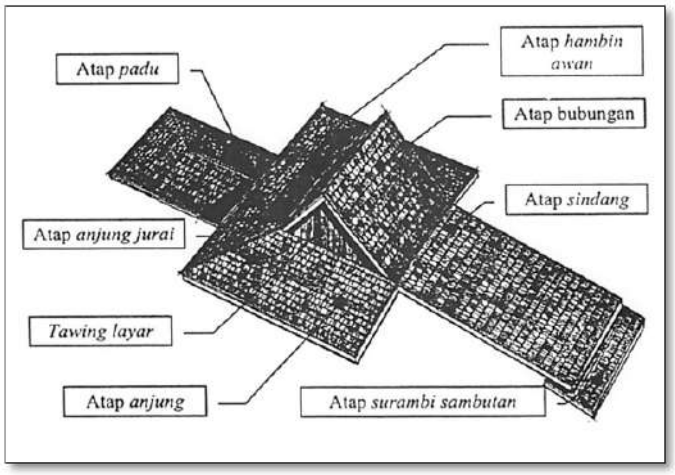


Easel Construction of a Bubungan Tinggi House

Anatomi Rumah Bubungan Tinggi

In addition, the changes are supported by an awareness to take advantage of the rest of the development of a Bubungan Tinggi House. The remaining Ulin wood is split into thin pieces so that it can function as a substitute for *Metroxylon Sagus* leaves. In other words, the creation of a Bubungan Tinggi House roof from Ulin wood is one of the proofs of Banjar society's wisdom. The process is:

1. The remaining Ulin wood from the house construction is collected and split into small parts.
2. Then, those parts are tied onto the roof frame with rope. The rope is then changed with nails.
3. After all parts are installed, the wood is placed on top of the roof and the peak in the form of intersecting layers (*layang-layang*). After Banjar society gained knowledge of nails, the wood was not used anymore for this purpose and the *layang-layang* form became just a decoration.



Parts of a BubunganTinggi House roof

Anatomi Rumah Bubungan Tinggi

Ornamental Patterns

At first, architecture was only for the basic necessities of life, and then architecture developed based on the philosophy of a community and differences with other communities. Differences can be present in the form of a building, carved patterns, and the status of a building. Embodiment of the present in the form of utilization of natural resources and, of course, symbols was presented in the form of buildings and the ornaments found on the Bubungan Tinggi House. As a traditional building, the Bubungan Tinggi House was built by exploiting natural resources, adaptation to the environment and becoming a symbol of natural forms. This was done as manifestation of gratitude to nature, with the form of the building or patterns in the building.

The ornamental patterns of a Bubungan Tinggi House are made by using the chisel method. There are three kinds of chisel methods used, *tatahsurut* (carvings in relief form), *tatahbabuku* (carvings in three dimensional form), and *tatahbaluang*or *bakurawang* (carvings which pierce through a wooden sheet). The ornamental patterns on a Bubungan Tinggi House can be generally classified into three types: plant, animal, and calligraphy. At the present time, carvings on a Bubungan Tinggi House are colored, and that reduces the authenticity of the cultural heritage.

Plant patterns

Chisel Plant Pattern combined with Calligraphy Pattern

The plant patterns used are considered not only for esthetic reasons but also in terms of utility. There are four forms of flora that are generally used, namely *sulur-suluran, kambangbarapun, kambangdalamjambangan,* and *kambangmalayap*. There are three forms of plants that are commonly used: fruits, flowers, and other special plants.

The fruit patterns feature fruits that are very important for society. They are starfruits, mango steen, *Morinda Citrifolia* (*mengkudu/pacekap*), and pineapple. The flower patterns used feature flowers that are available in the local environment, are beautiful, and also used in most customary ceremonies. They are gardenia, *Canangium Odoratum*, fern, rose, jasmine, lotus, and *Spomoca Pescprae*. The other special plants are various plants which grow in the local environment, can be processed into food, and can be used as medicines. Those special plants are *Ipornoea Reptans*, fungus, cloves, *Parkia Roxburghii*, bamboo bud/*Pucuk Rabung*, *Jaruju*, and betel vine.

Animal patterns

Animal patterns used in the architecture of a Banjar traditional house are the rooster (*Babulungan Hayam Jago*), Cacak bird, *Ophiocephalus Striatus*, centipede (*halilipan*), beetle (*Kumbang Begantung*), fowl (*I-itikan*), beehive (*wanyi*), hornbill, and dragon. In these patterns the animals that are featured in the carvings are not shown completely; just some particular parts of the animals. This relates to the society's belief that rendering of the form of complete animals is forbidden for religious reasons. Therefore, the animal patterns feature a complicated carving process of some small parts, so that the animals are only considered and seen symbolically.

Chisel Animal Pattern

Calligraphy patterns

These patterns started to be used since Islam became more established in Banjar society.

III. Values

A Bubungan Tinggi House is not only a place to shelter from the sun, rain, and wind, but it is also a masterpiece of human civilization, which is based on human wisdom. A Bubungan Tinggi House reflects the ability of humans to adapt to their environment, the local social system formed, and the beliefs and art expression of Banjar

Chisel Plant Pattern combined with Calligraphy Pattern

society, South Kalimantan.

a. Adaptation pattern

The Bubungan Tinggi House is the adaptation of local society toward the swampy environmental conditions. The *Kalang Pandal* and *Dua Lapis* foundations that use Galam and Kapur Naga wood show clearly the local wisdom and knowledge of Banjar society in facing these natural conditions. Although the ground upon which a Bubungan Tinggi House is built is weak, the house can be built to be sturdy and durable by using appropriate architecture and choosing appropriate materials.

The ability of local society to adapt to the climate can be seen in the building of the front yard. The existence of the front yard is Banjar society's way to solve the problem of insufficient land to conduct social activities. The use of Ulin wood as the frame, floor, and wall of the house is also another indication of Banjar society's ability to adapt. By using Ulin wood, Bubungan Tinggi House construction can last for 60 years. The society's ability to adapt can also be seen in the roof form which rises up to an extreme 60° slant. By doing this, although they just use *Metroxylon Sagus* leaves or Ulin wood slices as the roof, a Bubungan Tinggi House will not leak in the rainy season.

b. Social system

The Bubungan Tinggi House is a portrait of Banjarmasin society's social system. When the Banjar Kingdom still existed, the Bubungan Tinggi House was the residence of Kings and aristocrats, and after the destruction of the Banjar Kingdom, Bubungan Tinggi Houses were possessed only by people who were fairly wealthy. This means the Bubungan Tinggi House is a reflection of social stratification in society. This social stratification is also shown by the variety seen inside a Bubungan Tinggi House. A Bubungan Tinggi House also shows social ethnics. It can be seen in the division of rooms, which created the concept of public and private rooms. The social system in a Bubungan Tinggi House can actually also be seen from the beginning of the construction of the house, that is, in the discussion stage. This stage is not only to formally ask society's opinion about matters that are connected to the house construction but also relates to customs and politeness. People who build a house without having a discussion are considered to be bad-mannered and impolite.

c. Expression of belief and hope

The Bubungan Tinggi House is also the expression of the belief and hopes of Banjarmasin society. The use of *depa* to construct houses, and animals to determine the width of the building shows that the building of a Bubungan Tinggi House has a sacred element. The use of expert labor, not only for the technical construction work but also non-technical work, proves that a Bubungan Tinggi House exists in both a profound and sacred dimension.

The Bubungan Tinggi House also acts as society's expression of hope. This hope can be seen in the use and the placement of decorations, which are in the form of plants, animals, and calligraphy. The use of mangosteen in *Sungkul Tangga* is aimed at making the people who live inside a Bubungan Tinggi House become hard workers, as there is a need to work hard to eat the mangosteen.

The use of Arabic calligraphy decorations is not only for esthetic reasons but also related to the hope of having the house avoid dangers and disasters. If the research continues, we will certainly obtain more knowledge. In this way, society will have an abundance of wisdom to face the conditions of the place where they live. What is needed now is to explore those values and apply them to the present.

IV. Conclusions and recommendations

IV.1. Conclusions

The Banjar traditional house at first symbolized the social status of the people who lived in it. An old proverb says that a high ridge house is a place of kings. This shows that the Bubungan Tinggi House was actually meant for the upper class at that time. After the fall of the Kesultanan Banjar in 1860, there was a great social shift in people's lives. The position of the tribal kings was taken by merchants who experienced economic progress. They were the merchants who traded goods within the country and even abroad. They then made the Bubungan Tinggi House a symbol of their success. Motifs which originally featured the Hindu Buddha were then replaced by carved motifs of plants that had a strong influence in Islamic teachings.

The context of the many rivers and swampy areas were addressed by the wisdom of the community in finding suitable building materials and the capability to respond to environmental influences. In addition, its relationship with time in the present context is related to the disappearance of the traditional Bubungan Tinggi house, because it is now considered irrelevant to social development in society. In addition, in terms of the social self, the community already knows no social stratification so there is no need to make the house a means of attaining high status or as a symbol of success.

IV.2. Recommendations

The Bubungan Tinggi House at Teluk Selong is now 143 years old and the culture has developed in that time. Surely it would be the addition of a decorative ornament, such as adding coloring to ornaments. In the not-too-distant future, people will recognize that these ornaments are already like that, and finally the authenticity of cultural heritage will slowly disappear.

Giving explanations to the local community is absolutely necessary, and explaining the origin of cultural heritage values is very important for the future of cultural heritage. The next step is to conduct a complete drawing of the Bubungan Tinggi House. The images were not just two dimensional images, but included three dimensional images with close attention to detail. The results from this description is recorded in visual and audiovisual form, and presented to the public as a form of learning about local wisdom at the time.

Traditional architecture places a high value on local wisdom, and this, of course, is required to be considered in conservation. Today it is very difficult to find high quality timber, and it remains a possibility that cultural heritage will become extinct if there is no conservation of wood. Conservation of wood can be achieved by providing dedicated land for conservation that can be used in the future.

IV. Final Reports by Participants

Muhammad Tang

Final Report: Training Course on Cultural Heritage Protection in Asia Pacific Region 2012 (Individual Course)

Overview

The training program was conducted by the Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU Nara Office) and is a regular activity in order to develop knowledge on the protection of cultural heritage in the Asia-Pacific region, especially in Indonesia. ACCU Nara Office was established in 1998 to promote the interests of the protection of cultural heritage in the Asia-Pacific region.

The individual course lasted for 31 days, from June 12, 2012 to July 12, 2012. The main theme was the preservation of wooden buildings, because, as is well known, Japan is a country that preserves old wooden buildings for hundreds of years. In addition to the main wooden buildings of a site, surrounding buildings also play an integral role, as it is important to maintain the harmony of nature, people and buildings.

The types of activities undertaken during the individual course included on-site lectures at a number of sites that have received local, national and World Heritage protection. Locations visited, among others, were Historic Monuments of Ancient Nara World Heritage Site, Imai-cho Kashihara City townscape preservation, Himeji Castle, Tanaka Family Residence, Yakushi-ji and Toshodai-ji Temple, Asuka Historical Museum and Tanzan-jinja Shrine, the Japanese Carpentry Tools Museum, Horyu-ji Temple, and the Historic Monuments of Ancient Kyoto. Lecture topics included “Risk Management of Cultural Heritage in Hyogo Prefecture.”

In addition to the on-site lectures, some of class lectures presented were: Japanese Heritage Buildings, System of Preservation Districts for Groups of Traditional Buildings, Conservation and Management of Cultural Landscapes, Documentation and Restoration Plans of Wooden Structures, Photograph Data Management, Disaster Risk Management of Cultural Heritage - Based on the Experience of the Great Hanshin Earthquake, Kobe, Dendrochronology, Deterioration of Wood Characteristics, Management of Historic Heritage Townscapes and How Archaeology Survived the Tsunami.

Nara as a Cultural Properties City

The presence of wooden buildings in Japan that can last a long time, even hundreds of years, should be a model for preservation. The Horyu-ji Temple, for example, is the world's oldest wooden building, originally built in the 7th century AD, in the Suiko period (606 CE). Although it once burned down, in the Tenchi period (670), and the only structure left standing was the five-story pagoda, it was rebuilt in the Nara-Heian-Kamakura period. Nara was the capital of Japan from 710 to 784, after which the capital moved to Kyoto. Although its time as the capital of Japan did not last long, Nara left behind many temples and shrines.

Not surprisingly, Nara can be called the cultural heritage city of Japan. Various temple buildings and shrines can be found there. These buildings are mainly made from wood, except for the foundations (stone) and roof tiles (*kawara*). Some buildings still exist that use different materials for the roof, such as bark (*hiwadabuki*), small boards (*itabuki*), and a type of grass (*kusabuki* and *kayabuki*).

Various historical buildings can be found in Nara. For example, Todai-ji Temple, the Great Buddha Hall, is the largest wooden building in the world, and contains a huge statue of Buddha. There are other notable buildings as well, such as Kofuku-ji Temple, Gango-ji Temple, and Kasuga Taisha Shrine. Then in several separate places can also be found Yakushi-ji Temple, Toshodai-ji Temple, Horyu-ji Temple, Hoki-ji Temple, and Nara Palace Site which is the former palace of the Nara period.

Protection system for cultural heritage buildings in Japan

In Japan there are various types of cultural properties, namely:

- Tangible cultural properties
- Intangible cultural properties
- Folk cultural properties
- Monument cultural properties
- Cultural landscapes
- Groups of traditional buildings

The protection of cultural properties is divided into several categories:

- UNESCO World Heritage
- National Treasure
- Province or Prefecture

- City or Municipality

The historical development of Japanese architecture can be traced as follows:

- 6th century, marked by the entry of Buddhism into Japan and the introduction of new building techniques.
- 7-8th centuries, many villages are built with a surrounding moat.
- 9th century, discontinued Chinese building techniques.
- 12th century, adoption of new techniques such as as *Daibutsu-yo* and *Zenshu-yo*. *Daibutsu-yo* was a construction technique for large statues, adopted from southern China. Zen is one of the streams of Buddhism in Japan with influence from northern China. *Zenshu-yo* was a technique used for Zen temples. This 12th century architectural revival showed Japan's momentum as a nation, evidenced by the large number of buildings that appeared in this period.
- 17th century, Japan shuts itself off from the outside world.
- 18th century, the emergence of new techniques adopted from the West. This century also marked the death of Tokugawa and the start of the Meiji period. The Meiji period was Japan's "golden age."

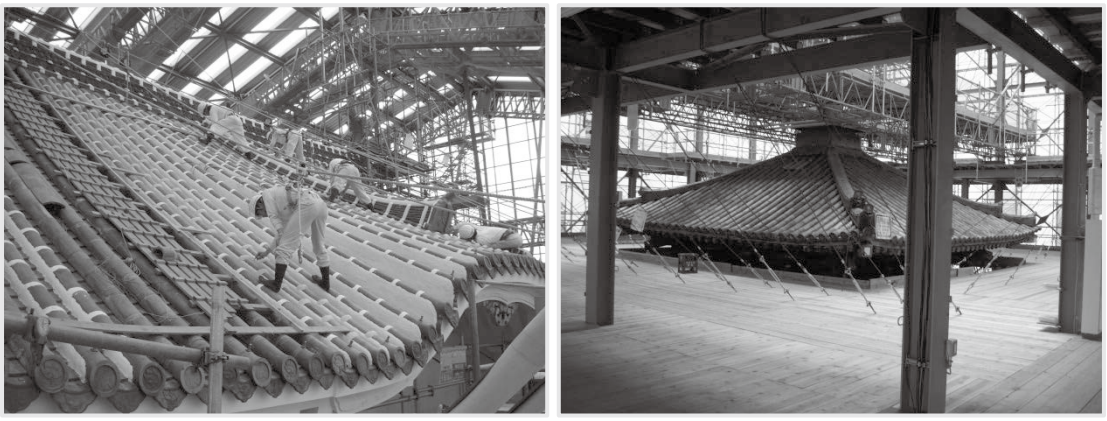
Building Restoration in Japan

The restoration of wooden buildings in Japan actually begins at the time of construction, because the old buildings are usually designed to be maintained even after entering the next historical period. This is a major feature of *ji* (Buddhist temples), in contrast to the building style used for *jinja* (Shinto shrines), which are always renewed every 20 years.

There are two types of restoration undertaken in Japan, namely:

a. Total restoration. With total restoration, the aim is to totally dismantle the building to examine the parts that are damaged and need replacing. Examples of this method can be seen at Himeji Castle, Yakushi-ji Temple and Kiyomizu-dera Temple.

   Refurbishment of the main building at Himeji Castle began in 2009 and is planned for completion by 2015. The main target is actually replacement of an earthen wall, but parts that contain damaged wood are also being replaced. The roof tiles are also undergoing retrofitting with glue mixed with a paint that will eventually blend in with the color of the tiles. One of the interesting things with the refurbishment of the main building is that visitors to Himeji Castle can see the restoration work being carried out up close. Thus, this restoration work is an attraction in its own right.



Himeji-jo Castle and Yakushi-ji Temple

At Yakushi-ji Temple, there is a temporary building in the process of being restored that is, the East Pagoda. The East Pagoda was founded in 730 and is the only original building that remains today. Restoration of the East Pagoda began in July 2009, and is planned for completion in December 2018.

While at Kiyomizu-dera Temple complex, Asakura-do buildings are in the process of being restored, planned for completion in about four years. Asakura-do was built between 1504 and 1520 and burned down in 1629. Restoration work was undertaken from 1939 to 1941, but only for a small part of the complex. The building has now been totally demolished except for a pole and the floor beams. Only one pole has been replaced because there is a big hole in the center about two meters from the foundation.

b. Partial restoration. The intention with partial restoration is to dismantle the building without replacing parts that are considered damaged. The case here is one of the buildings in the Horyu-ji Temple complex. The restored building was moved intact to one side because the floor will be strengthened with concrete and stone. The concrete floor of the building is located on a hill slope and there is the fear that restoration work may affect the structure of the soil under the building. Once the building is moved, a check is done to see which parts are damaged, which are then removed and taken to the office for measuring and subsequent replacement in the same size as the originals.

   Another example of this is the restoration of some buildings at Shōsō-in, which is a storage warehouse property from the Nara period. Shōsō-in is located behind Todai-ji Temple in Nara, and was built in 761 AD. The last known restoration was in 1913, about 99 years ago, when a total renovation was done, including the provision of reinforcement measures in the form of a ring of iron poles and concrete floors. The refurbishment in 1913 lasted only nine months. This time, restoration is being undertaken for the replacement of the roof only and is planned for three years starting in September 2011.

Awareness of the importance of maintaining wooden buildings in Japan can be seen in the way temple pillars and shrines are still able to survive until the present. Almost every building mentioned above still maintains the original poles, which have been improved. At the bottom of poles in direct contact with pedestals, for example, the original pole can usually be seen, along with sections replaced by new wood (left photograph). The pole replacement process also demonstrates the rules for restoration today, that is, still use the same material, the same size and similar technology. Although in ancient times there were changes in the governing authority buildings that were abandoned were not necessarily destroyed, but rather maintained. Although nothing in the building has changed, there is usually only addition to the building to show the characteristics of the rulers at the time.

In other cases, such as the reconstruction of a building that had burned down at Kofuku-ji Temple, a search for information about the building was done. The old documents still in existence were used as a reference, and the buildings around it were also used as a comparison. Wood samples that may have been used in the building were found during excavations. Sample timber was used as a reference to compare it with the surrounding buildings. The old documents also clarified the size, image and form of the building.

At the start of the reconstruction work, the building foundation of *chukondo*, was in pristine position. This development will take about eight years and is scheduled for completion in October 2018. The foundation around the building is also visible in some of the foundations that have been cast in concrete and may not be rebuilt unless there are available funds for it. Retrofitting of the concrete foundation stones did not follow their initial form. In the past, the foundation stone was surrounded by soil or rock, only to keep the foundation stone in place. However, the land could then be eroded in the rainy season. If stone is used, it costs more than using concrete. Thus, the construction of this foundation is very flexible in terms of materials used, though it is preferable to use the original materials, such as poles made of Hinoki wood.

It is interesting, actually, that the construction or restoration of a building in Japan takes such a long time. The question is, why should refurbishment always take place, although in some parts the original wood material can still be used (in some places, *jinja* buildings should be restored every 20 years)? Each restoration is usually done by a few people to dozens of people, ranging from the most skilled artisans to people entirely new to the field of restoration, especially wood working. It turns out that during the refurbishment, a transfer of knowledge occurs from the skilled to the new craftsman.

Thus, the regeneration of restoration expertise is never interrupted. There is therefore a hereditary legacy of expertise in the field of carpentry and the use of tools.

The outboard or camouflage with sawdust on the wood is damaged, and is now no longer made in Japan. Instead, the damaged parts were replaced with similar wooden slabs. Camouflage techniques with wood powder have a weakness in terms of color. Although at the beginning it is the same color, the color fades over time and is not artistic.

Camouflage techniques using sawdust and wood

Practical Training

In the individual course, participants practiced the photographic recording of wood. This practice was done at the Tanaka Family Residence, estimated to be the oldest house in Japan, dating from the 18th-19th centuries AD. The Tanaka Family Residence was originally located in Horen-cho, Nara City, about 700 meters from Nara station. The house was dismantled in 1982 and stored in warehouses, and in 1990 moved to its current location. Restoration of this house has been done several times but only certain parts have been repaired. In 1996, the roofs made of *kayabuki* were replaced. Later, in 2009, the replacement of certain parts was carried out. In 2009 and 2010, parts of thatched roofs were replaced and the framework was partially repaired. In March 2012, improvements of roofs and partial repair were made to maintain this traditional home.

Practice in recording measurements of the details of the building and the wood craftsmanship took precedence, in order to make the floor plan and cross-section. In addition, identification of the type of technology used for construction of the timber was carried out. The most practical way is to use tracing paper. This paper was stuck to the block of wood and then polished using carbon paper. When finished it detected traces of the woodwork to indicate which type of instrument was used, both traditional tools and modern equipment. By knowing the kind of tools that have been used, any replacement work will have to also use the same such tools. Another practice was to identify the type of wood found in the Tanaka house.

In general, the types of wood used as building materials in the Tanaka Family Residence are as follows:

a. *Hinoki* (cypress) with the following characteristics: the surface is harder and slippery, and tree-rings are not visible or very subtle. *Hinoki* is a common high quality, durable wood in Japan, so it is used mostly used for poles. It can last up to hundreds of years.
b. *Matsu* (pine) has the following characteristics: tree-rings clearer, and the wood is usually straight and not as hard as *hinoki. Matsu* is the type of wood usually used as the main beam or cantilever. Another characteristic is that it has the most eyes (knots).
c. *Sugi* (*cedar*) characteristics include more subtle tree-rings than *matsu* and softer surfaces. Tree-rings are almost the same size.
d. *Tsuga*, of which only a few examples were found in the Tanaka house. A *tsuga* wood pole is located near the *doma*.

Another practice that was done at Tanaka house was **photography**. The purpose of this practice was to obtain cultural heritage data in the form of photography, especially where the data may not last long. The three main aspects of capturing images of a particular object of cultural heritage are:

a. Aperture (represented by an f-number) or the diaphragm is the aperture through which the camera receives light. The standard f-number scale on a camera is 2.8 - 4 - 5.6 - 8 - 11 - 16 - 22 - 32 - 45 - 64. The smaller the f-number (e.g. 5.6), the greater the exposure to light, and the effect is that the focus gets smaller as well. Conversely, if the f-number is a larger number (e.g. 64), then the less the incoming light and the effect is a greater or broader focus.
b. Shutter speed (s) or exposure time is the length of time a camera's shutter is open. The scale typically is: 1 - 2 - 4 - 8 - 15 - 30 - 60 - 125 - 250. In other words, 1 indicates that the shutter is open for 1 second, 2 for ½ second, 4 for ¼ second, 8 for ⅛ second, and so on. The smaller the number (e.g. 1, or 1 second), the more light that is allowed into the camera when taking a picture. Conversely, the greater the number (250 or 1/250 of a second), the less light is allowed into the camera.

   Basic principles:

   - In the case of moving objects such as trains, the shutter speed (s) is determined in advance, then we need to determine the aperture (f).
   - In the case of immobile objects, f is determined first, then s.

c. ISO (ASA) is a film speed system that indicates a film's sensitivity to light. The scale used is typically: 25 - 50 - 100 - 200 - 400 - 800 - 1600 - 3200 - 6400. The bigger the number, the greater the film's sensitivity to light.

   Case in point:

   From the measurement taken by an exposure meter we have obtained the numbers *f*/11, 2 s and ISO 100. But 2 seconds is too long, in case the object moves, and should be changed to ½ second by raising the ISO to 400.

Disaster Risk Management

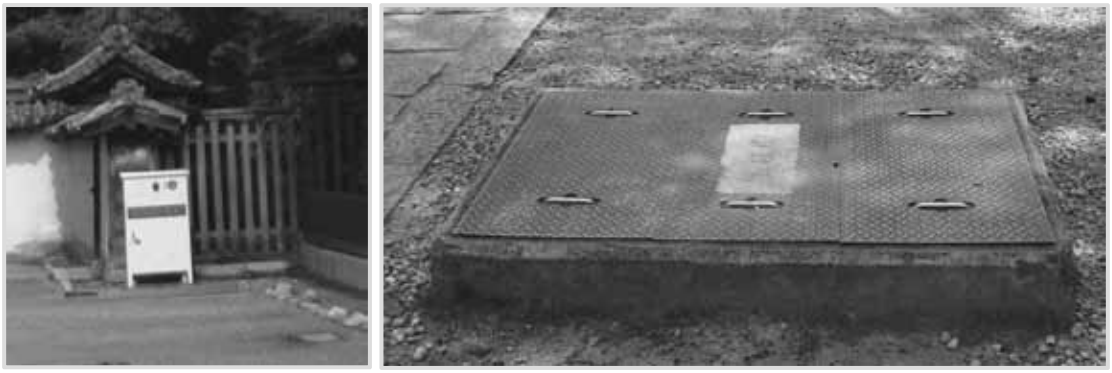
The Hanshin-Awaji earthquake in Kobe on January 17, 1995 is one of many natural disasters that have taken human lives. In addition to human casualties, many public facilities and a large amount of housing were also destroyed. This includes a number of the historic buildings that can be found in Kobe City. With wide experience of the natural disasters that frequently hit Japan, the Japanese government anticipates the possibility of similar damage in the future.

A form of retrofitting of the historic buildings that can be seen in Kobe is the installation of a steel frame in the Weathercock House. A steel frame is mounted under the roof to protect the wooden posts using the brick structure. And because it uses a brick structure, wire is attached to the wooden posts and bricks. The function of this wire is to bind the bricks together. So the bricks are tied to the bars one by one wire.

In other cases, there is a wooden building in Kobe where the manufacture of Japanese sake takes place. The building was destroyed during the earthquake. At the time of reconstruction, anti-seismic equipment was installed, located at the bottom of the building. The equipment has undergone trial simulations to measure its strength and resilience during an earthquake. At the Nara Palace site, which has been rebuilt, there is also a system like this. The Nara Palace site was rebuilt to withstand the intensity of a maximum-sized earthquake. At the bottom of this building can be seen anti-seismic devices so that if an earthquake hits, the building may move in the direction of the motion of the earthquake and then return to its original position.

What to do in the case of a fire? It is well known that Japanese cultural heritage buildings, especially in Nara, are mostly wooden structures. To anticipate the case of a fire, in certain places around the wooden building are installed fire hydrants. Of course, portable fire extinguishers are also provided, and are usually placed at the corners of buildings. The fire hydrants are very visible in terms of both position and color, and some are disguised so as not to indicate that they are fire-fighting equipment.

Examples of such cases are Horyu-ji Temple, Imai-cho in Kashihara City and Todai-ji Temple. The firefighting equipment at Horyu-ji temple is installed near buildings in a rectangular box-shaped stand, and is indicated by a colored white and red strip. Although white is used as the color of the walls of nearby buildings, the equipment is visible when seen from afar. Likewise, at Imai-cho and Todai-ji, the fire-fighting equipment is camouflaged or harmonized with the surrounding buildings so that it does not stand out. In the traditional village, Imai-cho, portable extinguishers are colored red with a lid with wooden bars of dark brown so they blend in and harmonize with the color of the houses. At Todai-ji temple, on the other hand, fire-fighting equipment, such as the square-shaped hydrants at Horyu-ji, is placed in the ground in a transverse position and covered with iron plates.



Fire extinguishers in Horyu-ji and Todai-ji Temple

The difference in the appearance of the fire extinguishers at both Horyu-ji and Todai-ji is an interesting case. Should the location of such devices be disclosed to the public so that in case of fire, the people who are around a device can directly see it and use it without waiting for an official in the building? Or should the devices be camouflaged and aligned with the ancient buildings around them, and if there is a fire then only an official in the building who knows the position of such fire-fighting equipment can use it?

Dendrochronology

Dendrochronology is the study of the age of wood, both newly harvested wood and wood that has long been buried in the ground. The science of dendrochronology itself is divided again into dendroarchaeology, dendroclimatology, dendrohydrology, dendrogeomorphology, dendroecology and dendrochemistry. Knowledge of the science does not seem to exist in Indonesia.

This science was first developed by Andrew Elliot Douglass (1867 - 1962), and promoted by the University of Arizona, USA, in the LTRR laboratory. Andrew E. Douglass at that time used a tool called an increment borer to tell the age of a tree by drilling it in a certain way. He was actually an astronomer who studied sunspot activity, which is associated with the growth of timber.

At present, with more modern technology, the equipment used is also more modern. Only with analysis and a computerized system can data can be seen on the growth of trees. Calculation of the age of wood can be determined by looking at the tree rings that grow each year. The growing cycle of wood in Japan begins in April in the spring and stops in the winter. Already, there are patterns of timber growth in Japan that are used as the index of tree-ring if you want to know the age of wood.

Prita Wikantyasning

An Overview of Preservation Activities within World Heritage Sites, National Treasures, and Important Cultural Properties in Nara, Kyoto, and Kobe City

Cultural heritage is our legacy from the past, what we live with today, and what we pass on to future generations. It consists of irreplaceable sources of life and inspiration. Places as unique and diverse as Borobudur in Indonesia, and the Historic Monuments of Ancient Nara[1] in Japan, make up our world's heritage. World Heritage sites, possessing universal values, belong to all the peoples of the world, irrespective of the territory in which they are located.

Cultural properties are part of a country's cultural heritage. In Japan, only Important Cultural Properties that have been registered can become National Treasures if they have unique value, nurture Japanese pride and represent an important part of the history of the Japanese people.

As a country which has several UNESCO World Heritage Sites, Japan takes measures to ensure the protection, conservation, and presentation of its National Treasures. These measures are:

1. To adopt a general policy which aims to give the cultural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning.
2. To set up services within Japan's territories for the protection, conservation, and presentation of cultural heritage with appropriate staff
3. To undertake scientific and technical studies and research and to develop operating methods in order to make the State capable of counteracting any dangers that threaten its cultural heritage.
4. To take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage.

[1] "Historic Monuments of Ancient Nara" consists of the eight properties that represent the historic city of Nara and which are included in the the List as a single property of cultural heritage, not as an individual entity.

- Properties that have buildings designated as National Treasures, the surrounding areas of which are designated as Historic Sites (Todai-ji Temple, Kofuku-ji Temple, Kasuga-Taisha Shrine, Gango-ji Temple, Yakushi-ji Temple, and Toshodai-ji Temple)
- Properties designated as Special Historic Sites or Special Natural Monuments (the Nara Palace Site and the Kasugayama Primeval Forest)

The Outstanding Universal Value criteria are (ii), (iii), (iv), and (vi)

5. To foster the establishment or development of national or regional centres for training in the protection, conservation, and preservation of the cultural heritage and to encourage scientific research in this field [2].

Apart from World Heritage sites, National Treasures, and Important Cultural Properties, Japan also has Cultural Landscapes (where tangible and intangible cultural properties merge), and also Groups of Traditional Buildings, which have to be preserved. The preservation steps are adopted from the UNESCO convention and many other conventions that Japan has ratified. Every country is unique, and so Japan develops rules or regulations[3] that are more suited to its environment, geographical location and communities.

Japan has developed a protection system for built heritage in the country. The main principles are:

1. To ensure permanent protection through rigid control and full official support → for Important Cultural Properties. It started from the Meiji Era.
2. To ensure the "conservation in use" of many and various cultural properties by more relaxed control, and by promoting the population's involvement → for Registered Tangible Cultural Properties
3. To ensure the conservation of various types of historic human settlements (e.g. villages, towns) and related landscapes, while respecting the municipality's autonomy, and in close cooperation with urban planning principles. → for Groups of Traditional Buildings

For many Cultural Properties in Japan, wooden structures play a major role, often as the main building. To preserve wooden structures, Japan has to develop various techniques to maintain their condition. The techniques are:

1. Placing equipment or devices within the structure to prevent damage from disasters, such as: fire prevention equipment (fire alarms, fire hydrants, etc), earthquake isolation devices.
2. Restoration activity, such as: full or half replacement of materials, and also exchanging materials with materials in other places in the structure (depending on the value of the materials and the restoration budget).

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[2] Quote from the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972, with several alterations.

[3] Quote from a brochure on World Heritage Historic Monuments of Ancient Nara:

- In 1897, the Ancient Shrines and Temples Preservation Law
- In 1919, Law for Preservation of Historic Sites, Places of Scenic Beauty and Natural Monuments
- In 1929, the National Treasures Preservations Law
- In 1950, Law for the Protection of Cultural Properties
- In 1950, Law Concerning the Development of Nara as an Internationally Oriented Cultural Tourism City
- In 1966, the Ancient Capitals Preservation Law

In many cases, restoration activities involve several measures that include the input of experts and also large budgets for repairing structures or whole buildings. But the most important thing that has to be done is to draw up a fixed restoration plan for calculating budgets and creating time schedules. By participating in this Training Course with ACCU Nara, we learned how to create good plans for restoration and how the Japanese preserve their cultural properties.

Before we created a restoration plan, the first thing that had to be done is to make a detailed drawing and measurements, and also identify the material of the structures or building. The aim of this activities was to learn how to make a detailed plan for restoration. For practice, we drew a small traditional Japanese farmhouse, the Tanaka Farmhouse. We didn't just create a drawing; we also learned how to identify the material the building was made of and what tools had been used to construct the building by observing and rubbing the surface of the material.

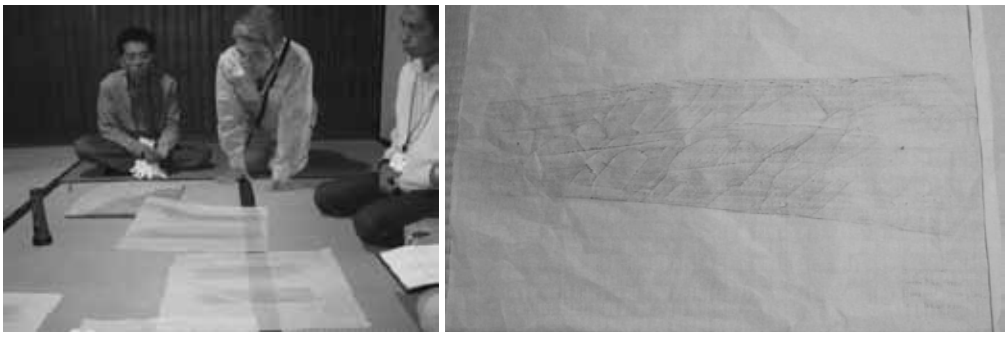


Figure 1. Left: Learning how to identify what tools had been used by rubbing the surface of the material with thin paper; Right: The result of rubbing on a wooden surface

Even the best drawing cannot be perfect without clear and detailed photographs. There are many techniques in cultural heritage or archaeological photography. The important thing to remember is we have to make our photos understandable and look real. So it is not recommend to use a compact camera for taking photos of cultural heritage objects, because of the inadequacies of this kind of camera. When using a view camera or a Digital Single Lens Reflex (D-SLR) camera, it is recommended to use a tripod. We also need an extra flash if we are taking photographs indoors.

In the preservation of a landscape or townscape, we have to consider the community's opinions, in order to create a good plan for goverment development programs. In Imai-cho in Kashihara City, the local government suggests that the local inhabitants use traditional architecture for building their houses. The local government also contributes with a restoration budget for traditional houses. Any modern devices (such as fireextinguishers , air conditioners, etc.) have to be camouflaged to hamonize with the surrounding areas, or hidden from view. To promote tourism and to raise awereness of the importance of cultural heritage preservation within Imai-cho, the local goverment encourages and supports a local community movement (NPO) to create programs such as homestays, light candles, etc.

Figure 2. Fire extinguisher hidden from view in Imai-cho village

In a larger building preservation (restoration), we also have to consider the following:

- Width of the protected area.
- Which parts of the structures or buildings are going to be restored? And how large?
- What kind of structures or buildings are going to be restored? Is it a public area or not?
- Materials in the old buildings and research to find substitute material if necessary.
- Presence of visitors.

  We can turn the presence visitors into a benefit for the restoration process as they are doing at Himeji Castle. At Himeji-jo Castle, visitors can see through the glass covered walls and observe the actual restoration work taking place.
- Safety of the workers.

  Workers should wear helmets, overalls, safety goggles, string and body straps, and gloves to prevent accidents.
- Safety of the structures or buildings.

  The manager of the restoration should prepare the lighting equipment, adjustment rings, fire hydrants, fire extinguishers, etc.

Then, we can start to plan a structure or building renovation.

Figure 3. Left: Himeji-jo Castle restoration; Right: Research to find suitable roof plaster

Cultural heritage properties are also susceptible to decay and destruction because of aging and disasters. For that reasons we have to consider conservation techniques that are suitable for the particular cultural heritage and review what kind of disaster might usually strike the cultural heritage in that particular area. To protect the integrity of the cultural heritage, we have to create a rescue plan to save the cultural heritage, which must involve experts from outside the area of the disaster, local government, and also persons in charge from the disaster area (if any). The rescue team must work fast to save the cultural property from decaying. But we must remember that human life is more important. So we have to rebuild the cultural heritage building with extra protection and special consideration for human safety.

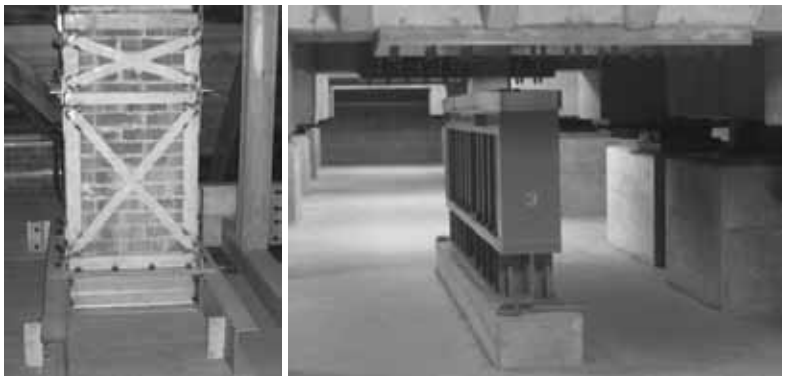


Figure 4 Left. Chimney bracket to prevent it from falling in a European style house; Right: An earthquake prevention device under the Heijo Palace building

The Japanese realize that all cultural heritage properties in Japan are made from wood. Therefore, besides engineers (architects), master carpenters also play an important role in Japanese cultural heritage restoration. The master carpenter's main job is to organize the entire restoration process, such as analyzing the degree of damage, calculating the budget, acting as head of all the workers, and judging which tools he wants to use for the restoration. Even though machine tools are widely used today for cutting and processing the wood, in some cases, the master carpenter (or restoration manager) only wants to use the traditional way to restore the building (such as with Tanzan-jinja Shrine). The main difficulty in all restorations in Japan is to obtain the same materials as in the original structure.

The replacement cycle of wood is also important. The master carpenter also has to consider what kind of trees and wood should be used, its place or position in the structures or buildings, and also the type of roof and roofing materials required. Sometimes they have to put old materials, which are often still in good condition, in other places in the building to maintain its value. Remember, all the temples that have to be restored are UNESCO World Heritage Sites. So they have to follow the World Heritage Convention.

Because wood is the main material of cultural heritage buildings in Japan, dendrochronology is an important science for preservation of cultural properties. We can deduce the age of the wood and identify the degree of damage to the wooden structure or building by using dendrochronology science. Unfortunately, in Indonesia, dendrochronology is difficult to be utilize because this kind of science only can indentify wood from countries with four seasons. So, for a tropical country like Indonesia, we have to use carbon dating (C^{14}) to identify the age of the wood. It is also expensive (around 17.000 yen for one wood sample).

Comparison with Indonesia

As country with a number of UNESCO World Cultural Heritage and Cultural Heritage properties, Indonesia also has to follow the World Heritage Convention regarding its world heritage and Law Number 11 Year 2010 regarding its cultural heritage. Although the main material of UNESCO World Cultural Heritage properties in Indonesia is not wood, wooden structures or buildings do play an important role in the traditional life of the Indonesian people. Most traditional houses in Indonesia are made from wood. But not many buildings survive, due to damage from fire, climate and humidity, as well as termites. So we have to develop cultural heritage wooden material research to preserve all of the buildings.

One thing we have to remember is that Indonesia has proposed six properties on a UNESCO World Heritage Tentative List, which includes the Toraja Traditional Settlements, and Bawomataluo Traditional Settlements. This tentative list comprises traditional houses which are made from wood, and other objects, so we have to pay attention to wooden material science research for cultural properties.

Sharing knowledge and information about wooden material technology is also useful for attaining our goal of preservation of cultural heritage. Therefore, further cooperation with other countries such as Japan, which has wood technology and expertise in specific sciences for cultural properties preservation, may come to benefit both countries.

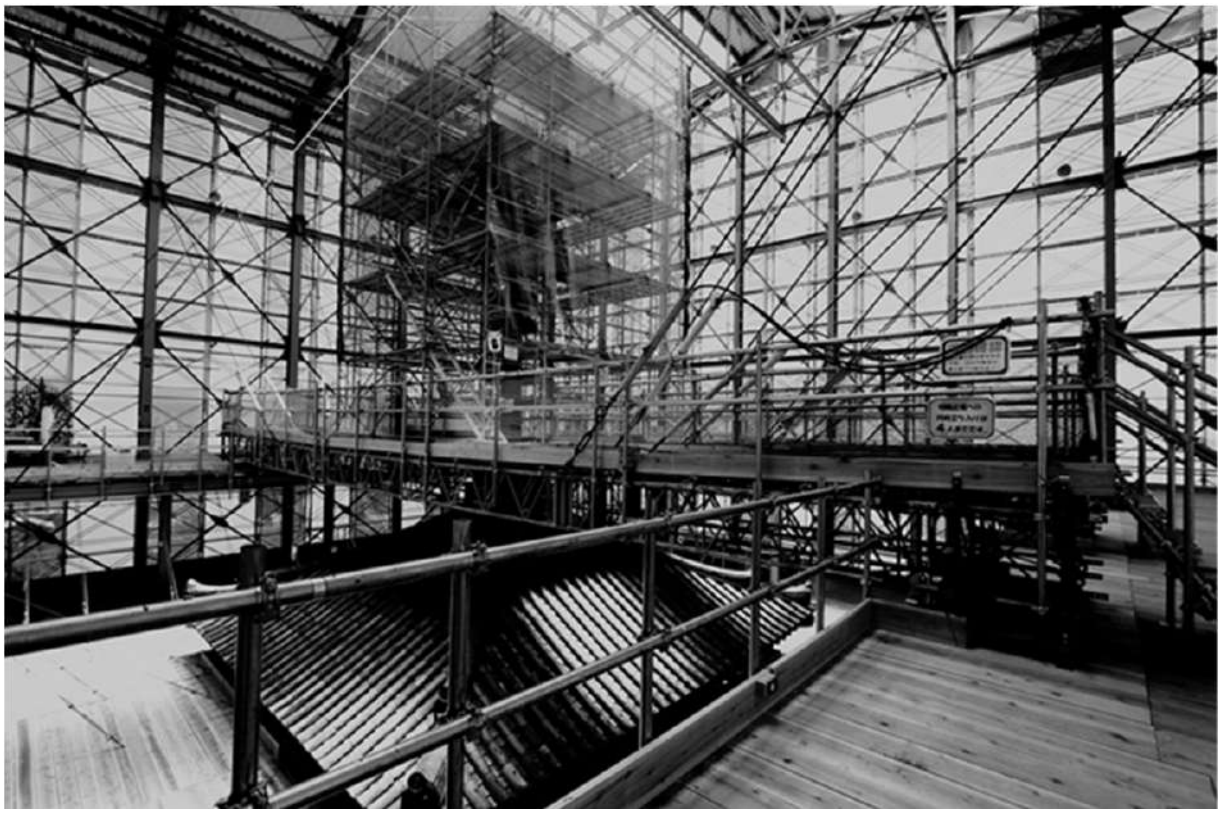
Sources:

Brochures
Information from Training Course lecturers
Law of the Republic of Indonesia Number 11 Year 2010 regarding Cultural Heritage (Undang-undang Republik Indonesia Nomor 11 Tahun 2010 tentang Cagar Budaya)
Lecturer workbooks
UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, Adopted by the General Conference at its 17th session, Paris, 16 November 1972.

Azahar Purwanto

Learning about Cultural Heritage Preservation in Nara, Japan

Training Course on Cultural Heritage Protection in the Asia-Pacific Region
(Individual Course) 12 June – 12 July 2012



The Individual Training Course has been held 25 times, from 2000 to the present. Last year, a number of trainees came from Indonesia and the subject of the training was Wooden Structures. This year, from 12 June until 12 July 2012, the Indonesian government, through the Ministry of Education and Culture has sent representatives based on invitations from ACCU Nara about Individual Training Course. The training will be held in Nara City, which is the oldest city in Japan. As an ancientcity, Nara City has so much cultural heritage, with cultural heritage buildings and structures being maintained until today. From that, we can learn many ideas and concepts on the restoration of cultural heritage in Japan, especially in Nara City.

In around 30 days the participants study seven topics including practice in the field. They are as follows:

- Japanese Wooden Cultural Heritage
- The Japanese Cultural Landscape
- Introduction to Recording of Wooden Structures
- Practical Training on How to Record Japanese Wooden Structures
- Introduction to Cultural Heritage Documentation – Photography
- Introduction to Disaster Risk Management
- Dendrochronology and Wooden Conservation

Japanese Wooden Cultural Heritage

Japan's cultural heritage has a long history, with buildings made from wood by master carpenters. The architecture of Japanese temples was influenced by China at the beginning, but over time this influence from China slowly disappeared from Japanese temples.

Japan is rich in natural resources, and there is so much wood that can be used for their buildings. Along with these resources, Japan needed master carpenters and master blacksmiths to complete the job. However, the original master carpenters and master blacksmiths could not maintain their own buildings, and so the first generation often left an image and information on the construction process for the temple . With the respect to their own cultural heritage, many cultural heritages can survive to the present.

Todai-ji and Kofuku-ji temples as World Heritage sites (photos by Azahar)

What if they do not have a record of the building? As secondary information, Japanese carpenters ask the owner of the building, but the primary information comes from the building itself. The evidences of construction process are left on the building and Japanese carpenters try to make it as close to the original as possible. Of course, they leave detailed information for the future.

Temples in Japan have a long life, mostly due to restoration according to its age or by tradition. To maintain the authenticity of the materials, they keep using the original materials as much as possible. Most of the damaged materials will be stored or put on display at a museum. The damaged section will be repaired with new material, of course with no visible connection to previous restoration, and also the detail of the restoration is depicted through photographs and other means..

Weather Cock House and Tanzan Shrine as Important National Heritage (photos by Azahar)

Japan has not only old temples that have survived until today, but Japan also retains a traditional urban area which existed hundreds of years earlier, for example, Imai Cho. To maintain the old town, a special law was needed that requires the community to help maintain the old town in its original form. Restoration is made easier through tax reductions, sharing the cost with the city and central government, access to assistance from public servants who have bachelor's degrees in architecture, and also the help of the rest of the community, which shares information with tourists.

With access to assistance from public servants who are architects, the community gains information about their own buildings and creates good designs for the façades of their own houses. With good façades, the face of the city will be beautiful, attracting tourists who are of benefit to the city. At the beginning, it is so difficult to start on such projects, and the community needs advice from universities. After that, discussions are held with relevant parties. The relevant parties come from the community, university, and public servants who have an interest in tourism development. This is certainly a more effective way to achieve results than just relying on government regulation. So the outcome of the discussions will be adhered to and implemented for the benefit of the city.

Imai-Cho as Area of Cultural Heritage (photos by Azahar)

The Japanese Cultural Landscape

Japan's cultural landscape consists of the country's traditional culture. It is very important to keep and protect the cultural landscape because it is a part of the history of Japan. The cultural landscapes in Japan have recently developed and are also attracting the government's attention.

It is very important to know the unique characteristics of the cultural landscape, its background, how to conserve it, the concepts involved, how to survey the cultural landscape, the most effective use of the cultural landscape for development, and systems to protect the cultural landscape. But the point here is that society and local communities should be an important part of how to maintain the cultural landscape, and discussions with experts can enable the community to have a favourable opinion of the conservation efforts. As in the area of cultural heritage, the outcome of discussions will be adhered to by everyone and implemented for the benefit of the city.

Introduction to Recording of Wooden Structures

Lecture from Nakamura Sensei on the Recording of Wooden Structures (photos by Azahar)

The recording of wooden structures is a very important thing to do, and one reason why Japan's cultural heritage has survived until this time is the good information recorded in the past for the future. It is very important to pass on information to the next era, so that the building can survive for future generations. The recording itself did not only start in the modern era; for many generations the recording has started from the establishment of the temple or house.

Japanese traditional architecture is unique, with temples or old houses built in a knockdown style. In the case where a building can be disassembled or assembled again, with this style it is easy to create a recording for the next generations. The recording of wooden structures is done using manual tools. To make it a working drawing, first of all the Japanese carpenter uses freehand style; after that, the drawing is transferred to another paper using rulers to make a more accurate drawing.

During the drawing process, the carpenter not only makes the drawings but also thinks about any damage that has occurred, what caused the damage, how to overcome the problem, and how to prevent the same damage from occurring again. All of this must be illustrated in detail on the drawings of the building.

Practical Training on How to Record Japanese Wooden Structures

Practical training is given at the Tanaka Family Old House, and at the beginning participants must know the characteristics of the building. It's very important to know the structure of the house itself. Even if the structure of the house is simple the participants must know the unique features of the building. First knowing the culture of the local society is very important, so we can know and give respect to the owner and their society.

To make good drawings, participants must know how to make freehand drawings in the field, because it would take more time if rulers were used in the field. Having sufficient detail on the

drawing paper is very important, and the drawings themselves to the millimeter scale. The drawings should not only show an overall view, but also the the building up close. Therefore, the drawings should be detailed and a good draftsman's drawings will clearly show the building itself, the material used, any damage, solutions to such damage, how to construct it and how to maintain it. Details are very important here, because they will provide good information for the next era and ensure that the building can survive for many years.

Practical Training on how to record wooden structures (photos by Azahar)

Introduction to Cultural Heritage Documentation – Photography

Photography in cultural heritage has an important role—with photography the condition of the cultural heritage before and after can be known clearly and in detail. For example, the details of the roof, the plafond, the walls, the structure and style, etc. The photograph must show the object in the same way as the original as far as possible. It means the colors, condition, and position should look the same as the object. This, of course, requires a complete set of equipment, to support good work for the best result.

Documentation training of photography with Sugimoto-sensei (photos by Azahar)

For photographing cultural heritage it is very important to use a good camera with the ability to capture pictures that produce a similar image as the object. There are currently two types available: manual and digital. Manual cameras are still used in Japan, but the camera does not look like other

manual cameras on market. Manual cameras for photographing cultural heritage are called view cameras. This type of camera can use positive and negative film, with the two kinds of film themselves having different functions depending on the occasion. With a view camera, the size of the film can be selected depending on the need.

Digital cameras look like manual cameras and the differences come from the film. If a manual camera uses film for the result, the digital camera uses a memory card known as a CF card or SD card for storing images of objects. It is very important to use a full frame camera for cultural heritages with zoom and a sharp lens to get the best quality picture with no distortion.

The result from the camera itself is very important, as not only color pictures are necessary; black and white pictures are important too. With color pictures, the result will disappear slowly over time, but with black and white, the image can survive for decades.

With digital cameras, images can be processed on high end computers and the files can be saved in every format. Usually photographers use only JPEG format on their camera, but for cultural heritage we must use RAW files for the images. RAW data can be processed using imaging software readily found on the market. Generally, this is Photoshop software. The photographer should be skilled in using imaging software that can handle the particular requirements for the documentation of cultural heritage.

Restoration cultural heritages with education

The documentation and drawings of cultural heritage in Japan are complete and very detailed, and they start from the beginning of the construction of the temple or shrine. It is therefore easy to build and know how to restore it. Although the documentation and drawings are complete, carpenters are still needed. To start with, workers on cultural heritage properties are not only aged 60 and above but they also work with workers in their 20's. This is an important legacy for future generations due to the decreasing availability of skilled craftsmen with traditional techniques for wooden buildings. In addition to the knowledge of the senior workers, the younger workers are previously trained and certified in dealing with cultural heritage.

The Japanese government is not only concerned with their carpenters, but also interested in educating the public. At Himeji-jo, we can see a large scaffolding structure which protects this cultural heritage as it is being restored. The scaffolding is not only to protect Himeji-jo, but also a place for tourists to observe the carpenters at work. The advantage with scaffolding which can be visited by tourists of course is to provide knowledge about the restoration process and to see how the carpenters work when handling cultural heritage.

Himeji-jo, the World Heritage site, with scaffolding covering the building to educate visitors on restoration (photos by Azahar)

Introduction to Disaster Risk Management

Japan has a long history of earthquakes but there is no specific legislation for cultural heritage in the event of an earthquake. The Kobe earthquake, which occurred in 1995, made experts more aware about cultural heritage, and what they must to do after an earthquake and how to prepare a program for cultural heritage.

Introduction to Disaster Risk Management and modern technology at a foundation for cultural heritage (photos by Azahar)

There are eleven steps we must take after a disaster. They are as follows:

1. Research the seriousness of damage
2. Prioritize the seriousness of damage; a temple is different to a traditional house
3. Check for adopted techniques from Europe for cultural heritage buildings which are different from traditional Japanese buildings
4. Return damaged objects of cultural note to their original condition, and decide how to protect them from natural disasters in the future
5. Traditional techniques are sophisticated, but some techniques may have been forgotten. It is very important to keep using these for cultural heritage and pass on a legacy to future generations.
6. Train volunteers to deal with damage to cultural heritage. This means networking within the community, universities and having links with other departments such as the military.
7. Secure funding for the restoration of cultural heritage
8. Use modern techniques for restoring cultural heritage buildings. Modern techniques are needed in order to protect buildings from natural disasters and minimize the damage. But with modern techniques, there must be discussion with other experts.
9. Provide psychological counseling for those who experienced the natural disaster.
10. Classify damage to the cultural heritage as major, secondary, or minor damage.
11. Pass special regulations on cultural heritage after a natural disaster

With the above points, the Japanese government expects the Agency for Cultural Affairs to accelerate the recovery of cultural heritage as soon as possible. Many cultural heritage experts in Japan also have meetings for sharing information on technology and cultural heritage, and it is necessary to accumulate knowledge and information in relation to the prevention of damage to cultural heritage and how to overcome natural disasters.

Dendrochronology and Wooden Conservation

Dendrochronology, or **tree-ring dating,** is the scientific method of dating based on the analysis of tree-ring patterns. Dendrochronology can date when tree rings were formed, in many types of wood, to the exact calendar year. With the use of dendrochronology to determine the age of wood, there are further considerations for the archaeologist. Dendrochronology is now growing rapidly. At first just an increment borer was used; the modern tree-ring measurement machine is now combined with a table, microscope and computer.

Digital cameras are also used in dendrochronology. Use of a full frame camera is very important and a digital scanner with x-ray radioscopy as well as x-ray CT function is needed for the highest accuracy in dendrochronology.

Tree-ring measurement machine and lecture from Kohdzuma Sensei (photos by Azahar)

Wooden Conservation involves knowing how to distinguish between the development and characteristics of various kinds of wood or wood cells, and then classify the type of wood used, whether hard or soft. The development of timber species in Japan and Indonesia is very different; in Japan, soft wood is mainly used, whereas the wood in Indonesia is hard wood. It is important to find out who the experts in wood conservation in Indonesia are, and to cooperate in dealing with cultural heritage.

The Advantages of This Training

For participants, there are many lessons to be learned from the training conducted by ACCU Nara, and this training adds to the knowledge and wider perception for the participants. The training during this month is expected to be put to practical use in the conservation of wooden cultural heritage in Indonesia, especially in the areas which are the responsibility ere the task of the participants.

Moreover, participants can share knowledge with colleagues at work and help each other in the conservation of cultural heritage. The sharing of knowledge is not limited to places where the participants are on duty, but also for anyone working in the area of conservation of cultural heritage.

Suggestion

Training provides added value for the participants, and sharing knowledge can benefit make to our coworkers in the office. All of the material provided is informative and insightful for the participants. However, participants do not get a soft copy of the material presented in the classroom. Participants will have difficulty in explaining the contents if there is no soft copy of the presentations. It will help the next participant if they could receive soft copy files, which will help with knowledge sharing.

Finally, I would like to express my sincere gratitude to ACCU Nara, who provided training on the conservation of wooden cultural heritage.

V. Appendix

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

1. List of Participants

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