The Workshop 2010 for Protection of Cultural Heritage at Vientine in Lao P.D.R.

1-6 November 2010

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

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Wat Sisaket

Preface

The Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (ACCU) was established in August 1999 with the purpose of serving as a domestic centre for promoting cooperation in cultural heritage protection in the Asia-Pacific region. Subsequent to its inception, our office has been implementing a variety of programmes to help promote cultural heritage protection activities, maintaining partnerships with international organisations, such as UNESCO and the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM).

The ACCU Nara's activities include, training programmes for the human resources development, the international conference and seminar, the training of young leaders in cultural heritage protection, the website for the dissemination of information relating to cultural heritage protection, and the world heritage lecture in local high schools. In addition to those, ACCU Nara periodically publishes International Correspondent Report based on contributions from appointed correspondents in the region and also conducts "the local training workshop" which dispatches a group of lecturers from Japan and implements the practical training on cultural heritage protection on sites.

The Workshop 2010 for Protection of Cultural Heritage at Vientiane in Lao P.D.R. was the fourth attempt of ACCU Nara. We were fortunate enough to receive the full cooperation and support from Department of National Heritage, Ministry of Information and Culture of Lao P.D.R. as a co-organiser. I would like to extend my sincere gratitude to Mr Thongsa Sayavongkhamdy and his staff; and to all related parties for their cooperation.

The advantages of implementing the local workshop are as follows:
1) A large number of participants from one country can attend the workshop at one time.
ACCU Nara has invited a few participants from a single country to the Individual Training Course held in Nara. However, participation is usually limited to two or three experts. It would be extremely efficient to accept a large number of people from one country at one time for providing opportunities to acquire expertise for the protection of cultural heritage.

2) The working language of the training course is their native language.
As a general rule, the working language used in both group and individual training programmes is English, which sometimes gives difficulty in understanding the content of the training course for some participants from Asia-Pacific region. Not all the participants are fluent in English. In order to resolve this kind of limitation on the communication, we have decided to use Lao for this workshop in Lao P.D.R. We believe that participants can understand the lecture more easily and accurately with interpretation.

(3) The teaching materials are locally available artefacts or vernacular houses.
Different from the programmes in Nara, participants in this workshop make use of artefacts or structures indigenous to their own country for the practical training, which is familiar and useful for them.

When organising a workshop overseas, the most important part is the selection of the themes of the training course. The preliminary survey should be made prior to selecting the appropriate theme which is most urgently needed for the country. The training programme should also have long-term effect on the protection of cultural heritage after the workshop has concluded. In organising this workshop, we were fortunate enough to receive useful information from Japanese researchers who had been engaged in heritage preservation activities in Lao P.D.R. for years.

I wish ACCU Nara will build on this experience of the local training workshop in Lao P.D.R. for the next step. Lastly, I would like to express my appreciation to Nara Prefectural Government and Nara Municipal Government for their cooperation in dispatching their officials to our workshop. I am also thankful to the Agency for Cultural Affairs, Japan (Bunkacho) for their continuing support.

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

I. Introduction

Wat Ho Phakeo

1. General Information

The Workshop 2010 for Protection of Cultural Heritage in Vientiane, Lao P. D. R.

- Organised by Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO in Cooperation with Department of National Heritage, Ministry of Information and Culture, Lao P. D. R. -

I. Venue and Country

Lao National Culture Hall in Vientiane, Lao P.D.R.

II. Date

From 1 November (Mon.) to 6 November (Sat.) 2010

III. Themes

Recording/Documentation of archaeological artefacts

1. Lecture
   - Introduction to Measured Drawing of Earthenware
   - Photographic Technique of Artefacts (theory and methods)
2. Practical Training
   - Measured Drawing of Earthenware
     (whole and shards / reconstruction from shards / design layout)
   - Descriptive Methods of Observed Details
   - Ink Rubbing and its Backing
   - Photography

IV. Schedule

As on another sheet: Schedule of the Workshop 2010 for Protection of Cultural Heritage in Vientiane, Lao P.D.R

V. Participants

Fifteen researchers, engaging in investigation, research and preservation of cultural properties in Lao P. D. R., who belong to research institutes, the management and preservation office for cultural properties or museums.

VI. Language

The main working language of the training course is Lao.

VII. Expenses

All the expenses required for the items listed below shall be born by ACCU Nara Office.

- Dispatching a group of instructors from Japan
  (five personnel from ACCU Nara and three instructors)
- Provision of transportation to the venue, accommodations and daily allowances to the participants
- Hire of venue for the training and a rental car
- Procurement of the necessary tools for workshop
- Employment of the interpreters between Lao and Japanese
- Local communication charge
- Publishing the training report

2. Programme Schedule

Date			Morning (9:00-12:00)	Afternoon (13:30-16:30)	Instructor
11	1	Mon.	10:00 ~ Opening Ceremony / Orientation	Lecture: -Fundamentals of Archaeological Research -Introduction to Measured Drawing of Earthenware	IRIKURA / NAKAJIMA
	2	Tue.	Practical Training: -Measured Drawing of Earthenware (whole)		IRIKURA / NAKAJIMA
	3	Wed.	Practical Training: -Measured Drawing of Earthenware (shards / design layout)		IRIKURA / NAKAJIMA
	4	Thu.	Practical Training: -Description Methods of Observed Details -Ink Rubbing and its Backing		IRIKURA / NAKAJIMA
	5	Fri.	Lecture: Photography of Archaeological Artefacts -Theory -Methods	Practical Training: -Photography	SUGIMOTO
	6	Sat.	Practical Training: -Photography	Summary and Review 15:30 ~ Closing Ceremony (Awarding Certificates)	SUGIMOTO

II. Workshop Journal

Patousai (Anousawari)

Friday, 29 October

ACCU staff and lecturers departed Kansai Airport and arrived in Vientiane (Laos) via Hanoi (Vietnam).

Saturday, 30 October

ACCU staff and lecturers met in Lao National Culture Hall with three staff of Ministry of Information and Culture (Mr Thonglith Luangkhoth, Mr Soulipane Bouraphane, and Mr Souliya Bounxaythip); Mr Phokhaysavanh Phothisane, an interpreter; and Ms Toshihara Kayoko, JICA Laos Senior Volunteer, to inspect the venue layout and training programme equipment, and carried them into the workshop venue.

In the Lao National Museum, they selected the earthenware and roof tiles stored in the museum to use in the workshop, such as complete earthenware, earthenware fragments for making reconstruction diagrams and pattern drawings, and decorative eaves tiles for making ink rubbed copies. They also prepared necessary documents and textbooks, and added missing pieces of equipment.

Sunday, 31 October

ACCU staff continued preparing for the workshop, checking the PC and projection equipment to make sure they ran properly and the seating for guests, and confirming the configuration for the press people.

Monday, 1 November

The opening ceremony of the "Workshop 2010 for Protection of Cultural Heritage in Vientiane, Lao P.D.R." was held at National Culture Hall. Mr Nishimura Yasushi, Director of ACCU Nara and Mr Thongsa Sayavongkhamdy, Director General of Department of National Heritage, Ministry of Information and Culture gave opening addresses, followed by Mr Kobayashi Shigeki, Counsellor of Embassy of Japan in Lao P.D.R. representing the honorable guests. Guests were introduced, followed by introductions of lecturers, programme participants, and staff.


Mr Nishimura Yasushi


Mr Thongsa Sayavongkhamdy

Mr Kobayashi Shigeki

After an orientation on the programme content and schedule, and briefing on training tools, Mr Irikura gave a lecture on earthenware production techniques, perspectives on earthenware observation, and essential points for measured drawing of earthenware. This was followed by Mr Nakajima's demonstration of the procedure of making measured drawings.

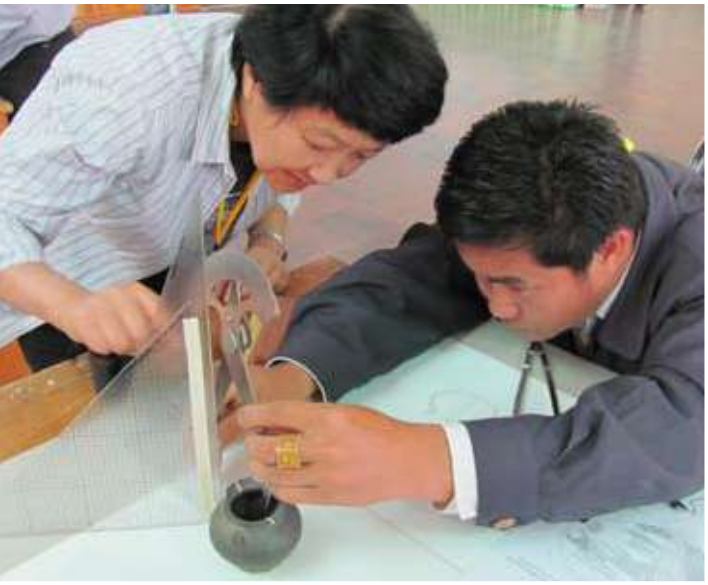
At night, a reception was held at the Lao Plaza Hotel, to which relevant parties such as the director of the Lao National Museum were invited.

Tuesday, 2 November

Mr Irikura and Mr Nakajima demonstrated how to make measured drawing of small complete earthenware. During that time, Mr Sugimoto toured Wat Ho Phakeo, Wat Sisaket, and That Luang in the morning, and the Textile Museum, Ancient City Wall, Buddha Park, and craftwork shops in the afternoon to take photographs.

Wednesday, 3 November

Participants continued the practical training on measured drawing of small complete earthenware. In the afternoon, they also practiced measured drawing of earthenware shards. Mr Sugimoto took pictures of the art gallery, That Luang, Victory Gate (Patousai), Wat Ho Phakeo, and Wat Sisaket in the morning. In the afternoon he continued with Wat Sisaket, then went on to photograph Lao Textile Museum and That Dam.



Thursday, 4 November

Drawing of potshards continued in the morning, followed by an explanation of pattern design layout on them. In the afternoon, an introduction to the ink rubbing method was given, followed by a hands-on ink rubbing session using Japanese coins and earthenware pieces. Mr Sugimoto took pictures of the Sisaket murals and the market in the morning, and of That Khao, Wat Inpeng, Wat Ongtey, and Wat Ho Phakeo in the afternoon.












Friday, 5 November

Mr Sugimoto gave a lecture on the theory of photography and gave an explanation and practical training on photography of archaeological artifacts. Programme participants first learned the mechanisms and usage directions of the large-format camera (4 X 5). They practiced photographing each other as models, and the hands-on session covered such topics as the relationship between aperture and shutter speed (depth of field) while checking the actual finish.

A simple photo studio was set up using materials which could be procured locally. The hands-on session went through how to position the artefacts to be photographed, and how to arrange the lighting. Different settings were tried and the finished photos were compared as the session proceeded. Through hands-on training, participants seemed to have learned the point of photograph sets and lighting for archaeological artifacts.

Saturday, 6 November

The lecture and hands-on training under the guidance of Mr Sugimoto continued in the morning. Participants are requested to review their yesterday's work and proceeded to take artifacts photography with a digital camera. The lecturer explained on the subtle adjustment on exposure and white balance.

In the afternoon, Mr Nakajima and Mr Irikura recapitulated the training workshop. Mr Nakajima spoke about "Review of how to make measured drawing of earthenware, and future prospects for earthenware research" and Mr Irikura also talked about "Review of the need for making measured drawing of earthenware."

The closing ceremony of the workshop was held in the evening. Mr Nishimura, Director of ACCU Nara; Mr Viengkeo Souksavatdy, Deputy Director General of Department of National Heritage, Ministry of Culture and Information; and Ms Vanhpheng Keonakhone, Assembly Member and Director of Department of Information and Cultural of Vientiane Capital made short speeches. Each participant was awarded with a certificate of completion. Mr Norseng Sayvongdouane made a speech on behalf of all participants. He thanked organisers of the training workshop and said that the knowledge and techniques relating to methods of making measured drawings, ink rubbing, and photography that he learned in the workshop would be useful in the conservation of cultural heritage, and to the protection of cultural heritage for the nation of Lao P.D.R. overall.

The earthenware, roof tiles, and equipment used in the workshop were collected and returned to Lao National Museum.

Mr Nishimura Yasushi

Mr Viengkeo Souksavatdy


Ms Vanhpheng Keonakhone

Sunday, 7 November

Lecturers and all staff went from Vientiane to Pakxe to take photographs of the World Heritage site, Vat Phou Heritage Park and observed the townscape of Champasak.

Baray

Nandi Hall

Gallery

Northen Palace

Southen Palace

Crocodile stone

Elephant stone

Snakes stone

the main sanctuary (shrine)

the carving of lintel in the main sanctuary

Sculptures in the main sanctuary

Monday, 8 November

After the meeting with the Director of Vat Phou Museum, the ACCU party toured Vat Phou administrative office guided by Mr Amphol Sengphachanh, an ex-participant in ACCU training programme with observation of an ongoing conservation project aided by the French, Italian and Indian governments. Lecturers and staff all took a picture at the Vat Phou site and Temple of Nang Sida site.

Vat Phou Museum

Vat Phou administrative office

Restoration work of Southern Palace

Restoration site of Southern Palace by French government


Nang Sida Temple


Nang Sida Temple


Nang Sida Temple


Hong Nang Sida area area


Hong Nang Sida area


Chanpasak


Chanpasak


Chanpasak


Chanpasak

Tuesday, 9 November

The ACCU party took pictures at Khone Phapheng waterfall, followed by a tour of Tomo Temple site.

Tomo Temple

Tomo Temple

Tomo Temple

Wednesday, 10 November

The ACCU party left Pakxe and returned to Vientiane, then left Vientiane for Kansai Airport via Hanoi.

Thursday, 11 November

Early morning, the ACCU party arrived at Kansai Airport.

III. Lecturer Papers

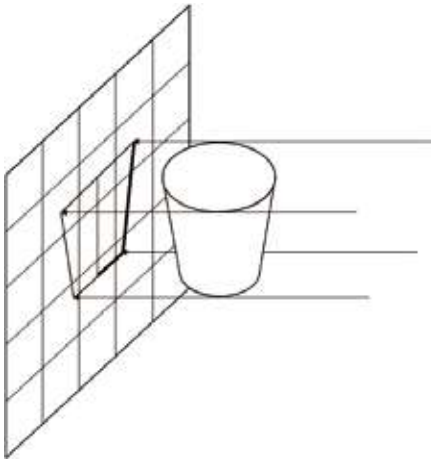
Streetscape of Vientiane Capital

Making actual measurement of artifacts

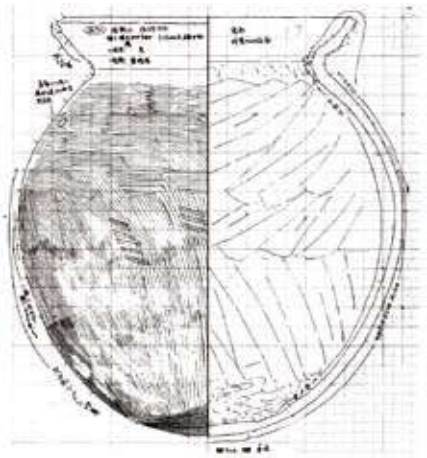
1. Purpose

(1) To render, following a set of rules, the configuration and characteristics of a given artifact into a two-dimensional drawing, for communication to a third party.

- Rules are set so that the characteristics of the artifact may be fully described.
- Rules differ according to the type of artifact.
- Rules must be shared amongst researchers.

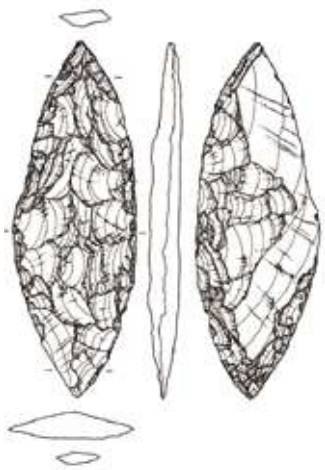


Orthographic projection is the general rule.



Left: Surface. Right: Cross section and interior.
Simple lip and bottom represented by straight lines

Complex configuration represented faithfully



Stone tool front and back

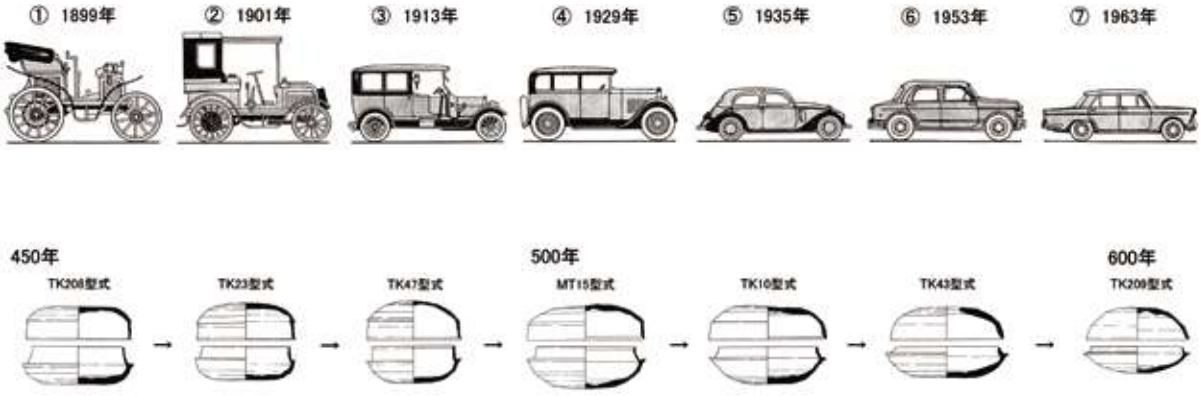
(2) Why are photographs not enough?

- The purpose of actual measurement is to not only photograph the shape of the artifact but also to record the results of observation.
- Certain features of artifacts – shape of cross section, surface adjustment, etc. – cannot be fully represented in photographs.
- mportant features may be emphasized.

2. Actual measurement of earthenware

(1) Importance of actual measurement of earthenware

- Earthenware articles are the most numerous of unearthed artifacts.
- The shapes, patterns, and manufacturing methods change rapidly, making them a good yardstick with which to measure the chronology of a given archaeological site.
- There are regional differences in shapes, patterns, and manufacturing methods. These reflect the range to which human interaction went on.



(2) Points for observing earthware

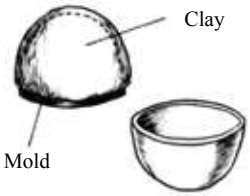
○Materials

- Clay: Coarse or fine?
- Sand granules: Sand granules (Any special minerals?)
- Mixed material: Any materials such as plant fibers used intentionally?

○Shaping: Forming the shape

- Method: Shaping by hand, using a mold, stacking clay coils, potter's wheel
- Configuration: Characteristics of the lip, body, and bottom

Shaping by hand



Clay, Mold

Stacking coils

Potter's wheel

○ Adjustment: Perfecting the surface

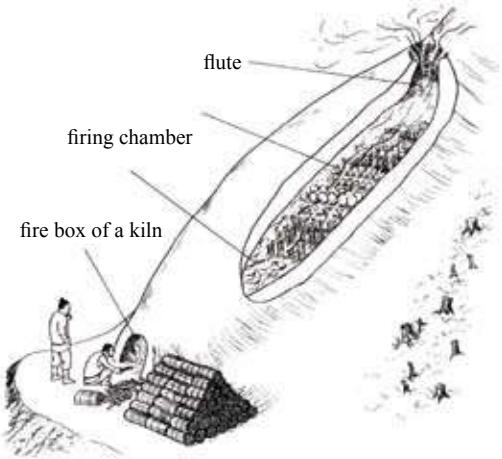
- Types: Stroking, polishing, scraping
- Method: Direction, density
- Tools: Fingers, spatula, stick, board

○ Pattern: Decorating

- Units: Chinsen, piercing, pasting, coloring
- Expression: Abstract pattern, pictures
- Tools: Spatula, stick, board, rope, shell

○ Firing

- Method: Open or kiln fire
- Finish: Color, hardness, state of surface/cross section



○ Traces of use

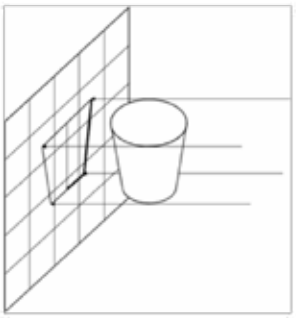
- Black spots: Used for boiling or lighting
- Piercing: Non-practical use item

ການວັດແທກວັດຖຸບູຮານ

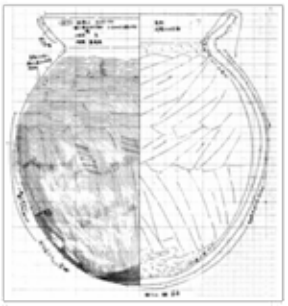
1. ຈຸດປະສົງຂອງການວັດແທກ

(1) ເພື່ອບອກໃຫ້ບຸກຄົນທີສາມ ຮູ້ຮູບລັກສະນະແລະຈຸດພິເສດຂອງວັດຖຸບູຮານດ້ວຍການແຕ້ມພາຍ 2 ມິຕິຕາມກົດເກນທີ່ແນ່ນອນ.

- ກົດເກນເມື່ອເພື່ອສະແດງລັກສະນະເພາະຂອງວັດຖຸບູຮານໃຫ້ເຫັນຕົ.
- ກົດເກນຈະແຕກຕ່າງຕາມແຕ່ລະຊະນິດຂອງວັດຖຸບູຮານ.
- ນັກຄົ້ນຄວ້າຈະຕ້ອງຮ່ວມກັນນຳໃຊ້ກົດເກນເຫຼົ່ານີ້.

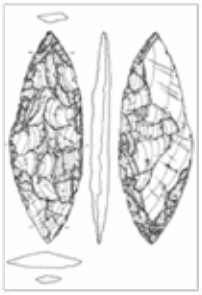


ພື້ນຖານແມ່ນພາຍສາຍແສງກົງ



ຊ້າຍ=ຜິວໜ້າ, ຂວາ=ໜ້າຕັດແລະຜິວໃນ ຂອບປາກທີ່ງ່າຍໆແລະພື້ນສະແດງດ້ວຍເສັ້ນຊື

ຮູບແບບຊັບຊ້ອນຈະຕ້ອງ ສະແດງຢ່າງຈິງຈັງ



ເຄື່ອງຫີນແຕ້ມດ້ານໜ້າດ້ານຫຼັງ

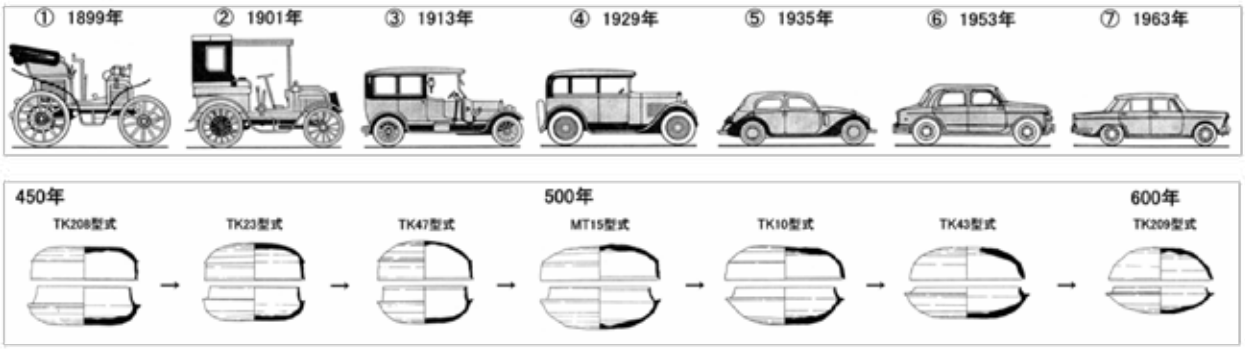
(2) ເປັນຫຍັງຈຶ່ງບໍ່ໃຊ້ພຽງແຕ່ຮູບຖ່າຍ

- ຈຸດປະສົງຂອງການວັດແທກບໍ່ພຽງແຕ່ລອກເອົາຮູບຮ່າງວັດຖຸດິບເທົ່ານັ້ນ ຈະຕ້ອງບັນທຶກຜົນຂອງການສັງເກດ.
- ຮູບຖ່າຍບໍ່ສາມາດສະແດງໃຫ້ເຫັນລັກສະນະສະເພາະ(ໜ້າຕັດ, ດັດປັບຜິວໜ້າ)ຂອງວັດຖຸບູຮານ.
- ລັກສະນະສະເພາະທີ່ສຳຄັນຈະຕ້ອງເນັ້ນສະແດງ.

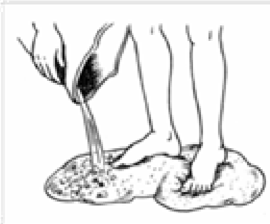
2. ການວັດແທກເຄື່ອງປັ້ນດິນເຜົາ

(1) ຈຸດສຳຄັນຂອງການວັດແທກເຄື່ອງປັ້ນດິນເຜົາ

- ເຄື່ອງປັ້ນດິນເຜົາສ່ວນຫຼວງຫຼາຍແມ່ນຂຸດພົບໃນດິນ.
- ·ການປ່ຽນແປງຮູບຮ່າງ, ແບບລວດລາຍ, ວິທີການເຮັດຕ່າງແມ່ນໄວ. → ເປັນບັນທັດບົ່ງຊີ້ສະໄໝຂອງວັດຖຸບູຮານ.
- ·ຄວາມຕ່າງລະຫວ່າງຂົງເຂດຂອງຮູບຮ່າງ, ແບບລວດລາຍ, ວິທີການເຮັດຕ່າງ → ສະແດງຂອບເຂດການພົວພັນຂອງມະນຸດ.



(2) ສິ່ງທີ່ຄວນເອົາໃຈໃສ່ໃນການສັງເກດເຄື່ອງປັ້ນດິນເຜົາ



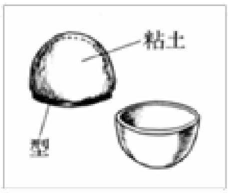
○ວັດຖຸດິບ

- ດິນໜຽວ(ດິນດາກ) → ຫຍາບບໍ?, ລະອຽດບໍ?
- ເມັດຊາຍ(ຊ່າ) → ເມັດຊາຍ(ແຮ່ທາດພິເສດຫຼືບໍ?)
- ທາດປະສົມ → ມີການຈົງໃຈໃສ່ເສັ້ນໄຍພືດນຳບໍ?

○ການຂຶ້ນຮູບ = ເຮັດເປັນຮູບຮ່າງ

- ກຳມະວິທີ → ປັ້ນຂຶ້ນຮູບດ້ວຍມື, ເຮັດດ້ວຍແບບ, ເສັ້ນດິນໜຽວຕໍ່ຊ້ອນຂຶ້ນ, ໄມ້ຕີຂຶ້ນຮູບ.
- ຮູບລັກສະນະ → ລັກສະນະສະເພາະບ່ອນຂອບປາກ, ບ່ອນລຳຕົວ, ບ່ອນພື້ນ.

ປັ້ນຂຶ້ນຮູບດ້ວຍມື



ເຮັດດ້ວຍແບບ

ເສັ້ນດິນໜຽວຕໍ່ຊ້ອນຂຶ້ນ

ໄມ້ຕີຂຶ້ນຮູບ

○ດັດປັບ = ແປງຜິວໜ້າ

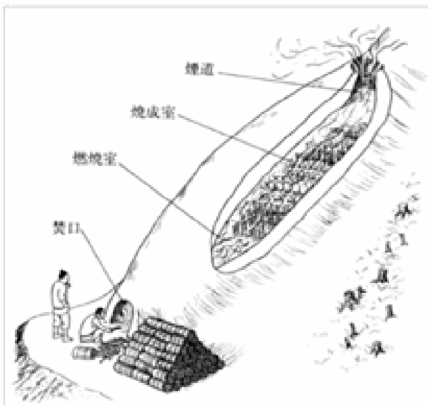
- ປະເພດ → ລູບ, ຂັດ, ຂູດອອກ
- ກຳມະວິທີ → ທິດທາງ, ຄວາມລະອຽດ
- ເຄື່ອງມື → ນິ້ວມື, ໄມ້ກະດ້ານ, ໄມ້ເປັນທ່ອນ, ໄມ້ແປ້ນ

○ແບບລວດລາຍ = ການຕົບແຕ່ງ

- ຫົວໜ່ວຍ → ລາຍເຊືອກ, ຂີດ, ລາຍຕິດ, ສີສັນ
- ການສະແດງ → ລາຍເລຂາຄະນິດ, ຮູບພາບ
- ເຄື່ອງມື → ໄມ້ກະດ້ານ, ໄມ້ເປັນທ່ອນ, ໄມ້ແປ້ນ, ເຊືອກ, ກາບຫອຍ

○ການເຜົາໄຟ

- ກຳມະວິທີ → ເຜົາດິບ(ບໍ່ໃຊ້ເຕົາ)ບໍ?, ເຕົາເຜົາບໍ?
- ຜົນງານອອກມາ→ ສີ, ຄວາມແຂງ, ສະພາບຜິວໜ້າ-ໜ້າຕັດ



○ຮ່ອງຮອຍການນຳໃຊ້

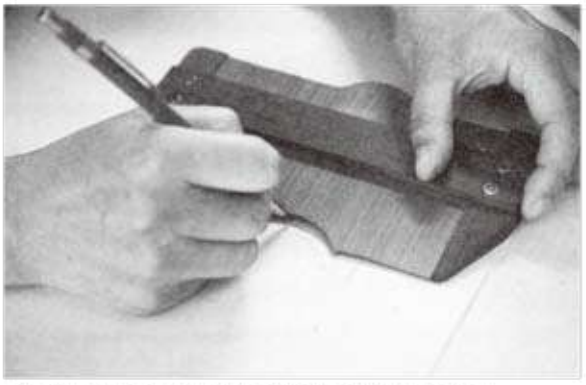
- ຈຸດດຳ → ໝໍ້ຕົ້ມ, ໝໍ້
- ເຈາະຮູ → ບໍ່ແມ່ນເຄື່ອງໃຊ້

The Flow of Measued Drawing (Earthenware)

1. Set the earthenware on graph paper and measure the bore of it.

2. Locate measurement points.

3. Gauge contours of earthenware with mako.

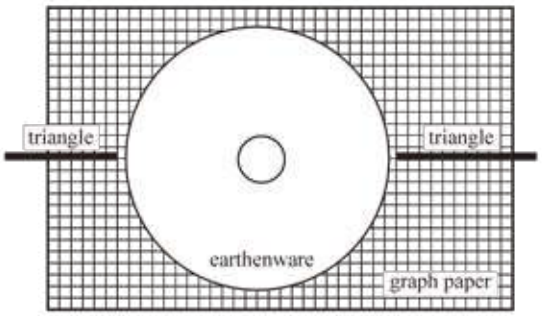


4. Draw contour lines on graph paper.

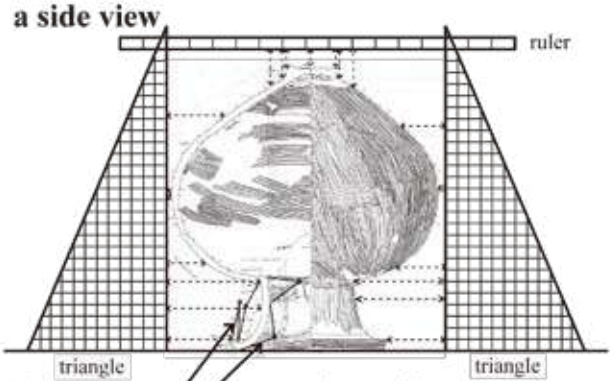
5. Observe surface finishing marks and gauge the units.

6. Write down finishing units on graph paper.

an overhaed view

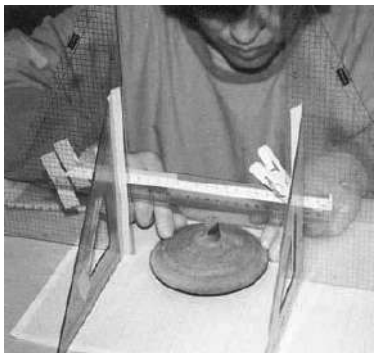


a side view

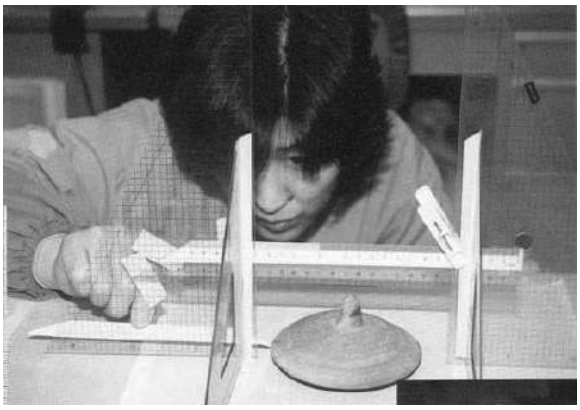


Gauge measurement points with a divider.

ຂັ້ນຕອນຂອງການວັດແທກເຄື່ອງປັ້ນດິນເຜົາ

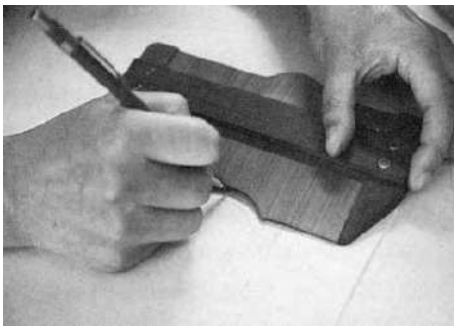


1 ວັດແທກເສັ້ນລັດສະໝີຂອງເຄື່ອງປັ້ນດິນເຜົາ
ວາງເທິງເຄື່ອງປັ້ນດິນເຜົາໃສ່ເທິງເຈ້ຍຕາຕະລາງ

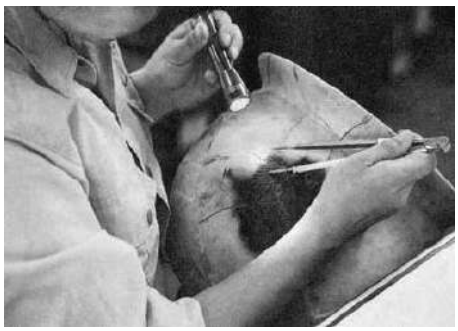


2 ວັດແທກຕຳແໜ່ງຈຸດທຽບຖານ

3 ລອກເອົາຂອບດ້ວຍເຄື່ອງມືຈັບໂຄ້ງ

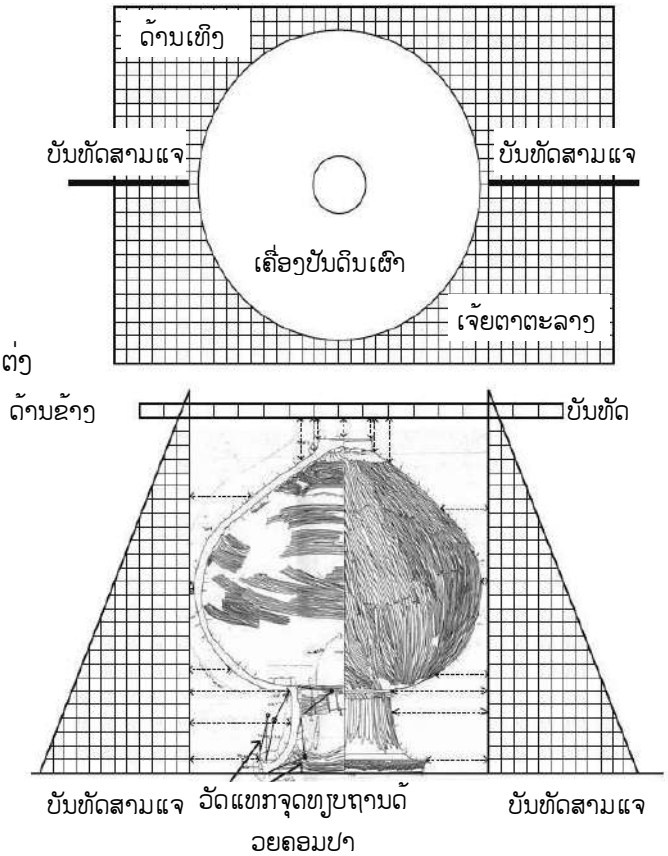


4 ບັນທຶກຂອບທີ່ລອກອອກມາໃສ່ເຈ້ຍຕາຕະລາງ



5 ສ້າງເກດ ບ່ອນປັບແຕ່ງແລ້ວ ວັດແທກຫົວໜ່ວຍປັບແຕ່ງ

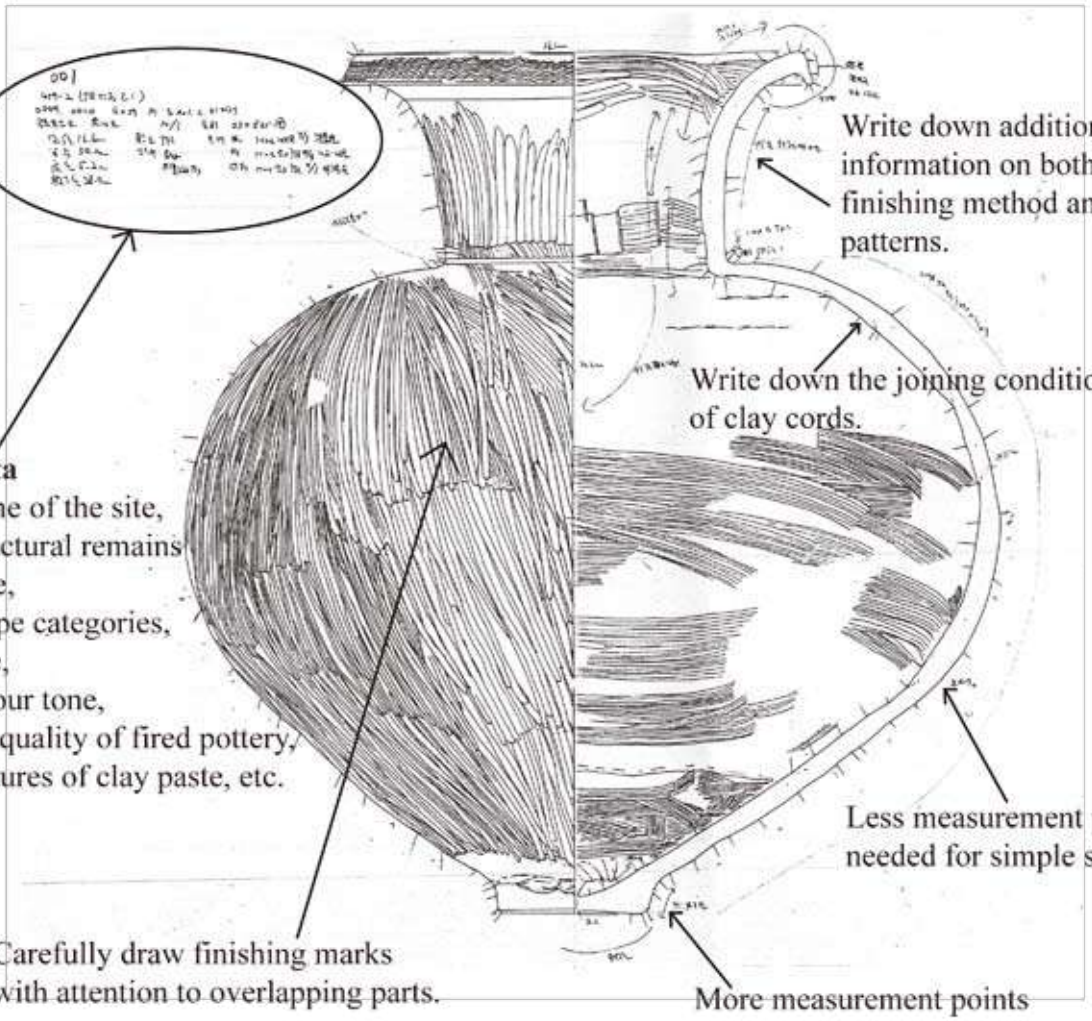
6 ບັນທຶກຫົວໜ່ວຍປັບແຕ່ງໃສ່ເຈ້ຍຕາຕະລາງ



An Example of Pottery Measured Drawing

- A full scale drawing is required. (usually)
- Basically, line drawing. (No shading needed.)

external surface on the left　　center line　　inner surface and cross section on the right



Data
name of the site,
structural remains
type,
shape categories,
size,
colour tone,
the quality of fired pottery,
features of clay paste, etc.

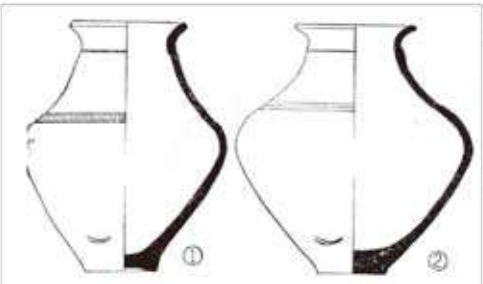
Write down additional information on both surface: finishing method and patterns.

Write down the joining condition of clay cords.

Less measurement points needed for simple shape.

Carefully draw finishing marks with attention to overlapping parts.

More measurement points needed for complecated shape.



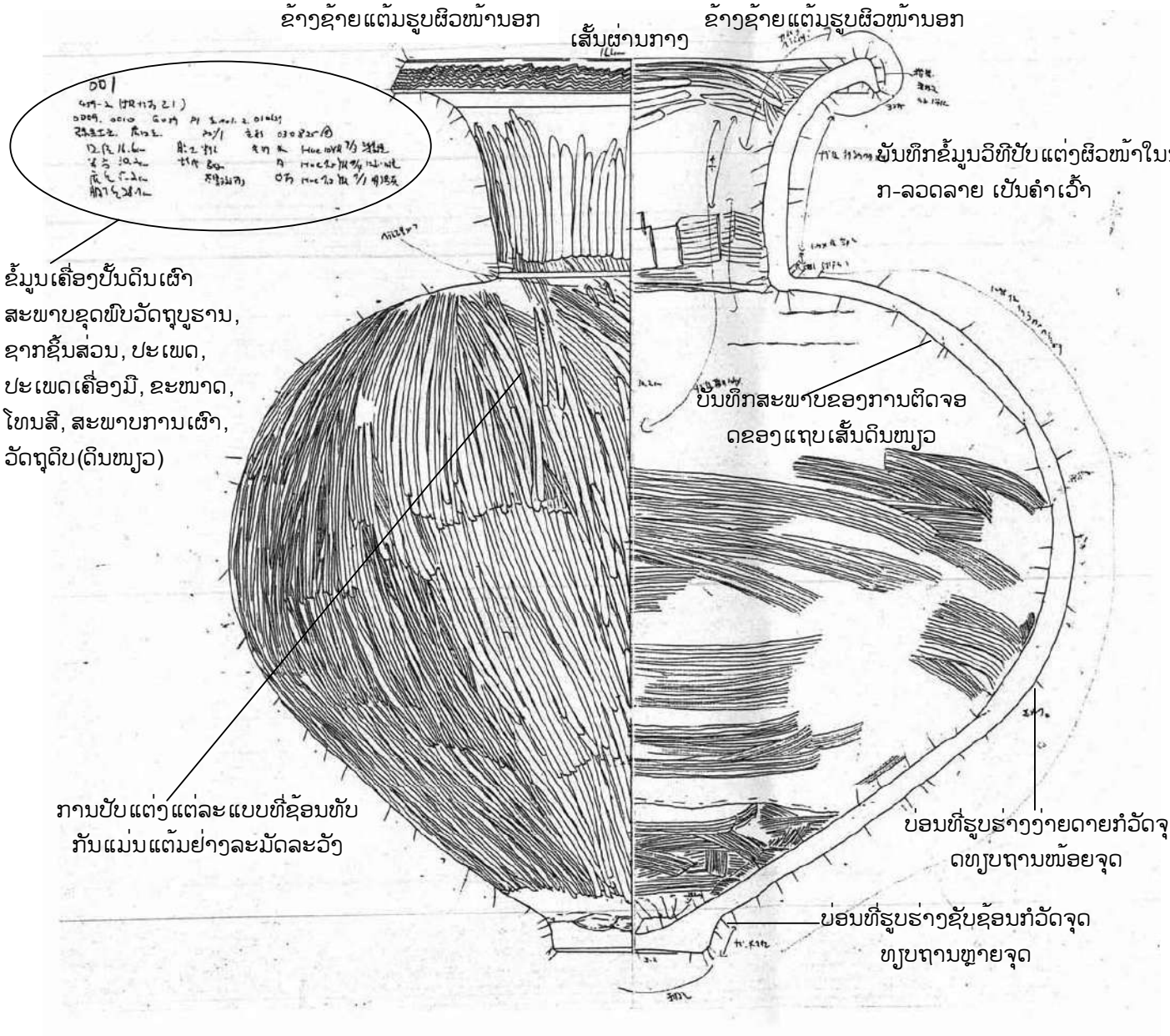
Two types of drawing due to two differnt measuring methods

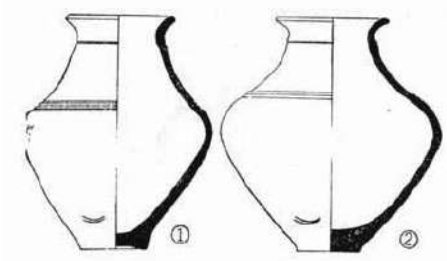
① By measureing diameters at mouth, body and bottom.
② By measureing a diameter at the bottom and replicating a cross section.

ຕົວຢ່າງຮູບພາບຂອງວັດແທກເຄື່ອງປັ້ນດິນເຜົາ

-ຕາມປົກະຕິວັດແຕ້ມດ້ວຍຂະໜາດຈິງ

-ໂດຍພື້ນຖານແຕ້ມເສັ້ນຈິງ(ເງົາມືດແມ່ນບໍ່ຈຳເປັນ





ວິທີວັດແຕ້ມຂະໜາດຈິງທີ່ແຕກຕ່າງ ສິ່ງອອກມາກໍແຕກຕ່າງກັນ

1 ວັດແທກເສັ້ນຜ່ານກາງປາກ, ລຳຕົວ, ພື້ນ

2 ວັດແທກເສັ້ນຜ່ານກາງພື້ນແລ້ວ ພັບປັ້ນຮູບໜ້າຕັດ

Basic Knowledge of Cultural Properties Photographs

Photography Dept., Nara National Research Institute for Cultural Properties

1. Introduction

Photographs are indispensable for study of cultural properties and must therefore be understood by anyone engaged in the study. If however cultural properties are photographed without understanding the objective and framework for taking photographs, the photographs will not yield an abundance of information. The fundamental principle of photography of cultural properties is to enable storage of materials that record an exhaustive amount of information in place of the cultural properties themselves for an extended period of time.

2. Role and types of photographs of cultural properties

Photographs of cultural properties include photos used for work and documentary photographs obtained by research and restoration as shown in Fig. 1. There are many types of photography including the most common type of photography used on a routine basis and so-called "optical survey" such as X-ray photography and infrared (IR) photography as shown in Fig. 2.

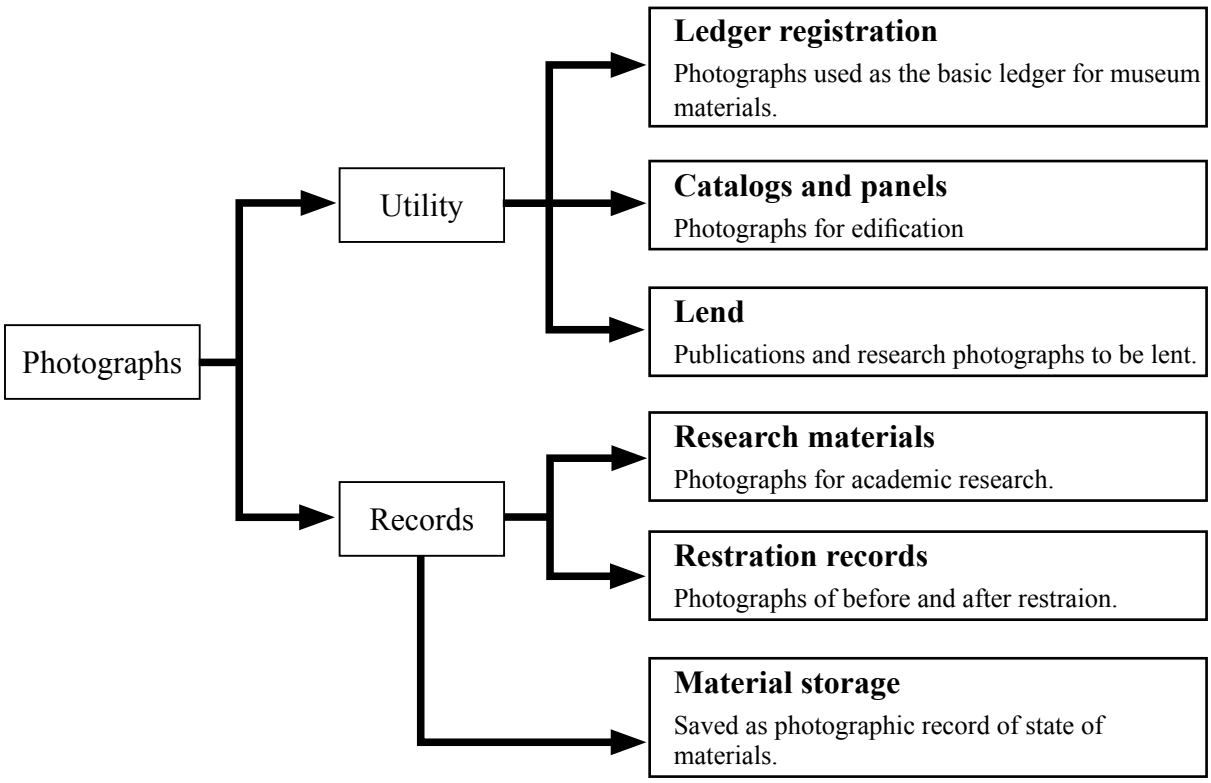


Fig. 1: Role of photographs

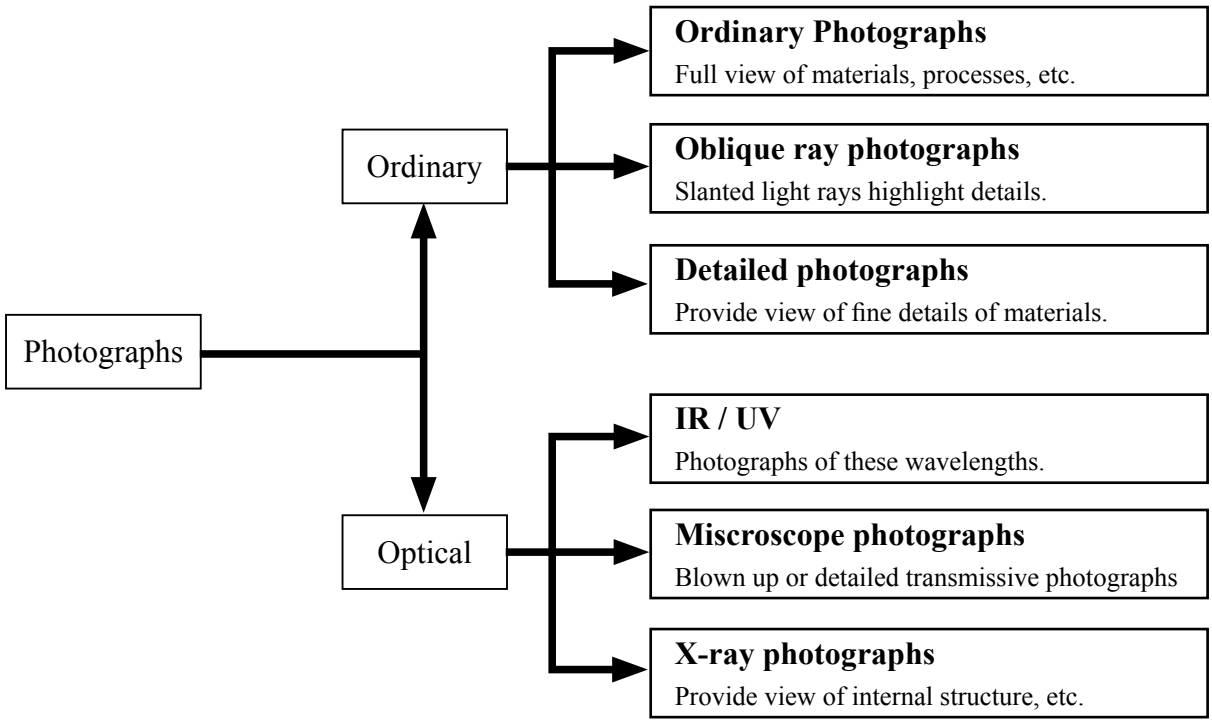


Fig. 2: Types of photographs

3. Types of cameras

There are various types of cameras, which differ according to film size. The larger the film size, the larger the camera tends to be. Larger film size also offers better picture quality. Consequently, larger cameras are used if better picture quality is desired. The size of the camera does not only affect picture quality. Single-lens reflex cameras take photographs in 24 x 36 mm rectangular format; there are also cameras that take 60 x 60 mm square photographs. The difference between rectangular and square significantly affects the photograph itself. Digital cameras also have a surface called CCD or CMOS that records images (photo-sensitive element). Just as with film size, the larger the surface, the better the picture quality generally is.

(1) 35 mm single-lens reflex camera

The most commonly used camera can flexibly adjust to various photographing conditions such as automatic focus, manual focus, macro photography, lens change, etc.

(2) Medium size cameras

Sixty millimeter roll film is referred to as "Brownie film." This type of film is used by medium sized cameras that take 60 x 45 mm or 60 x 90 mm photos. Medium size cameras are often equipped with separate film holders. Some conventional cameras can be converted to digital cameras by exchanging the film holder for a picture element such as a CCD picture element.

(3) Large cameras

Sheet film is changed for each photograph for large cameras. Film sizes include 4 x 5 inch (postcard size) and 8 x 10 inch (A4 size). Such film offers superior quality photographs. The photographer must however make all adjustments manually, including focusing and setting the diaphragm and shutter speed. The lens and film holders are connected by bellows, and therefor offer the advantage of tilt-shift photography to correct distortion that can be caused by the lens. Digital photographs can be taken by replacing the film holder with a picture element such as a CCD picture element.

4. Digital single-lens reflex camera

Digital cameras also come in many types that vary according to size, type and effective sensor resolution (hereinafter referred to as "pixels"). Here we have used a digital single-lens reflex camera equipped with a 35 mm picture element as a model. Let's take a look at its features.

***Pixel count**

If we enlarge the picture you can see a mosaic like image consisting of rows of squares. Each of these squares is called a "pixel." The number of pixels is the pixel count. For example, if the image consists of 4000 pixels vertically and 6000 pixels horizontally; it therefore consists of 4000 x 6000 pixels, or 24 million pixels. This is an index in addition to determining quality of a photographic record. It does not however mean the larger the pixel count, the better the picture quality is, but rather determines the total performance such as the lens precision and CCD recording format.

***Gradation**

Gradation expresses rich coloring for the factors that decide picture quality. Gradation refers to picture representation performance. Rich gradation enables expression with smooth color. There are shades of gray between white and black; some shades of gray are closer to white, while others are closer to black. If gradation is rich, color changes smoothly from white to black. If gradation is poor, smoothness is lost.

***Picture element**

Picture elements come in various sizes. Recently, many single-lens reflex cameras use 24 x 36 mm picture elements called "full size." 1/1.8 picture elements often used by compact cameras are only 1/16 the size of a 35 mm picture element. If the pixel count is the same for these picture elements. that is, 10 million pixels, the per pixel area of the 35 mm size would be larger. The larger per pixel area is able to receive more optical information, so gradation is richer (See Fig. 3).

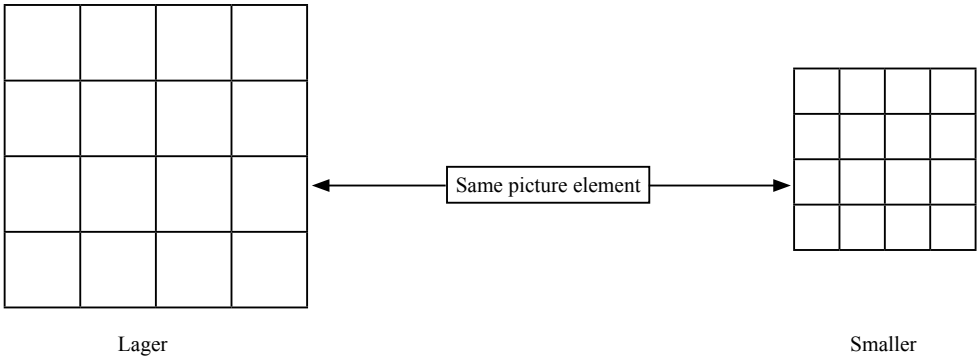


Fig. 3: Correlation of picture elements and gradation; The large area is capable of receiving more light.

***High sensitivity / noise prevention**

The larger the picture element, the larger per pixel area is and the more optical information it can contain. Improving efficiency of converting light to electronic information makes noise less likely to be produced. Also, because conversion is efficient, low intensity light can also be recorded efficiently, and better photographs can be taken because sensitivity is higher.

***Resolution**

Resolution indicates concentration of pixels per unit area for output. The number of pixels required depends on output method and size, but if the pixel count is too low, resolution will be low (see Fig. 4) and the image will not be clear. The number of pixels required for output size must be met (see Fig. 5).

Fig. 4: Unclear output
Low resolution
(Ex. 50 dpi 2 x 3 inch output)

Fig. 5: Clear output
Sufficient resolution
(Ex. 96dpi 2 x 3 inch output)

5. Digital photograph image saving format

Images photographed with a digital camera are first recorded as raw image files. With digital cameras such as single-lens reflex type, you can choose to save as raw image files or JPEG format. Compact digital cameras may only be capable of saving in JPEG format. JPEG format enables you to view the photos is all sorts of digital environments. Raw image files, on the other hand, can only be handled as they are, and must be processed on a computer. Image processing refers to converting digital data to a format that can be viewed such as JPEG or TIFF (See Fig. 6).

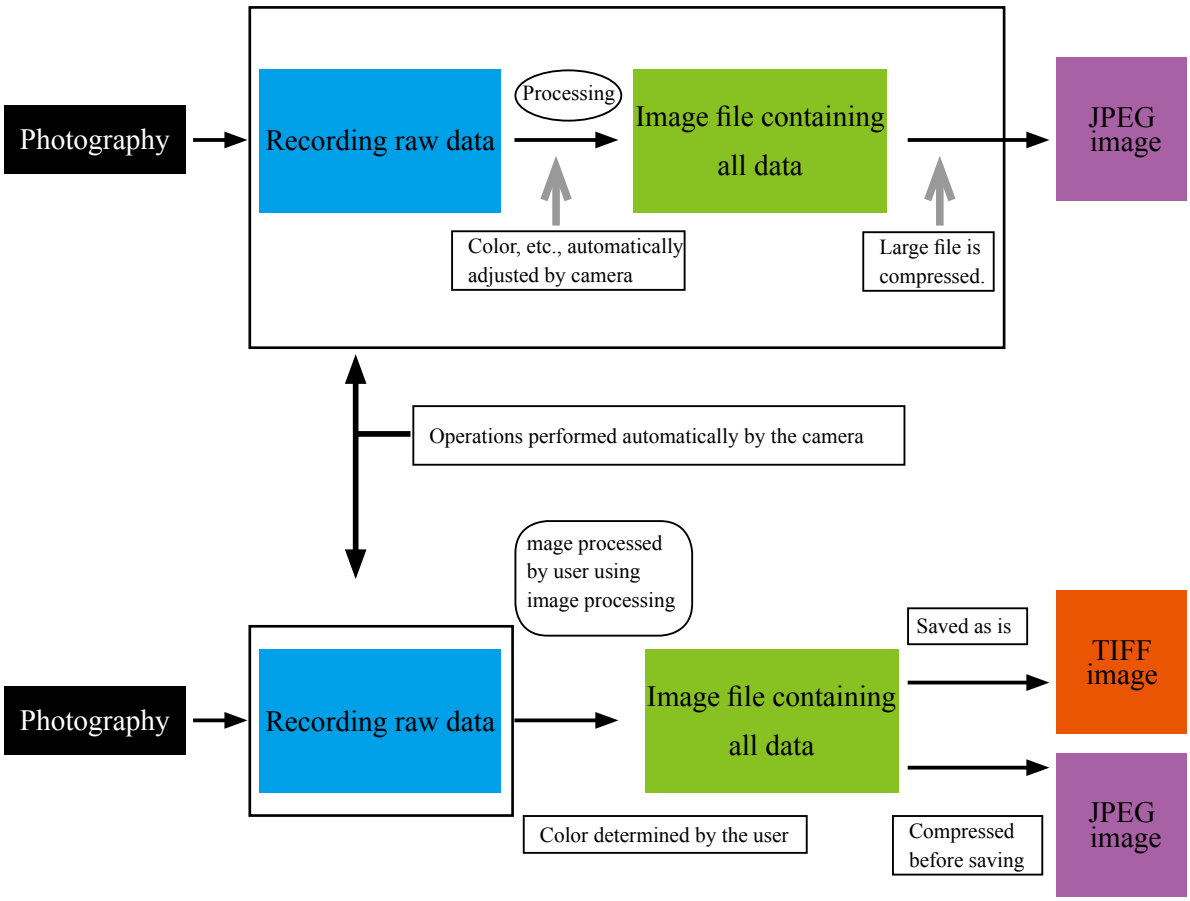


Fig. 6: JPEG format

***Raw image files**

Raw image files are the optical data obtained by photographing itself; raw image files are raw data prior to processing. Raw data (all data pertaining to the image) cannot be viewed as an image until it is processed. Raw data is the origin from which JPEG images are produced. The camera just automatically processes and compresses the raw data. As long as you have the raw data, you can avoid having the camera process it and decide the picture quality for you. Cultural properties must be saved as raw image files.

***JPEG format**

Image data obtained by a digital camera and saved in JPEG format is raw data that is automatically processed by the camera. Automatically processed image files are compressed to a degree where image quality is not affected. The degree of compression can usually be selected. If you want to preserve quality by maintaining a large file, you select a lower compression ratio, and if you prefer a smaller file with lower quality, you select a higher compression ratio. JPEG format maintains comparatively high quality even if the compression ratio is altered.

The drawback of JPEG format is that compression ratio is left up to the camera. The information of compressed files is inferior to the raw image data before being automatically processed by the digital camera; once data is lost it cannot be recovered. Because the data is automatically processed by the camera, aspects such color are determined by the processing; the images can only be processed within the parameters of the camera itself. Consequently, because photographs of cultural properties may have to be used in various sizes and subsequent processing may be required later on, processing by the camera is not really suited to such photography.

***TIFF format**

TIFF format allows photographic image data to be saved without compression, thereby maintaining the size of the file. Bitmap data, which simply consists of a mapped array of bits of optical data, is a basic format, and is therefore suited to a wide range of applications. TIFF format is a stable format with a high potential for being reproduced in the future. Uncompressed files can be quite large, but it the most suitable format for saving photographic image data of cultural properties that may have to be used in various sizes or subsequent processing may be required later on.

In the case of digital photography, no matter what format an image file may be saved or by what procedure it is saved, you must record the proper tone and light status by photographing a gray card or color target, and save the image data processed based on it, and then make use of the saved image data.

In the case of photographing using a gray card, light source by which the image was photographed and neutral tone are reproduced by computer based on gray without being affected by color bias, so it is necessary to save the digital image reproduced based on it when photographing cultural properties requiring precise recording. Details concerning the methods of photography and preproduction processing are provided in the attached document. Theses can be viewed by accessing the website at the following URL (Japanese only). http://maishaken.cool.ne.jp/cgi-bin/diarypro/data/upfile/5-1.pdf

6. Mechanism by which a photograph is taken

Up to this point, we have talked primarily about cameras. Now we will talk about the mechanism by which photographs are taken to produce the desired results.

***Photograph and exposure**

For our purposes, the object of taking a photograph is to record the subject exactly as it is. To do this, the image of the subject is reflected by adjusting the focus and shutter speed. The light that enters the camera through the lens must be properly recorded on the surface of the film or picture element. Adjusting the proper amount of light is called "exposure." As long as the light is adjusted to the proper amount, the subject will be photographed at the correct exposure. The diaphragm adjusts the size of the aperture through which the light enters. If the diaphragm is opened, more light enters, and if it is closed, only a small amount can enter. Shutter speed is the amount of time the shutter the covers the aperture through which light passes is open. If the film or picture element continues to be exposed to light longer than is needed, the photograph will eventually appear white. "Overexposure" occurs when there is too much light. Inversely, if there is not enough light, the photograph will be dark. This is referred to as "underexposure."

***Function of the diaphragm**

We learned that the amount of light can be adjusted by how much the aperture of the diaphragm is opened. Now let’s take a look at how this works. Under ordinary circumstances, the lens are marked with FX. X, FY and FZZ. These units are diaphragm numbers called "f numbers." The larger the diaphragm number, the smaller the aperture is, and the smaller the number, the large the aperture becomes.

***Function of shutter speed**

Shutter speed is the amount of time between when the camera shutter is pressed, the shutter opens, light comes in through the aperture in the diaphragm, and the shutter closes, thereby ending exposure. Cameras are equipped with a shutter speed adjustment function.

***Correlation of the diaphragm and shutter speed**

How do the diaphragm and shutter speed affect the photograph? Here is a photograph taken with the f number set to F8 and correct exposure of 1/125 of a second. If we consider the diaphragm and shutter speed, several patterns of correct exposure can be prepared. If for example we think we can get correct exposure by changing the setting of the diaphragm from F8 to F16, the diaphragm aperture becomes smaller and the amount of light that passes through the diaphragm aperture is reduced. In order to secure the amount of light necessary for correct exposure, we must therefore reduce the shutter speed. Oppositely, if we change the setting from F8 to F4, the amount of light that passes through the aperture increases, so shutter speed must be increased.

***Correct exposure and exposure compensation**

If the built-in automatic exposure function of the camera is used, the diaphragm aperture and shutter speed are automatically adjusted according to the amount of light that the camera determines to be correct exposure. Both may however exist simultaneously if the subject is too light or dark, or is photographed against a white backdrop, and the exposure may consequently not be correct for the subject. The light distribution of the entire screen is calculated according to the characteristics of the camera to determine correct exposure, and the camera is incapable of determining what the subject is. If photographing a dark subject against a bright backdrop, the camera determines the amount of light for the entire screen and darkens the exposure; correct exposure can however be obtained if the photographer takes the initiative to brighten the exposure. If photographing a bright subject against a dark backdrop such as black or gray, correct exposure can be obtained if the photographer takes the initiative to darken exposure. This is called "exposure compensation." Positive compensation is provided for a bright subject and negative compensation for a dark subject in order to archive correct exposure. The method by which exposure compensation is achieved differs according to the camera. It is important to read the camera's instruction manual carefully and get empirical knowledge of the procedures.

***Focus range = field depth and focus depth** (Fig. 7)

One function of the diaphragm is to adjust the amount of light, but it has another important role, i.e., to adjust focus range. Increasing the f number widens the focus range, and decreasing it shrinks the range. The focus range is referred to as "field depth." Field depth varies according to the type of lens as well as the diaphragm setting.

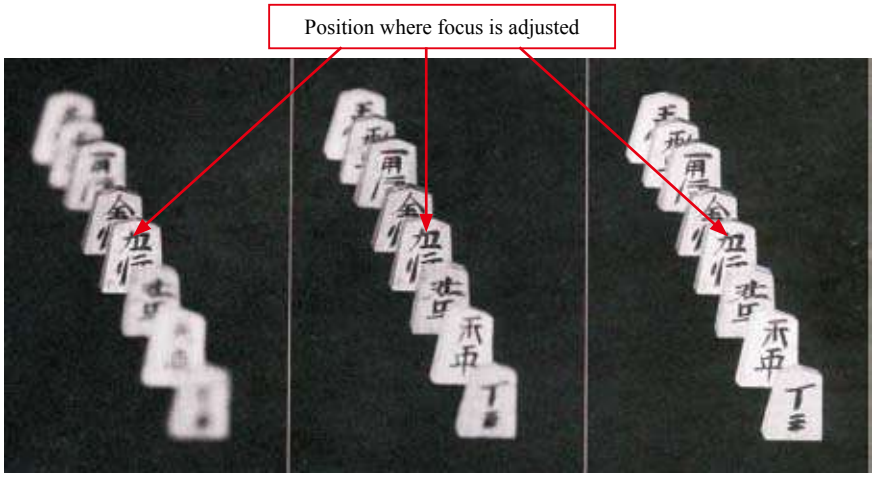


Fig. 7: Field depth and focus depth

The photograph taken with F22 appears sharper than the one taken with F2.8. This tells us that the range(field depth) of F22 is wider. The focus is behind the silver general in the photograph taken with the F2.8 setting. This tells us that focus depth is the rear surface.

***ISO sensitivity**

The mechanism by which photographs are taken contains another important factor. The factor is "sensitivity." "ISO sensitivity" is the sensitivity for the films reaction with light. In other words, the reaction differs according to the sensitivity with which the film receives the same amount of light.

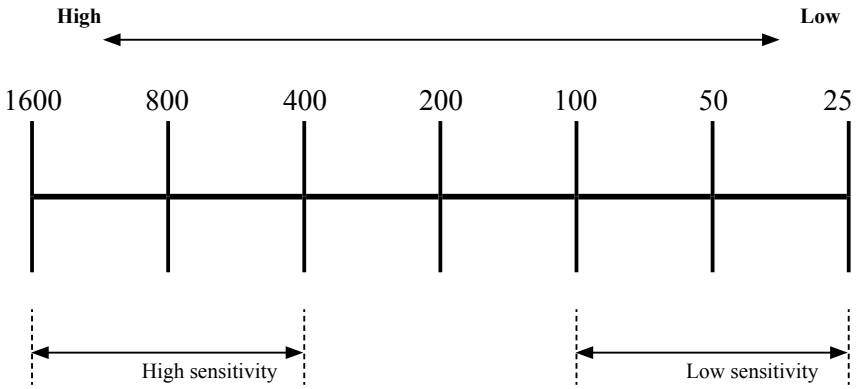


Fig. 8: ISO sensitivity

As shown in Fig. 8, The higher the number, the higher sensitivity is, and the lower the number, the lower the sensitivity is. This means that the higher sensitivity is, the less light is needed to take photographs, and the lower the sensitivity is, the more light it takes to achieve correct exposure.

There are several combinations of diaphragm and shutter speed settings that realize correct exposure. The same goes for ISO sensitivity. Changing from ISO100 to ISO200 is the same as changing the diaphragm and shutter speed settings by one increment. The higher ISO sensitivity is, however, the more gradation and sharpness deteriorate, regardless of whether film or digital medium is used. ISO sensitivity must be carefully set (see Fig. 9). Cultural properties may generally be photographed with sensitivity set between ISO100 - 200.

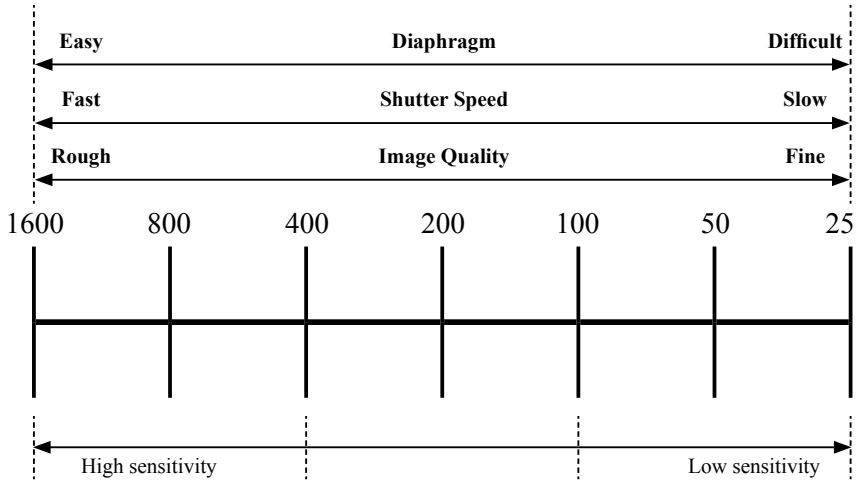


Fig. 9: Correlation of ISO sensitivity and diaphragm setting

7. Light orientation = Lighting

It would not be an exaggeration to say lighting and composition are everything to photographing point when photographing cultural properties. Light orientation -- the angle at which light strikes the subject -- is an element that has a decisive effect on the quality of the photographs. With the exception of special circumstances, the fundamentals of lighting refer to making it reflect off the walls, or flexible "indirect light" such as light dispersed through tracing paper or white cloth. With direct light, strong shading or halation are caused by the angle of the light, resulting in a photograph that does not convey enough information. Lighting includes types with various functions. The light beams that affect expression and atmosphere are called "main light,"and the light beams that adjust brightness of the subject are called "sub light." Key light, which is used to express fine parts of the subject or top light / sky light, which adjust brightness of the background are sometimes used.

Quite a significant amount of heat is produced by lighting equipment. Organic substances, in particular, may be damaged by rapid drying. It is consequently necessary to device a way to minimize irradiation time.

***Main light irradiation direction and effect**

***Forward light (light from front)**

State where the subject receives light from the front; in this state, the photograph provides a planar impression. This type of lighting produces a dark vertical shadow according to the irregularities of the subject. This type is not generally used because shading of the subject cannot be expressed.

***Oblique light (oblique light from the side)**

Forward oblique light from the side. Part where light is angled and shading is pronounced. Produces a more 3-dimensional photograph than forward light. Most basic type of light.

***Side light (light completely from the side)**

Light directly from the side of the subject. Irregularities on the surface of the subject can be clearly recognized.

***Top light (light from directly above)**

State where the subject receives light from directly above. Does not tend to produce a shadow, so there is no need to worry about the direction in which the shadow will be produced.

***Back light**

Light that strikes the subject from directly behind.

***Semi back light**

Light that strikes the subject obliquely from behind.

***Transmission light**

Light that clearly shows the contour, etc., of the subject. Used in combination with forward light and oblique light. Subjects are photographed using combinations of these types of light so the subject can be recognized well.

***Photographing pottery shards and stone tools from above**

In order to avoid the shadow of the subject from falling into the background thereby making the contour unclear, the subject is placed on a sheet of transparent glass that if raised from the background. If the background is not bright enough, brightness is adjusted by shining auxiliary light on the background. The subject and background are both basically illuminated by main light. It is necessary to come up devise measures to avoid producing halation for shiny subjects such as stone tools made of obsidian, such as using reflected light or creating indirect light using tracing paper.

***Photographing planar subjects such as ancient texts from above**

Subjects such as ancient texts are placed on a copier and photographed from above. A level is first however placed on the camera and the subject is set parallel to the camera. The entire subject is uniformly illuminated. The light source is aimed at the copier with lamps set at 45 degree angles to the left and right.

***Photographing using paper backdrop**

Color of the paper backdrop is selected according to the color of the subject. A neutral color such as gray or white is generally used to avoid color transfer to the subject. Illumination varies according to the size and 3-dimensional structure of the subject, but basically consists of a combination of top light and main light.

8. Structural outline

Photography is the act of forcing the subject to fit in a limited frame. The appearance of the photograph varies according to the way it is fit into the frame, in other words, the structural outline.

***1/3 structural outline**

This is the method of arranging the subject by separating the screen into 1/3 horizontally and vertically.

***Structural outline with subject in center:**

Structural outline with the subject positioned in the center of the screen. The information you want to convey about the object to be photographed is directly expressed. Lots of museum materials are photographed using this structural outline. Since it is used for publications and so on as well, a proper margin is left around the subject.

***Camera angle**

When considering the structural outline, it is important to think about what is to be placed where. It is also important to consider from where the subject is to be photographed, in other words, the camera angle. The impression varies according to whether the subject is photographed from a high or low angle, or from a frontal angle. The appearance of the subject also varies if the left and right angles are changed.

9. Lens

Lens are classified by millimeter units. This is referred to as "focal length." If the focal length is small, it is capable of photographing a wide angle (wide angle lens), and if it is large, it can zoom in on a limited range (telephoto lens). In addition to these, there are standard lens that can photograph from close up without restriction.

Telephoto lens

Standard lens

Wide Angle lens

10. Image processing

In the case of film, color tone and contrast are adjusted when developing. In the case of digital photographs, images are processed using image processing software such as Photoshop after photographing. These processes are classified as "adjustment" or "processing." Operation differs according to the type of image processing software used. The user must therefore read the software manual well familiarize himself with operation.

***Adjustment**

Adjustment refers to precise adjustment of color tome reproduction or contrast, trimming, etc. This task is always required when processing digital images. In an ideal situation, digital images should basically not be processed any more than necessary for saving. It is therefore important to sufficiently consider photographing conditions before taking pictures.

***Processing**

Processing basically includes getting rid off unwanted images, converting color tones or altering color of the subject; it also refers to adding effects, etc., to images. There are many problems with processing photographs of cultural properties which play an important role as a record. Photographs are not processed under ordinary circumstances.

ຄວາມຮູ້ພື້ນຖານຂອງການຖ່າຍຮູບວັດຖຸບູຮານ

ສູນຄົ້ນຄວ້າວັດຖຸບູຮານນະຄອນ ຫ້ອງຖ່າຍຮູບ

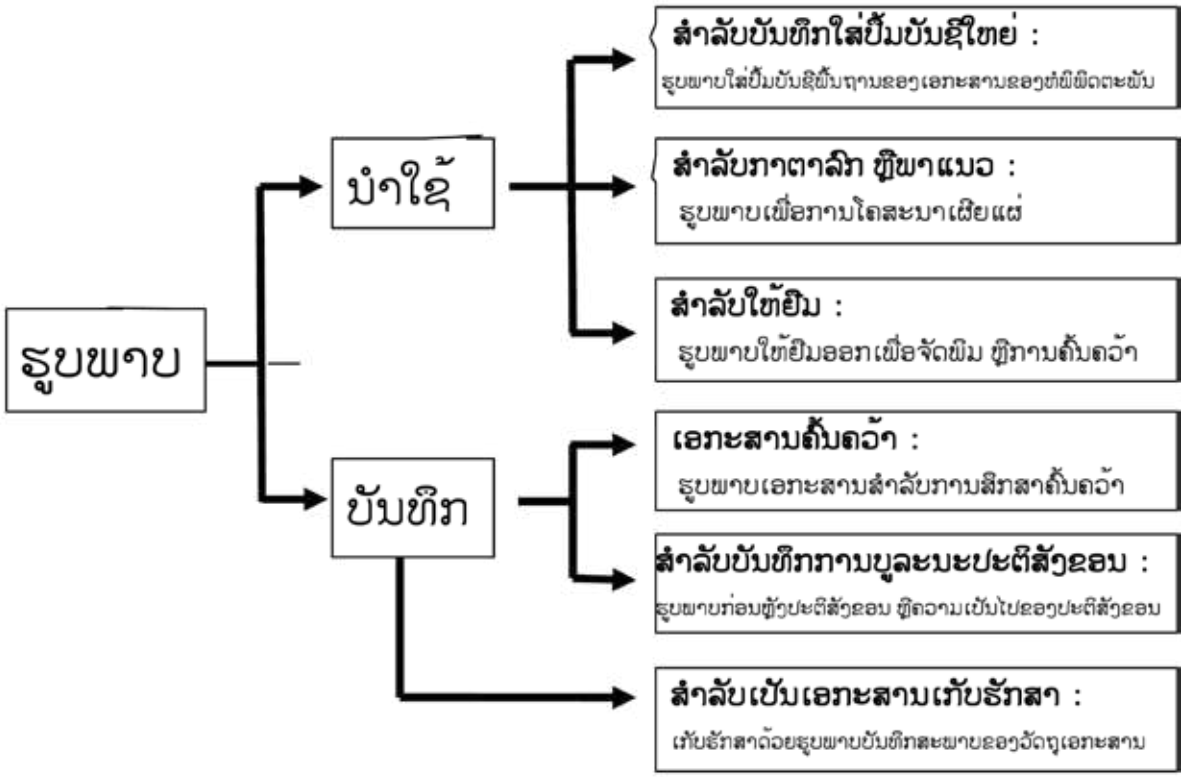
1. ຄຳນຳ

ຄວາມຈຳເປັນແລະຂາດບໍ່ໄດ້ຂອງຮູບພາບໃນການສຳຫຼວດວັດຖຸບູຮານເປັນສິ່ງທີ່ຮູ້ກັນດີໃນບັນດາຜູ້ຄົ້ນທີ່ເຮັດວຽກສຳຫຼວດ. ແຕ່ກໍມັກຖ່າຍໂດຍບໍ່ໄດ້ມີການທຳຄວາມເຂົ້າໃຈ "ເປົ້າໝາຍຂອງການຖ່າຍຮູບ" ແລະ "ລະບົບໂຄງສ້າງຂອງການຖ່າຍຮູບ" ຈຶ່ງບໍ່ສາມາດຖ່າຍຮູບທີ່ກຳໄດ້ຂໍ້ມູນທີ່ມີຄຸນຄ່າ.ຮາກຖານຂອງຮູບພາບວັດຖຸບູຮານແມ່ນການບັນທຶກເປັນເອກະສານທີ່ບໍ່ມີຂໍ້ມູນໃດຂາດຕົກບົກຜ່ອງເພື່ອເກັບໄວ້ຍາວນານ, ໃນປະເດັນນີ້ຈະເປັນການຖ່າຍຮູບທີ່ມີປະລິມານຂໍ້ມູນຢ່າງຫຼວງຫຼາຍ ທັງເປັນຮູບທີ່ມີຄຸນຄ່າໃນການນຳໃຊ້ສູງ ແລະເກັບຮັກສາໄວ້, ລະບົບໂຄງສ້າງເຫຼົ່ານີ້ເປັນສິ່ງທີ່ຍາກໃຫ້ຄົນຮູ້ເຂົ້າ.

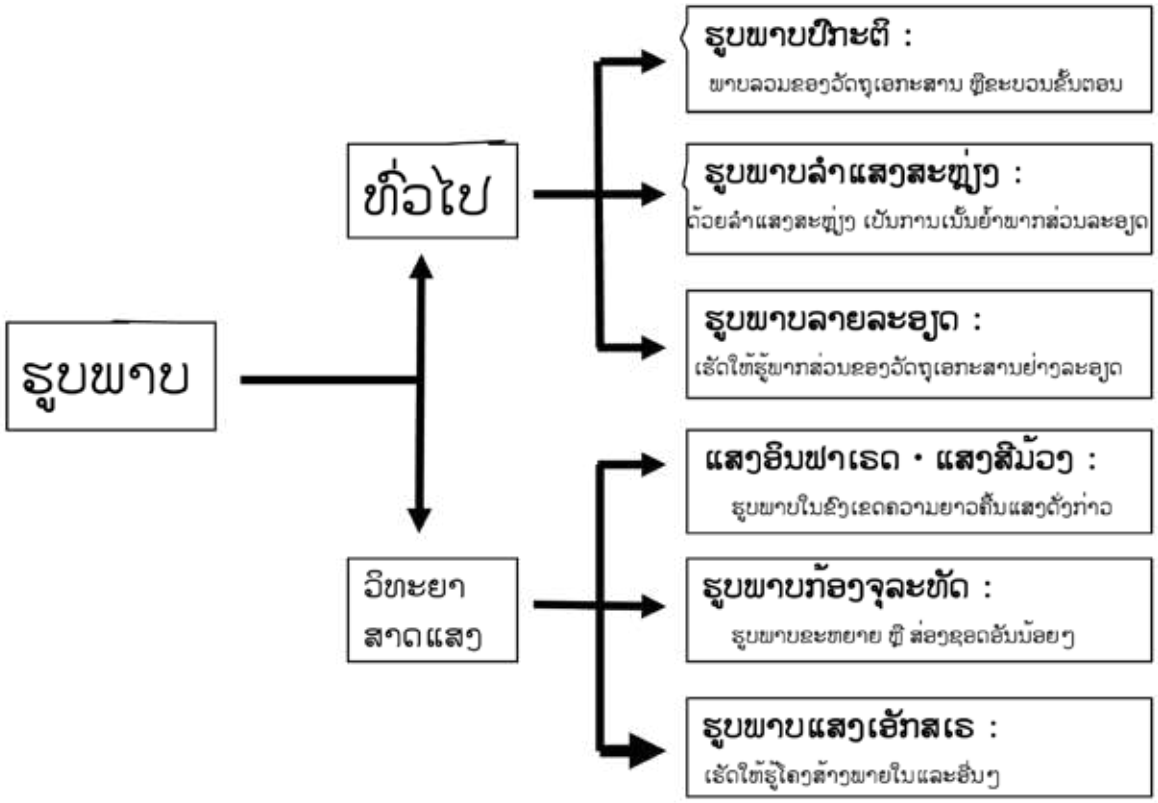
2. ພາລະໜ້າທີ່ ແລະປະເພດຂອງຮູບພາບໃນຂະແໜງວັດຖຸບູຮານ

ໃນຮູບພາບວັດຖຸບູຮານ ດັ່ງຮູບ-1 ຮູບພາບບັນທຶກເປັນຮູບພາບນຳໃຊ້ໃນວຽກງານທີ່ກ່ຽວຂ້ອງ ແລະຮູບພາບທີ່ໃຊ້ໃນການຄົ້ນຄວ້າສຳຫຼວດ ຫຼືໃນການບູລະນະປະຕິສັງຂອນ. ນອກນີ້ ຮູບ-2 ຮູບພາບທົ່ວໄປທີ່ນຳໃຊ້ຢ່າງຫຼວງຫຼາຍໃນຊີວິດປະຈຳວັນ ແລະຮູບພາບທີ່ໃຊ້ຖ່າຍດ້ວຍແສງອິນຟາເຣດ ຫຼືວ່າ ແສງເອັກສເຣທີ່ໃຊ້ໃນການສຳຫຼວດແບບວິທະຍາສາດແສງ.

ຮູບ-1 ພາລະໜ້າທີ່ຂອງຮູບພາບ



ຮູບ-2 ປະເພດຂອງຮູບພາບ



3. ຊະນິດຂອງກ້ອງຖ່າຍຮູບ

ກ້ອງຖ່າຍຮູບມີຫຼາຍຊະນິດອີງຕາມຂະໜາດຂອງຟິມ. ເມື່ອຟິມມີຂະໜາດໃຫຍ່ຂຶ້ນ ໂຕກ້ອງຖ່າຍຮູບກໍໃຫຍ່ຂຶ້ນ, ຄຸນະພາບຂອງຮູບພາບກໍດີຂຶ້ນ. ສະນັ້ນ ຖ້າຢາກໄດ້ຮູບພາບທີ່ມີຄຸນະພາບດີກໍຈະຕ້ອງໃຊ້ກ້ອງຂະໜາດໃຫຍ່. ນອກຈາກນີ້ ຂະໜາດຂອງກ້ອງຖ່າຍຮູບຈະບໍ່ປ່ຽນແປງພຽງແຕ່ຄຸນະພາບຂອງຮູບພາບເທົ່ານັ້ນ. ກ້ອງປ່ຽນເລັນ ທີ່ຖ່າຍດ້ວຍຟອກແມັດສີ່ແຈສາກ 24ມມx26ມມ, ແລະ ຍັງມີກ້ອງຖ່າຍ ດ້ວຍຟອກແມັດຈະຕຸລັດ 60 ມມx60ມມ. ຄວາມຕ່າງຂອງຮູບສີ່ແຈສາກ ແລະຮູບຈະຕຸລັດຈະເຮັດໃຫ້ພາບລັກຂອງຮູບພາບແຕກຕ່າງຢ່າງໃຫຍ່ຫຼວງ. ກ້ອງດີຈິຕອນກໍມີແຜ່ນຈໍຮັບພາບ(ແຜ່ນບັນທຶກພາບ)ທີ່ເອີ້ນວ່າ CCD, CMOS, ແລະກໍເປັນແບບດຽວຂະໜາດຂອງຟິມ ໂດຍທົ່ວໄປເມື່ອມີຂະໜາດໃຫຍ່ຂຶ້ນຄຸນະພາບຂອງພາບກໍຈະດີຂຶ້ນ.

① ກ້ອງປ່ຽນເລັນ35ມມ

ເປັນກ້ອງທີ່ຖືກນຳໃຊ້ທົ່ວໄປແລະຫຼວງຫຼາຍ, ເປັນກ້ອງທີ່ມີທັງຖ່າຍຮູບແບບໂຟກັດອັດຕະໂນມັດ, ແບບໂຟກັດມື, ຖ່າຍໃກ້, ແບບປ່ຽນເລັນ ແລະອື່ນໆ ເວົ້າໄດ້ວ່າເປັນກ້ອງທີ່ຕອບສະໜອງໄດ້ຢ່າງຍືດຍຸ່ນກັບຫຼາຍໆ ສະພາບການຖ່າຍຮູບ.

② ກ້ອງຖ່າຍຮູບຂະໜາດກາງ

ຄວາມກວ້າງຂອງຟິມ60ມມ ແບບກ້ ເຊິ່ງຟິມແບບນີ້ເອີ້ນວ່າ ຟິມບາວນີ(Browne). ກ້ອງທີ່ໃຊ້ຟິມບາວນີ ແມ່ນກ້ອງຖ່າຍຮູບຂະໜາດກາງ, ແຜ່ນຟິມມີຂະໜາດ 60ມມx45ມມ, 60ມມx90ມມຕ່າງໆ. ກ້ອງຖ່າຍຮູບຂະໜາດກາງສ່ວນຫຼາຍມີຕົວກ້ອງຖ່າຍຮູບແລະຕົວຈັບຟິມແຍກກັນ. ສະນັ້ນ ກ້ອງຖ່າຍບາງອັນເມື່ອປ່ຽນແຜ່ນຟິມເປັນແຜ່ນຈໍຮັບພາບແບບCCDຫຼືແບບອື່ນໆ ກໍຈະໃຊ້ເປັນກ້ອງດີຈິຕອນ.

③ ກ້ອງຖ່າຍຮູບຂະໜາດໃຫຍ່

ກ້ອງຖ່າຍຮູບຂະໜາດໃຫຍ່ຈະປ່ຽນຟິມທີ່ເປັນໃບທຸກໆທີ່ຖ່າຍຮູບ. ຂະໜາດຂອງຟິມແມ່ນ 4x5ນິ້ວ(ໂປສຄາດ), 8x10ນິ້ວ(ເຈ້ຍA4) ແລະອື່ນໆ ເຊິ່ງຖ່າຍໄດ້ພາບທີ່ມີຄຸນະພາບຍິດງາມ. ການຖ່າຍຮູບຈຳເປັນຕ້ອງເລີ່ມຈາກປັບຈຸດໂຟກັດ, ຄວາມກວ້າງຂອງເລັນ, ຄວາມໄວຂອງຊັດເຕີ ແລະຄ່າອື່ນໆ ດ້ວຍຕົນເອງ. ເລັນ ແລະຕົວຈັບຟິມຈະເຊື່ອມຕໍ່ກັນດ້ວຍແຜ່ນຍືດຫົດໄດ້ ຍ້ອນແນວນີ້ ເລັນບາງອັນຈະມີຈຸດແຂງໃນການຖ່າຍຮູບຂ້ອນເງີຍໄດ້ ເຊິ່ງຈະສາມາດດັດແກ້ຄວາມບິດບ້ຽວຂອງວັດຖຸທີ່ຖ່າຍທີ່ຕັ້ງຢູ່. ກ້ອງກໍເຊັ່ນກັນ ເມື່ອປ່ຽນແຜນຈັບຟິມເປັນແຜ່ນຈໍຮັບພາບແບບCCDຫຼືແບບອື່ນໆ ກໍຈະໃຊ້ເປັນກ້ອງດີຈິຕອນ.

4. ກ້ອງດີຈິຕອນດີເອສເອວອາ

ກ້ອງດີຈິຕອນຈະຖືກແບ່ງປະເພດຕາມຂະໜາດຂອງຈໍຮັບພາບ CCDຫຼືຈໍຮັບພາບແບບອື່ນໆ, ປະເພດຂອງຈໍຮັບພາບ, ຂະໜາດຈຸດຮັບພາບທີ່ມີຜົນ(ຄວາມຄົມຊັດ) ແລະອື່ນໆ. ນະທີ່ນີ້ ຈະກ່າວເຖິງຈຸດພິເສດຂອງກ້ອງດີເອສເອວອາທີ່ມີຈໍຮັບພາບຂະໜາດ 35ມມ.

◆ຂະໜາດຈຸດຮັບພາບ

ເມື່ອເຮົາຂະຫຍາຍຮູບພາບໃຫ້ໃຫຍ່ຂຶ້ນຈະເຫັນເປັນສີ່ແຫຼ່ມຄືກັບພາບເຊັ່ນເຊີລຽງກັນຢູ່. ນີ້ ແຕ່ລະອັນແຕ່ລະອັນເອີ້ນວ່າ ຈຸດພາບ(pixel). ແລະຂະໜາດຈຸດຮັບພາບເປັນສິ່ງທີ່ສະແດງເຖິງຈຳນວນຂອງຈຸດພາບເຫຼົ່ານີ້ມີຫຼາຍປານໃດ. ຕົວຢ່າງ ທາງຕັ້ງ 4000ຈຸດພາບ • ທາງຂວາງ 6000ຈຸດພາບລຽງກັນ ຈະໄດ້ຮູບພາບທີ່ມີຂະໜາດ 4000x6000 ຈະເປັນຮູບພາບທີ່ມີ2.4ລ້ານຈຸດພາບ. ຂະໜາດຈຸດຮັບພາບນີ້ເປັນໜຶ່ງໃນດັດສະນີວັດແທກຄຸນະພາບຂອງການບັນທຶກພາບ, ແຕ່ກໍບໍ່ໄດ້ໝາຍຄວາມວ່າ ຂະໜາດຈຸດຮັບພາບຫຼາຍແລ້ວຈະເຮັດໃຫ້ຄຸນະພາບຫຼາຍຂຶ້ນ, ຄວາມສາມາດການສາຍຂອງເລັນ ແລະວິທີການບັນທຶກພາບຂອງຈໍຮັບພາບCCD ແລະປັດໄຈຕ່າງໆມາເປັນຄວາມອາດສາມາດໂດຍລວມເປັນຕົວກຳນົດຄຸນະພາບຂອງການບັນທຶກພາບ.

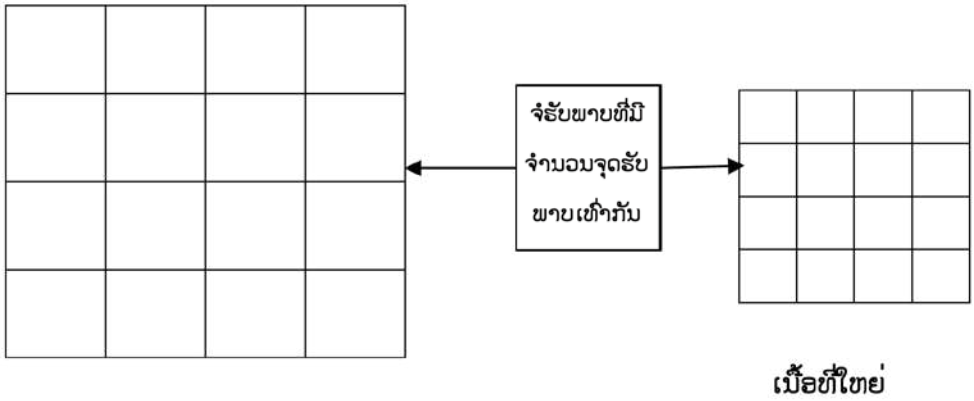
◆ລະດັບປ່ຽນຊັ້ນສີ

"ລະດັບປ່ຽນຊັ້ນສີ" ເປັນອົງປະກອບ ຫຼືປັດໄຈໜຶ່ງທີ່ບົ່ງບອກຄຸນະພາບຂອງຮູບພາບເຊິ່ງສະແດງເຖິງຄວາມອຸດົມສົມບູນຂອງສີສັນ. ລະດັບຊັ້ນຂັ້ນໝາຍເຖິງຄວາມອາດສາມາດໃນການສາຍຮູບພາບ(ສະແດງ). ເມື່ອລະດັບປ່ຽນຊັ້ນສີອຸດົມສົມບູນເທົ່າໃດຍິ່ງເຮັດໃຫ້ສີສັນມີຄວາມລຽບນວນ. ຢູ່ລະຫວ່າງສີຂາວແລະສີດຳແມ່ນສີຂີ້ເຖົ່າ, ໃນສີຂາວກໍຈະມີສີຂາວທີ່ຢູ່ໃກ້ສີຂີ້ເຖົ່າ, ສີດຳກໍເຊັ່ນກັນ ກໍຈະມີສີດຳທີ່ຢູ່ໃກ້ສີຂີ້ເຖົ່າ. ຖ້າລະດັບປ່ຽນຊັ້ນສີມີອຸດົມສົມບູນ ຈາກສີຂາວຫາສີດຳ ສີກໍຈະປ່ຽນຢ່າງລຽບແລະນຸ້ມນວນ. ແຕ່ຖ້າລະດັບປ່ຽນຊັ້ນສີຂາດຄວາມອຸດົມສົມບູນຄວາມລຽບແລະນຸ້ມນວນນີ້ກໍຈະຂາດຫາຍໄປ.

◆ຈໍຮັບພາບ

ຈໍຮັບພາບຈະມີຫຼາຍໆຂະໜາດ. ໃນມໍ່ໆນີ້ ກ້ອງດີເອສເອວອາທີ່ມີຂະໜາດຈໍຮັບພາບ 24x36ມມ ມີຫຼາຍ. ກ້ອງຖ່າຍຮູບແບບກະທັດຮັດສ່ວນໃຫຍ່ຈໍຮັບພາບຂະໜາດ1/1.8 ເຊິ່ງມີຂະໜາດພຽງແຕ່1ສ່ວນ16ເທົ່າຂອງຈໍຮັບພາບ35ມມເທົ່ານັ້ນເອງ. ຖ້າວ່າ ຈໍຮັບພາບເຫຼົ່ານີ້ມີຂະໜາດຈຸດຮັບພາບ 10ລ້ານຈຸດຄືກັນ ສະແດງວ່າ 1ຈຸດຮັບພາບຂອງຂະໜາດ35ມມຈະມີເນື້ອທີ່ໃຫຍ່ກວ່າ. ເນື້ອທີ່ຕໍ່ຈຸດຮັບພາບໃຫຍ່ຈະສາມາດຮັບຂໍ້ມູນປະລິມານແສງໃນໜຶ່ງເທື່ອໄດ້ຫຼາຍກວ່າ, ເຊິ່ງຈະເຮັດໃຫ້ມີລະດັບປ່ຽນຊັ້ນສີອຸດົມສົມບູນ.(ຮູບ-3)

ຮູບ-3 ຄວາມສຳພັນຂອງຈຸຮັບພາບ ແລະ ລະດັບປຸ່ນຊັ້ນສີ



ເນື້ອທີ່ໃຫຍ່

◆ຜົນປະໂຫຍດລະດັບເຊັນເຊີ(ຮັບຮູ້)ສູງ ແລະການປ້ອງກັນສິ່ງລົບກວນ(ນອຍສ໌)

ເມື່ອຈຸຮັບພາບໃຫຍ່ຂຶ້ນເນື້ອທີ່ຕໍ່1ຈຸດຮັບພາບກໍ່ເພີ່ມຂຶ້ນ, ປະລິມານຂໍ້ມູນຂອງແສງກໍເພີ່ມຂຶ້ນ. ຍ້ອນແນວນັ້ນ ຈະໄປຍົກສູງປະສິດທິພາບການແລກປ່ຽນຈາກແສງປ່ຽນເປັນຂໍ້ມູນເອເລັກຕ໊ງ, ເຮັດໃຫ້ສິ່ງລົບກວນ(ນອຍສ໌)ເກີດຍາກຂຶ້ນ. ນອກນີ້, ຍ້ອນປະສິດທິພາບການແລກປ່ຽນດີຂຶ້ນ ຈະສາມາດບັນທຶກແສງທີ່ມີລະດັບປະກາຍໜ້ອຍໄດ້ຢ່າງມີປະສິດທິພາບ ທັງເຮັດໃຫ້ການຖ່າຍພາບລະດັບເຊັນເຊີສູງໄດ້ດີອີກ.

◆ຄວາມລະອຽດຄົມຊັດ

ຄວາມລະອຽດຄົມຊັດບົ່ງບອກຄວາມໜາແໜ້ນຂອງຈຸດພາບຕໍ່ຫົວໜ່ວຍເນື້ອທີ່ໃນເວລາພິມອອກມາ. ຈຸດພາບຈຳເປັນຕ້ອງຕອບສະໜອງຕາມວິທີການ ແລະຕາມຂະໜາດພິມອອກມາ, ຖ້າວ່າ ຈຳນວນຈຸດພາບບໍ່ພຽງພໍ ຈະເຮັດໃຫ້ຄວາມລະອຽດຄົມຊັດຢູ່ໃນສະພາບທີ່ຕ່ຳບໍ່ດີ (ຮູບ-4), ຈຸດພາບກໍຢູ່ໃນສະພາບບໍ່ຄົມຊັດ. ດັ່ງນັ້ນ ຈຳນວນຈຸດພາບຈຳເປັນຕ້ອງຕອບສະໜອງກັບຂະໜາດທີ່ໃຊ້ ແລະສະໜອງກັບຄວາມລະອຽດຄົມຊັດ.

ຮູບ- ພິມສະແດງບໍ່ຄົມຊັດ
ຄວາມລະອຽດຄົມຊັດຕ່ຳ

ຮູບ-5 ພິມສະແດງຄົມຊັດ
ຄວາມລະອຽດຄົມຊັດພຽງພໍ

Ex. ພິມ50dpi・2 × 3 inch

Ex. ພິມ96dpi・2 × 3 inch

5. ຮູບແບບຟາຍເກັບຮັກສາຮູບພາບຖ່າຍດີຈີຕອນ

ຮູບພາບທີ່ຖ່າຍດ້ວຍກ້ອງດີຈີຕອນຈະຖືກບັນທຶກໃນຮູບແບບຟາຍRAWກ່ອນ, ໃນກ້ອງດີເອສເອວອາໂດຍທົ່ວໄປຈະເລືອກເອົາRAWຫຼືJPEG, ຫຼືວ່າ ເລືອກໃຫ້ບັນທຶກທັ້ງສອງຮູບແບບ. ໃນກ້ອງດີຈີຕອນແບບກະທັດຮັບໂດຍທົ່ວໄປຈະບັນທຶກໄດ້ພຽງແຕ່ແບບJPEGເທົ່ານັ້ນ. ຟາຍແບບJPEGຈະສາມາດສາຍເບິ່ງໄດ້ກັບຄອມພິວເຕີ ຫຼືເຄື່ອງພິມດີຈີຕອນທົ່ວໆໄປໄດ້ເລີຍ. ອີກອັນໜຶ່ງຟາຍແບບRAW ຈະບໍ່ສາມາດນຳມາສາຍເບິ່ງຮູບໄດ້ເລີຍໂລດ , ເຊິ່ງຈຳຕ້ອງໄດ້ "ຜ່ານການລ້າງຮູບ-DEVELOP" ໃນຄອມພິວເຕີກ່ອນ. ການລ້າງຮູບນີ້ ໝາຍເຖິງຂະບວນການປ່ຽນຂໍ້ມູນດີຈີຕອນຂອງຂໍ້ມູນແສງໃຫ້ເປັນຮູບແບບຟາຍທີ່ສາມາດເບິ່ງເຫັນເຊັ່ນJPEG ຫຼື TIFFແລະແບບອື່ນໆ. (ຮູບ-6)

◆RAW(ຂໍ້ມູນດິບ)

RAW ໝາຍເຖິງ "ຂໍ້ມູນຂອງແສງ" ທີ່ຮັບມາເມື່ອຖ່າຍຮູບນັ້ນເອງ, ເຊິ່ງເປັນຕົວເລກຂໍ້ມູນດິບ(RAW)ກ່ອນການລ້າງເປັນຮູບ. ຕົວເລກຂໍ້ມູນດິບທີ່ປະກອບດ້ວຍຂໍ້ມູນທຸກສິ່ງຢ່າງທີ່ກ່ຽວຂ້ອງກັບຮູບພາບຖ້າບໍ່ເອົາມາລ້າງຮູບກ່ອນຈະບໍ່ສາມາດເບິ່ງເຫັນເປັນຮູບ. ຮູບພາບJPEG ກໍມີເຄົ້າກຳເນີດຈາກຕົວເລກຂໍ້ມູນດິບRAWຄືກັນ. ຂໍ້ມູນດິບດັ່ງກ່າວແມ່ນກ້ອງຖ່າຍຮູບລ້າງຮູບແລະປັບອັດເປັນຮູບພາບໃຫ້ເຮົາເບິ່ງເຫັນໂດຍອັດຕະໂນມັດເທົ່ານັ້ນ. ຖ້າກ້ອງຖ່າຍຮູບເປັນຕົວລ້າງຮູບເອງ ຄຸນະພາບຂອງຮູບພາບກໍຢູ່ໃນສະພາວະທີ່ຖືກກຳນົດໄວ້ແລ້ວ ດັ່ງນັ້ນຖ້າຍັງເປັນຕົວເລກຂໍ້ມູນດິບRAW ກໍສາມາດຫຼີກລ້ຽງບັນຫານີ້ໄດ້. ການຖ່າຍຮູບວັດຖຸບູຮານຈຳເປັນຕ້ອງຖ່າຍດ້ວຍຮູບແບບຂໍ້ມູນດິບRAW.

◆JPEG

ຮູບທີ່ຖ່າຍດ້ວຍກ້ອງດີຈີຕອນແລ້ວເກັບຮັກສາແບບຟາຍJPEG ແມ່ນກ້ອງຖ່າຍຮູບເອງໃຊ້ຂໍ້ມູນດິບRAW ມາ "ລ້າງຮູບໂດຍອັດຕະໂນມັດ". ຮູບພາບທີ່ລ້າງໂດຍອັດຕະໂນມັດນີ້ ຈະຖືກ "ປັບອັດ" ໃນລະດັບທີ່ບໍ່ເປັນບັນຫາກັບຄຸນະພາບຂອງຮູບພາບ. ການປັບອັດນີ້ ໂດຍທົ່ວໄປສາມາດເລືອກລະດັບປັບອັດໄດ້, ກໍລະນີ ຈະປັບອັດຮູບພາບຂະໜາດໃຫຍ່ແລະມີຄຸນະພາບສູງຈະຕ້ອງເອົາ "ອັດຕາປັບອັດຕ່ຳລົງ", ກໍລະນີບໍ່ສົນໃຈກັບຄຸນະພາບແລະຢາກໃຫ້ມີຂະໜາດນ້ອຍກໍຕ້ອງເອົາ "ອັດຕາປັບອັດສູງຂຶ້ນ". ເມື່ອການປ່ຽນແປງຂອງອັດຕາປັບອັດນີ້ຫຼາຍຂຶ້ນກໍຕາມ ການເກັບຮັກສາແບບ "JPEG"ນັ້ນ ເມື່ອທຽບກັບການປ່ຽນແປງແລ້ວຍັງຄົງຄຸນະພາບໄວ້ໄດ້ຫຼາຍຖືກວ່າເປັນຮູບແບບທີ່ດີເດັ່ນ.

ຢ່າງໃດກໍຕາມ, ຈຸດອ່ອນຂອງຮູບພາບJPEGທີ່ກ້ອງຖ່າຍຮູບເປັນຕົວຈັດການເກັບຮັກສາແມ່ນການປັບອັດຂໍ້ມູນຈະຂຶ້ນກັບກ້ອງຖ່າຍຮູບນັ້ນເອງ. ຂໍ້ມູນທີ່ຖືກປັບອັດແລ້ວ ຈະຂີ້ຮ້າຍກວ່າຂໍ້ມູນຕົ້ນສະບັບກ່ອນການລ້າງໂດຍອັດຕະໂນມັດໂດຍກ້ອງຖ່າຍຮູບ, ແລະ ຂໍ້ມູນທີ່ເສຍໄປແລ້ວກໍບໍ່ສາມາດເອົາກັບຄືນມາໄດ້ອີກ. ນອກຈາກນີ້ ການລ້າງອັດຕະໂນມັດໂດຍກ້ອງຖ່າຍຮູບນັ້ນ ສີສັນຕ່າງໆຈະຖືກກຳນົດໄວ້ແລ້ວ, ແລະບໍ່ສາມາດຈັດການນອກເໜືອໄປຈາກຂອບເຂດທີ່ໄດ້ກຳນົດໄວ້ນັ້ນ. ສະນັ້ນ ຮູບພາບຂອງວັດຖຸບູຮານທີ່ອາດຈະຈຳເປັນຕ້ອງມີການປ່ຽນແປງ ຫຼືມີຂະບວນຈັດການຫຼາຍໆຢ່າງເພື່ອການໃຊ້ສອຍພາຍຫຼັງນັ້ນ ຮູບແບບການເກັບຮັກສານີ້ຈຶ່ງບໍ່ແທດເໝາະ.

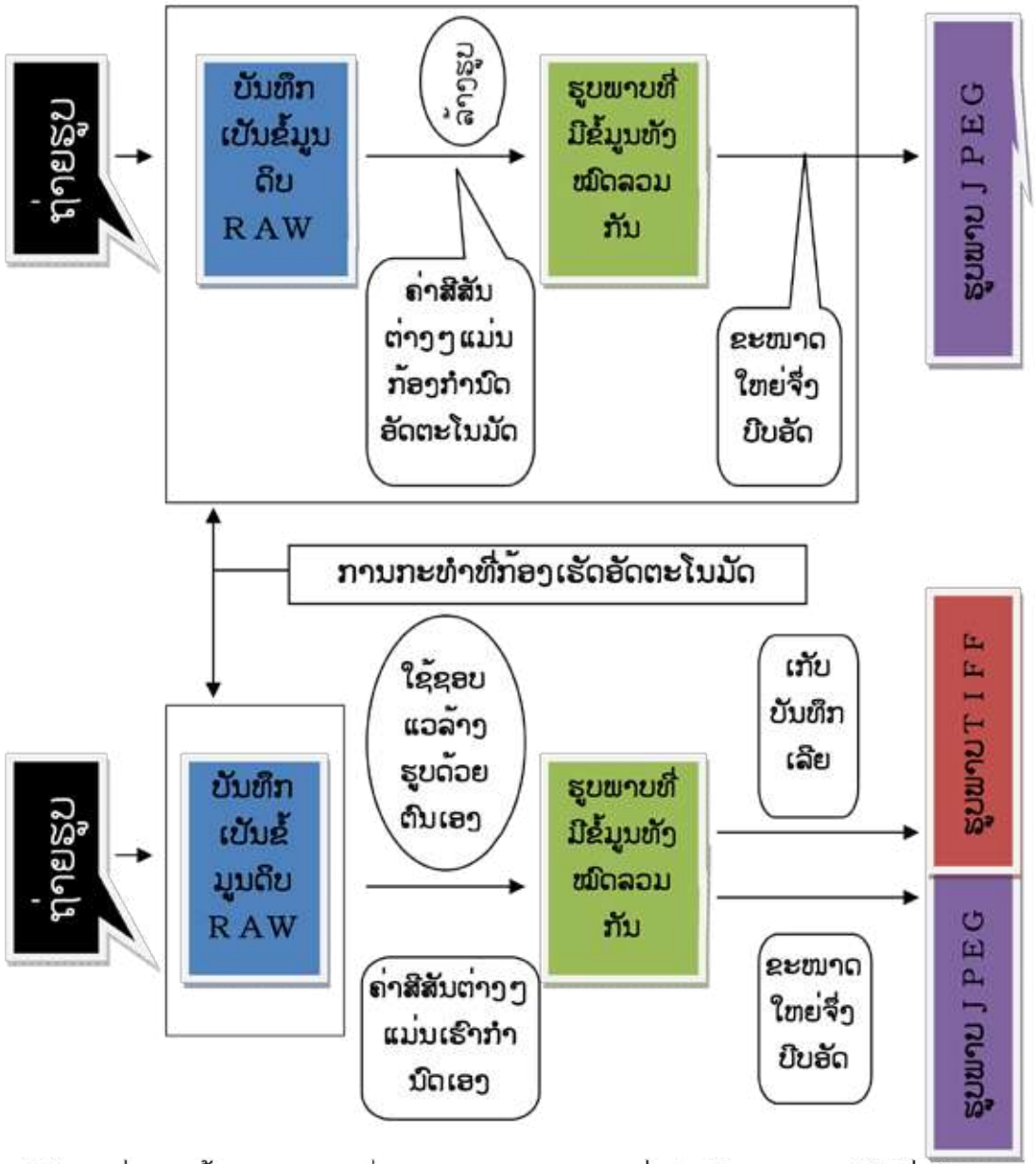
◆TIFF

ຮູບແບບTIFFເປັນການເກັບຮັກສາທີ່ບໍ່ຄັດຈ້ອນຂໍ້ມູນຮູບພາບໃນເວລາລ້າງຮູບ, ເຊິ່ງສາມາດເກັບສາຢູ່ໃນສະພາບທີ່ບໍ່ມີການປັບອັດ. ນອກນີ້ ພື້ນຖານຂອງຮູບແບບແມ່ນຂໍ້ມູນບິດແມັບເຊິ່ງເປັນຕາຕະລາງຄ່າຂອງແສງແບບງ່າຍດາຍ ຈຶ່ງສາມາດໃຊ້ໄດ້ຫຼາກຫຼາຍ, ມີຄວາມເປັນໄປໄດ້ທີ່ສາມາດໃຊ້ໄດ້ຮອດອະນາຄົດ ຖືເປັນຮູບແບບທີ່ມີສະຖຽນລະພາບ. ຂໍ້ມູນທີ່ບໍ່ໄດ້ປັບອັດຈະມີຂະໜາດໃຫຍ່ກໍຕາມ ແຕ່ຂໍ້ມູນພາບຂອງ

ວັດຖຸບູຮານທີ່ຈຳເປັນຕ້ອງມີການປ່ຽນແປງ ຫຼືມີຂະບວນຈັດການຫຼາຍໆຢ່າງເພື່ອການໃຊ້ສອຍພາຍຫຼັງ ນັ້ນ ຮູບແບບການເກັບຮັກສານີ້ ຈຶ່ງແທດເໝາະທີ່ສຸດ.

ເຖິງວ່າຈະເກັບຮັກສາໃນຮູບແບບໃດ ຫຼືໃຊ້ຂະບວນຂັ້ນຕອນແນວໃດ່ກໍຕາມ ກ່ອນນີ້ຖ່າຍຮູບດີຈີຕອນ ໃນເວລາຖ່າຍຮູບນັ້ນ ຈະໃຊ້ເກຣດາດ ຫຼື ຄໍເລີຫາເກັດຖ່າຍກໍຕາມສິ່ງສຳຄັນແມ່ນການບັນທຶກສະພາບຖືກຕ້ອງແທດເໝາະຂອງສີສັນແລະແສງໄວ້, ແລ້ວບັນທຶກຂໍ້ມູນຮູບພາບທີ່ລ້ຳຈາກຂໍ້ມູນຕົ້ນສະບັບຢ່າງແທດເໝາະ ແລ້ວມານຳໃຊ້ພາຍຫຼັງ.

ຮູບ-6 ກ່ອນນີ້ຖ່າຍຮູບແບບJPEG



ວິທີການຖ່າຍຮູບດ້ວຍເກຣດາດແມ່ນການສະແດງສະພາບແຫ່ງກຳເນີດແສງແລະສີສັນທີ່ເປັນກາງຂອງຮູບພາບຄືນ ໂດຍເອົາສີເກຣ(ຂີ້ເຖົ່າ)ທີ່ບໍ່ສີທີ່ຜິດພ້ຽນເປັນພື້ນຖານໃນເວລາລ້ຳຮູບຢູ່ໃນຄອມພິວເຕີ, ສຳລັບຮູບພາບວັດຖຸບູຮານທີ່ຈຳເປັນຕ້ອງບັນທຶກຢ່າງຖືກຕ້ອງຊັດເຈນແລ້ວ ສຳຄັນທີ່ສຸດທີ່ຈະຕ້ອງເກັບຮັກສາຮູບພາບດິ

ຈິຕອນທີ່ສ້າງພາບຂຶ້ນມາຈາກວິທີການຖ່າຍຮູບຄືແນວນີ້. ລາຍລະອຽດຂອງວິທີການຖ່າຍຮູບ, ວິທີການຈັດການການສ້າງພາບຄົນແມ່ນຢູ່ນຳເອກະສານຕິດຄັດ. ສາມາດອ່ານໄດ້ໃນເວຟໄຊດັ່ງລຸ່ມນີ້(ພາສາຍີ່ປຸ່ນ)

http://maishaken.cool.ne.jp/cgi-bin/diarypro/data/upfile/5-1.pdf

6. ລະບົບໂຄງສ້າງການຖ່າຍຮູບພາບ

ມາຮອດຈຸດນີ້ ພວກເຮົາໄດ້ເວົ້າກັນເຖິງເລື່ອງກ້ອງຖ່າຍຮູບເປັນຕົ້ນຕໍ, ຈາກນີ້ຕໍ່ໄປ ພວກເຮົາຈະເວົ້າເຖິງເລື່ອງລະບົບໂຄງສ້າງການຖ່າຍຮູບພາບໃຫ້ໄດ້ຕາມໃຈປາດຖະໜາ.

◆ຮູບພາບແລະການອາບແສງ

ການຖ່າຍຮູບພາບແມ່ນການຖ່າຍທອດສິ່ງທີ່ເຫັນຢູ່ຕໍ່ໜ້າໃຫ້ຄົງໄວ້ດັ່ງມັນເປັນ. ເພື່ອການຖ່າຍຮູບພາບຄືແນວນີ້ ຈະຕ້ອງຕັ້ງຄ່າ "ຮູຮັບແສງ" ແລະ "ສປີດຊັດເຕີ(ຄວາມໄວໃນການປິດປະຕູຮັບແສງ)" ປະກອບເຂົ້າກັນ, ເຊິ່ງການບັນທຶກແສງທີ່ສະທ້ອນອອກຈາກວັດຖຸຖືຖ່າຍ ຜ່ານເລັນເຂົ້າມາໃນກ້ອງຖ່າຍຮູບເຂົ້າຫາແຜ່ນຟິມ ຫຼືຈໍຮັບແສງຢ່າງຖືກຕ້ອງ. ການດັດປັບປະລິມານແສງໃຫ້ເໝາະສົມນີ້ເອີ້ນວ່າ "ການອາບແສງ(exposure)". ຖ້າການປັບປະລິມານໄດ້ເໝາະສົມແລ້ວ ຈະຖືວ່າຖ່າຍຮູບໄດ້ຕາມ "ການອາບແສງພໍດີ". "ຮູຮັບແສງ" ແມ່ນຮູທີ່ແສງສ່ອງຜ່ານ, ເຊິ່ງສາມາດປັບປະລິມານແສງເຂົ້າໂດຍເຮັດໃຫ້ຮູໃຫຍ່ຂຶ້ນ ຫຼືນ້ອຍລົງ. ເມື່ອເປີດ"ຮູຮັບແສງ" ໃຫຍ່ຂຶ້ນແສງກໍເຂົ້າມາໄດ້ຫຼາຍຂຶ້ນ, ເມື່ອຮູນ້ອຍລົງແສງກໍເຂົ້າມາໄດ້ໜ້ອຍລົງ. "ສປີດຊັດເຕີ" ເຮັດໜ້າທີ່ປັບໄລຍະເວລາເປີດໃຫ້ແສງເຂົ້າໃນ "ຮູຮັບແສງ".

ເມື່ອໃຫ້ແສງເຂົ້າໄລຍະເວລາຍາວເກີນກວ່າການອາບແທດເໝາະນັ້ນ ຈະເຮັດໃຫ້ຮູບພາບທີ່ອອກມາເປັນສີຂາວໆ. ສະພາບທີ່ແສງຫຼາຍເກີນໄປເອີ້ນວ່າ "ໂອເວີເອັສໂພສ(ອາບແສງຫຼາຍເກີນ)". ກົງກັນ ຂ້າມ ຖ້າປະລິມານແສງໜ້ອຍເກີນໄປຈະເຮັດໃຫ້ຮູບພາບມືດ. ສະພາບນີ້ເອີ້ນວ່າ "ອັນເດີເອັສໂພສ(ອາບແສງໜ້ອຍເກີນ)".

◆ພາລະໜ້າທີ່ຂອງ "ຮູຮັບແສງ"

ພວກເຮົາໄດ້ຮຽນຮູ້ແລ້ວວ່າ ປະລິມານການເປີດ "ຮູຮັບແສງ" ຈະເຮັດໃຫ້ປະລິມານຂອງແສງປ່ຽນແປງ. ແຕ່ສິ່ງເຫຼົ່ານີ້ເຮັດວຽກດ້ວຍລະບົບຄືແນວໃດ?. ໂດຍທົ່ວໄປ ຈະມີຄ່າ FX . X , FY , FZZ . ຊຽນໃສ່ຢູ່ຕົວເລັນ. ອັນນີ້ເອີ້ນວ່າ ຄ່າ F , ເປັນຫົວໜ່ວຍສະແດງຄ່າຂອງຮູຮັບແສງ. ຄ່າຮູຮັບແສງນີ້ໃຫຍ່ຂຶ້ນເທົ່າໃດ ຮູທີ່ປ່ອຍໃຫ້ແສງຜ່ານເຂົ້າໄປຍິ່ງນ້ອຍລົງ, ຄ່າຍິ່ງນ້ອຍລົງເທົ່າໃດຮູທີ່ປ່ອຍໃຫ້ແສງຜ່ານຍິ່ງໃຫຍ່ຂຶ້ນ.

◆ພາລະໜ້າທີ່ຂອງ "ສປີດຊັດເຕີ"

"ສປີດຊັດເຕີ"ແມ່ນໄລຍະເວລາຈາກການເປີດມ້ານປະຕູຮັບແສງຢູ່ໜ້າຟິມເມື່ອກົດຊັດເຕີ(ກົດຖ່າຍຮູບ) ແລະຮັບເອົາແສງຜ່ານເຂົ້າຮູຮັບແສງແລ້ວ ຫາການປິດມ້ານປະຕູແສງເປັນຢຸດການອາບແສງ. ໃນຕົວກ້ອງຖ່າຍຮູບຈະມີຟັງຊັນເພື່ອປັບຄວາມໄວນີ້ຢູ່ນຳ.

◆ ຄວາມສຳພັນຂອງ "ຮູຮັບແສງ" ແລະ "ສປີດຊັດເຕີ"

ຮູຮັບແສງແລະສປີດຊັດເຕີຈະສົ່ງຜົນກະທົບແນວໃດຕໍ່ກັບຮູບພາບ?. ມີຮູບພາບທີ່ອາບແສງພໍດີເວລາຖ່າຍດ້ວຍຄ່າຂອງຮູຮັບແສງແມ່ນ F8 ແລະ ສປີດຊັດເຕີແມ່ນ1/125ວິນາທີ. ດັ່ງທີ່ກ່າວຜ່ານມາ ການອາບແສງພໍດີຈະມີການກຽມໄວ້ໃນກ້ອງຖ່າຍຮູບຫຼາຍຮູບແບບ. ຕົວຢ່າງ ຈາກຮູຮັບແສງ F8 ປ່ຽນເປັນ F16 ແລ້ວຢາກຖ່າຍດ້ວຍການອາບແສງພໍດີນັ້ນ ເມື່ອຕັ້ງໃສ່ F16 ຈະມີຮູຮັບແສງນ້ອຍ ປະລິມານແສງເຂົ້າກໍຈະໜ້ອຍລົງ, ຈຶ່ງຈຳເປັນຕ້ອງປ່ອຍໃຫ້ສປີດຊັດເຕີຊ້າລົງ ເພື່ອຮັບປະກັນປະລິມານແສງໃຫ້ພຽງພໍກັບການອາບແສງພໍດີ. ກົງກັນຂ້າມ ກໍລະນີຈາກ F8 ປ່ຽນເປັນ F4 ແສງເຂົ້າຫຼາຍຂຶ້ນ ຈຶ່ງຈຳເປັນຕ້ອງເຮັດໃຫ້ສປີດຊັດເຕີໄວຂຶ້ນ.

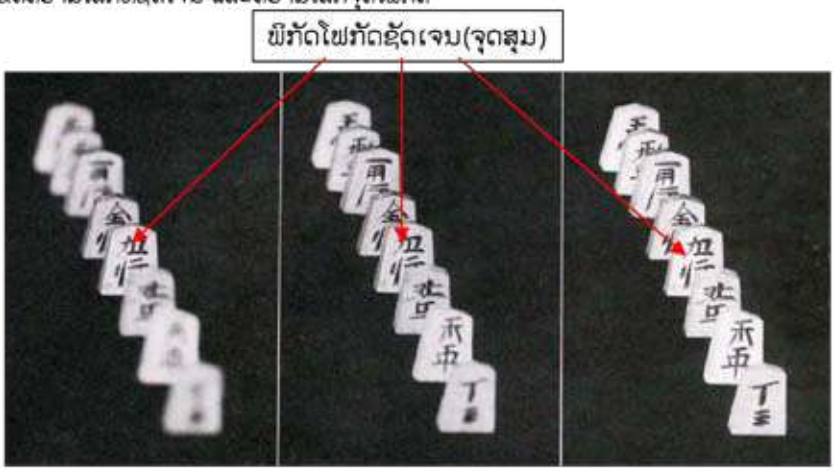
◆ການອາບແສງພໍດີແລະການດັດສົມອາບແສງ

ເມື່ອໃຊ້ຟັງຊັ່ນອາບແສງອັດຕະໂນມັດໃນຕົວກ້ອງຖ່າຍຮູບ, ກ້ອງຈະພິຈາລະນາປະລິມານແສງຕາມ ແລ້ວເລືອກຮູຮັບແສງ ແລະສປີດຊັດເຕີໃຫ້ມີການອາບແສງພໍດີ. ແຕ່ວ່າ ວັດຖຸທີ່ຖືກຖ່າຍອາດຈະແຈ້ງໂພດ ຫຼື ມືດໂພດ ຫຼືວ່າ ກໍລະນີການຖ່າຍຮູບວັດຖຸຖືກຂຸດພົບທີ່ມີສາກຫຼັງສີຂາວແລະກໍລະນີອື່ນໆ ຈະມີທັງສອງ ແຈ້ງໂພດມືດໂພດອອກມາພ້ອມກັນ, ເຊິ່ງວັດຖຸຖືກຖ່າຍກໍ່ບໍ່ແມ່ນວ່າຈະມີການອາບແສງພໍດີ. ຕາມຈຸດ ພິເສດຂອງກ້ອງຖ່າຍຮູບ ກ້ອງຈະວັດແສງທີ່ກະຈາຍຢູ່ໃນໜ້າຈໍທັງໝົດແລ້ວມາຄິດໄລ່ການອາບແສງ ເຊິ່ງກ້ອງບໍ່ສາມາດພິຈາລະນາວ່າວັດຖຸຖືກຖ່າຍຈະແມ່ນຫຍັງ. ກໍລະນີ ຖ່າຍສາກຫຼັງແຈ້ງ ແລະວັດຖຸຖືກ ຖ່າຍມືດ ກ້ອງກໍຈະພິຈາລະນາປະລິມານແສງຈາກໜ້າຈໍທັງໝົດແລ້ວ ກ້ອງປັບໃຫ້ມືດລົງ, ສະນັ້ນໃນ ການຖ່າຍຮູບຈຶ່ງຕ້ອງປັບ "ໃຫ້ແຈ້ງຂຶ້ນກວ່າກ້ອງວັດ" ຈຶ່ງຈະໄດ້ການອາບແສງພໍດີ. ກໍລະນີ ການຖ່າຍຮູບ ທີ່ມີສາກຫຼັງສີດຳ ຫຼືສີຂີ້ເຖົ່າ ແລະວັດຖຸຖືກຖ່າຍແຈ້ງ ຈະຕ້ອງປັບ"ໃຫ້ມືດລົງກວ່າກ້ອງວັດ" ກໍຈະຖ່າຍໄດ້ ດີ. ການປັບນີ້ເອີ້ນວ່າ "ການດັດສົມອາບແສງ". ວັດຖຸຖືກຖ່າຍແຈ້ງດັດສົມບວກ, ວັດຖຸຖືກຖ່າຍມືດດັດສົມ ລົບ ແລ້ວຈະເຮັດໃຫ້ສາມາດໄດ້ການອາບແສງພໍດີ. ວິທີການດັດສົມອາບແສງຈະແຕກຕ່າງກັນໃນແຕ່ລະ ກ້ອງຖ່າຍຮູບ. ສິ່ງສຳຄັນແມ່ນຈະຕ້ອງອ່ານຄູ່ມືກ້ອງຖ່າຍຮູບຢ່າງລະອຽດ ແລ້ວຈື່ດ້ວຍການຖ່າຍຕົວຈິງ.

◆ຂອບເຂດຂອງໄຟກັດຊັດເຈນ(ຈຸດສຸມຖືກຕ້ອງ)=ຂອບເຂດຄວາມເລິກທີ່ຊັດເຈນ ແລະຄວາມເລິກຈຸດໄຟ ກັດ(ຮູບ-7)

ພາລະໜ້າທີ່ຂອງຮູຮັບແສງແມ່ນການດັດປັບປະລິມານແສງ, ນອກນີ້ຍັງມີພາລະໜ້າທີ່ທີ່ສຳຄັນອີກ ອັນໜຶ່ງ. ສິ່ງນັ້ນແມ່ນການປັບ "ຂອບເຂດຂອງໄຟກັດຊັດເຈນ" ດ້ວຍການປ່ຽນແປງຄ່າຮັບແສງ. ເມື່ອເຮັດ ໃຫ້ຄ່າຮູຮັບແສງໃຫຍ່ຂຶ້ນ ຂອບເຂດຂອງໄຟກັດຊັດເຈນຈະຂະຫຍາຍອອກ, ເມື່ອຄ່າຮູຮັບແສງນ້ອຍລົງ ຂອບເຂດຂອງໄຟກັດຊັດເຈນກໍແຄບລົງ. ຂອບເຂດຂອງໄຟກັດຊັດເຈນເອີ້ນວ່າ "ຂອບເຂດຄວາມເລິກທີ່ ຊັດເຈນ". ຂອບເຂດຄວາມເລິກທີ່ຊັດເຈນຈະປ່ຽນແປງບໍ່ພຽງແຕ່ຍ້ອນຮູຮັບແສງເທົ່ານັ້ນ ແຕ່ຍັງປ່ຽນແປງ ຍ້ອນປະເພດຂອງເລັນນຳອີກ.

ຮູບ-7 ຂອບເຂດຄວາມເລິກທີ່ຊັດເຈນ ແລະຄວາມເລິກຈຸດໄຟກັດ



ຮູຮັບແສງ F 2．8　　ຮູຮັບແສງ F 8　　ຮູຮັບແສງ F 2 2

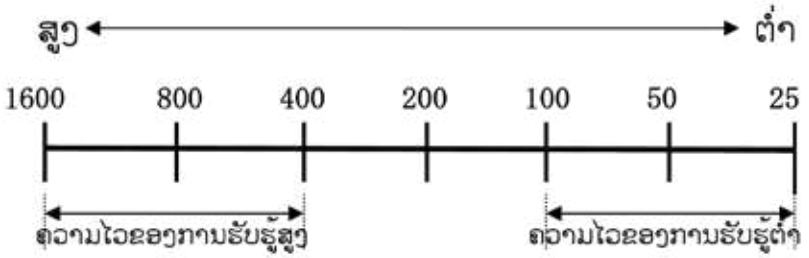
ຮູບພາບຂອງຮູຮັບແສງ F22 ຈະແຈ້ງຊັດກວ່າຂອງ F2.8 ຮູ້ໄດ້ວ່າ ຂອບເຂດ(ຂອບເຂດຄວາມເລິກທີ່ຊັດ ເຈນ)ຈະກວ້າງ. ນອກນີ້ ເມື່ອເບິ່ງຮູບຂອງຮູຮັບແສງF2.8ຈະເຫັນໄດ້ວ່າ ດ້ານຫຼັງຂອງ"銀将" ໄຟກັດຈະ ເລິກ. ຄວາມເລິກຈຸດໄຟກັດຈະເລິກເຂົ້າໄປດ້ານຫຼັງ.

◆ຄວາມໄວຂອງການຮັບຮູ້ ISO

ອົງປະກອບທີ່ສຳຄັນອັນໜຶ່ງຂອງລະບົບໂຄງສ້າງການຖ່າຍຮູບແມ່ນ "ຄວາມໄວຂອງການຮັບຮູ້".

ຄວາມໄວຂອງການຮັບຮູ້ຂອງ"ຄວາມໄວຂອງການຮັບຮູ້ ISO" ບົ່ງບອກດ້ວຍລະດັບປະຕິກິລິຍາຂອງຟິມເມື່ອຮັບແສງ. ເວົ້າອີກແບບແມ່ນ ເມື່ອຮັບແສງໃນປະລິມານທີ່ເທົ່າກັນ ຄວາມໄວຂອງການຮັບຮູ້ຂອງຟິມທີ່ຕ່າງກັນ ຈະມີປະຕິກິລິຍາທີ່ແຕກຕ່າງກັນ.

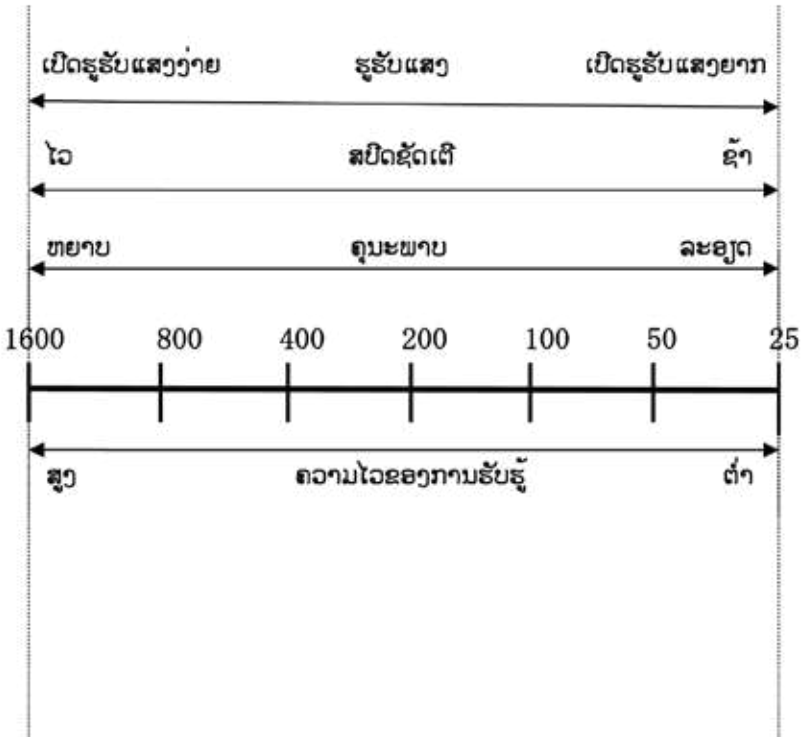
ຮູບ-8 ຄວາມໄວຂອງການຮັບຮູ້ ISOຂອງຟິມ



ດັ່ງຮູບ-8 ເມື່ອຄ່າໃຫຍ່ຂຶ້ນເທົ່າໃດ ຄວາມໄວຂອງການຮັບຮູ້ຍິ່ງສູງຂຶ້ນ, ແລະຄ່ານ້ອຍລົງ ກໍຍິ່ງຕ່ຳລົງ. ນີ້ໝາຍຄວາມວ່າ ຄວາມໄວຂອງການຮັບຮູ້ຍິ່ງສູງເທົ່າໃດ ກໍຈະສາມາດຖ່າຍຮູບທີ່ມີແສງໜ້ອຍໄດ້, ເຊິ່ງນີ້ບົ່ງບອກວ່າ ຄວາມໄວຂອງການຮັບຮູ້ຕ່ຳເທົ່າໃດ ຈຳເປັນຕ້ອງມີແສງຫຼາຍເພື່ອໃຫ້ໄປຮອດລະດັບອາຍແສງພໍດີ.

ເມື່ອປະກອບລະຫວ່າງຮູຮັບແສງທີ່ໃຫ້ລະດັບອາຍແສງພໍດີ ແລະສປີດຊັດເຕີຈະສາມາດປະກອບໄດ້ຫຼາຍຮູບແບບ, ຄວາມໄວຂອງການຮັບຮູ້ ISO ກໍຄືກັນ. ກໍລະນີ ປ່ຽນ ISO100 ເປັນ ISO200 ກໍຈະທຽບເທົ່າກັບປ່ຽນຮູຮັບແສງ ຫຼືປ່ຽນສປີດຊັດເຕີໄປອີກຂັ້ນໜຶ່ງ. ແຕ່ຖ້າເອົາຄວາມໄວຂອງການຮັບຮູ້ ISO ຂຶ້ນສູງເທົ່າໃດ, ເຖິງແມ່ນຖ່າຍດ້ວຍຟິມກໍຕາມ ຫຼື ຖ່າຍດ້ວຍດີຈິຕອນກໍຕາມ ລະດັບປ່ຽນຊັ້ນສີຂອງຮູບພາບ ແລະຄວາມຊັດເຈນກໍຈະຂາດຫາຍໄປ. ດັ່ງນັ້ນ ຈຶ່ງຈຳເປັນຕ້ອງໄດ້ລະວັງການຕັ້ງຄວາມໄວຂອງການຮັບຮູ້ ISO. ກໍລະນີຂອງການຖ່າຍພາບວັດຖຸບູຮານ ໂດຍທົ່ວໄປ ຈະຖ່າຍດ້ວຍຄວາມໄວຂອງການຮັບຮູ້ ISO100-200.

ຮູບ-9 ຄວາມສຳພັນຂອງຄວາມໄວຂອງການຮັບຮູ້ISO ແລະຮູຮັບແສງແລະອື່ນໆ



7. ທິດທາງຂອງແສງ = ໄລຕິ້ງ

ສຳລັບການຖ່າຍຮູບວັດຖຸບູຮານນັ້ນ ຈຸດສຳຄັນແມ່ນການໄລຕິ້ງ ແລະການຈັດໂຄງປະກອບພາບ ເຊິ່ງເວົ້າໄດ້ວ່າ ເປັນທຸກສິ່ງທຸກຢ່າງ, ທິດທາງຂອງແສງ ແລະມຸມຂອງແສງທີ່ສ່ອງໃສ່ວັດຖຸຖືກຖ່າຍເປັນອົງປະກອບທີ່ເປັນຕົວກຳນົດຄຸນະພາບຂອງພາບຖ່າຍ. ຍົກເວັ້ນກໍລະນີພິເສດ ພື້ນຖານຂອງການໄລຕິ້ງແມ່ນການໃຫ້ຝາສະທ້ອນມາໃສ່ ຫຼືວ່າ ສ່ອງແສງໃສ່ເຈ້ຍແກ້ວ ຫຼື ຜ້າຂາວໃຫ້ແສງກະຈາຍອອກ, ເຊິ່ງຈະເຮັດໃຫ້ແສງນຸ້ມນວນ ດ້ວຍ "ການສ່ອງແສງໃສ່ທາງອ້ອມ". ຖ້າສ່ອງແສງໃສໂດຍກົງ ມຸມຂອງແສງບາງມຸມຈະເຮັດໃຫ້ເກີດມີບາງບ່ອນເປັນເງົາເຂັ້ມ ຫຼືບາງເທື່ອກໍເກີດມີປະກາຍແສງສະທ້ອນໃສ່ເລັນ(Lens Flare) ແລ້ວຈະເຮັດໃຫ້ຮູບພາບທີ່ບໍ່ສາມາດບອກຂໍ້ມູນໄດ້ຢ່າງພຽງພໍ. ໃນການໄລຕິ້ງ ຈະນຳໃຊ້ການເຍືອງແສງຫຼາຍປະເພດທີ່ມີພາລະບົດບາດແຕ່ລະຢ່າງ. ລຳແສງທີ່ສົ່ງຜົນເຖິງທ່າທາງພາບລັກ ຫຼືບັນຍາກາດ ເອີ້ນວ່າ "ເມນໄລ(ແສງຕົ້ນຕໍ)", ລຳແສງທີ່ດັດປັບຄວາມມືດແຈ້ງຂອງວັດຖຸຖືກຖ່າຍ ເອີ້ນວ່າ "ສັບໄລ(ແສງສຳຮອງ)". ນອກນີ້ ຍັງມີ "ທ໊ອບໄລ - ສກາຍໄລ"ທີ່ໃຊ້ດັດປັບຄວາມສະຫວ່າງຂອງສາກຫຼັງ, "ຄິໄລ" ໃຊ້ສຳລັບສະແດງລາຍລະອຽດພາກສ່ວນໃດໜຶ່ງຂອງວັດຖຸຖືກຖ່າຍ.

ນອກນີ້ ໃນບັນດາອຸປະກອນເຍືອງແສງກໍມີບາງອັນທີ່ກຳເນີດຄວາມຮ້ອນຫຼາຍ. ໂດຍສະເພາະ ກໍລະນີ ວັດຖຸທີ່ເປັນອົງຄະທາດ ການທີ່ຖືກຄວາມຮ້ອນແລ້ວແຫ້ງລົງກະທັນຫັນ ອາດຈະເຮັດໃຫ້ເກີດຄວາມເສຍຫາຍ. ດັ່ງນັ້ນ ຈຳເປັນຕ້ອງໄດ້ຄົ້ນຄິດວ່າການໃດໜຶ່ງເພື່ອເຮັດໃຫ້ໄລຍະເວລາການສ່ອງແສງສະຫວ່າງສັ້ນເທົ່າທີ່ຈະເປັນໄປໄດ້.

◆ທິດທາງການສ່ອງແສງເມນ ແລະຜົນ

＊ແສງກົງໜ້າ(ແສງສ່ອງຈາກດ້ານໜ້າ) :

ສະພາບທີ່ວັດຖຸຖືກຖ່າຍຮັບແສງຈາກທາງກົງໜ້າ, ຈະໄດ້ຮູບພາບທີ່ຮູ້ສຶກວ່າເປັນລັກສະນະແຜ່ນລຽບ. ຈະມີເງົາເຂັ້ມທາງຕັ້ງຕາມບ່ອນລູບໂນນຂອງວັດຖຸຖືກຖ່າຍ. ຍ້ອນຮູບພາບແບບນີ້ ບໍ່ສາມາດສະແດງໃຫ້ເຫັນເງົາມືດຂອງວັດຖຸຖືກຖ່າຍ ໂດຍທົ່ວໄປ ຈຶ່ງບໍ່ໃຊ້ແສງແບບນີ້.

＊ແສງສະໜຽງ(ແສງສ່ອງສະໜຽງຈາກດ້ານຂ້າງ) :

ແສງສ່ອງສະໜຽງດ້ານຂ້າງທາງໜ້າ. ໃນສ່ວນທີ່ແສງເຮັດເປັນມຸມ ຈະເຮັດໃຫ້ເກີດມີເງົາມືດຈະແຈ້ງ, ຈະໄດ້ຮູບພາບທີ່ມີມິຕິກວ່າແສງກົງໜ້າ, ເປັນແສງທີ່ເປັນພື້ນຖານກວ່າໝູ່.

＊ແສງທາງຂ້າງ(ແສງສ່ອງຈາກຊີ່ຂ້າງ) :

ແສງສ່ອງຈາກຊີ່ຂ້າງຂອງວັດຖຸຖືກຖ່າຍ. ເຮັດໃຫ້ເຫັນບ່ອນລູບໂນນຂອງດ້ານໜ້າຂອງວັດຖຸຖືກຖ່າຍຢ່າງຈະແຈ້ງ.

＊ແສງທາງເທິງ(ແສງສ່ອງຈາກຊີ່ເທິງ) :

ສະພາບທີ່ວັດຖຸຖືກຖ່າຍຮັບແສງຈາກຊີ່ເທິງ.ເງົາມືດເກີດມີຍາກ, ແລະເງົາບໍ່ຄ່ອຍມີ ຈຶ່ງບໍ່ຈຳເປັນຕ້ອງສົນໃຈ.

＊ແສງສວນຄືນ :

ແສງສ່ອງທາງຫຼັງຂອງວັດຖຸຖືກຖ່າຍກົງໆ.

＊ແສງເຄິ່ງສວນຄືນ :

ແສງສ່ອງທາງຫຼັງສະໜຽງຂອງວັດຖຸຖືກຖ່າຍ.

＊ແສງສ່ອງຜ່ານ :

ແສງທີ່ເຮັດໃຫ້ເຫັນຂອບຂອງວັດຖຸຖືກຖ່າຍຢ່າງຈະແຈ້ງ. ໃຊ້ແສງກົງແລະແສງສະໜຽງຄວບໃສ່ກັນ.

ການຖ່າຍຮູບທີ່ເອົາແສງເງົ່ານີ້ມາປະກອບໃສ່ກັນຈະເຮັດໃຫ້ສາມາດຮັບຮູ້ວັດຖຸຖືກຖ່າຍໄດ້ດີ.

◆ການຖ່າຍຮູບເສຍເຄື່ອງປັ້ນດິນເຜົາ ແລະເຄື່ອງມືຫີນຕ່າງໆຈາກມຸມສູງ

ເພື່ອຫຼີກລ້ຽງບໍ່ໃຫ້ເງົາຂອງວັດຖຸຖືກຖ່າຍຕົກໃສ່ສາກຫຼັງແລ້ວເຮັດໃຫ້ຂອບຂອງວັດຖຸບໍ່ເຫັນຈະແຈ້ງດີນັ້ນ ໃຫ້ເອົາແວ່ນໄສຮອງກ່ອນສາກ ແລ້ວເອົາວັດຖຸຖືກຖ່າຍວາງຢອງໃສ່ເທິງແວ່ນໄສກ່ອນຈຶ່ງຖ່າຍຮູບ. ກໍລະນີ ສາກຫຼັງແຈ້ງບໍ່ພໍ ກໍດັດປັບດ້ວຍການສ່ອງແສງຊ່ວຍໃຫ້ສາກຫຼັງແຈ້ງຂຶ້ນແຕ່ລະວັ້ງບໍ່ໃຫ້ເປັນຜົນກະທົບແກ່ວັດຖຸຖືກຖ່າຍ. ໂດຍພື້ນຖານແລ້ວ ສາຍແສງໃຫ້ກັບວັດຖຸຖືກຖ່າຍແລະສາກຫຼັງດ້ວຍເມນໄລ. ເຄື່ອງມືຫີນທີ່ເຮັດດ້ວຍObsidian ເຊິ່ງວັດຖຸຖືກຖ່າຍທີ່ເປັນທາດແກ້ວນັ້ນ ເພື່ອບໍ່ໃຫ້ເກີດມີແສງສະທ້ອນເຂົ້າເລັນ ຫຼືເລັນຝະເລ ຈະຕ້ອງໃຊ້ແສງສະທ້ອນ, ຫຼືວ່າ ໃຊ້ເຈ້ຍແກ້ວກະຈ່າຍເປັນການສາຍແສງແບບທາງອ້ອມ.

◆ການຖ່າຍຮູບປັ້ນເກົ່າແລະອື່ນໆທີ່ເປັນວັດຖຸຖືກຖ່າຍເປັນແຜ່ນຈາກມຸມສູງ

ເຖິງວ່າຈະຢອງໃສ່ແຜ່ນຕັ້ງຖ່າຍສຳເນົາແລ້ວຖ່າຍຮູບຈາກມຸມສູງກໍຕາມ ແຕ່ກ່ອນອື່ນໝົດຈະຕ້ອງຕັ້ງກ້ອງໃສ່ເຄື່ອງວັດລະດັບ, ຈັດໃຫ້ວັດຖຸຖືກຖ່າຍແລະກ້ອງຖ່າຍຂະໜານກັນ. ສາຍແສງໃຫ້ວັດຖຸຖືກຖ່າຍທັ້ງໝົດມີແສງທີ່ເທົ່າກັນ. ແຫ່ງກຳເນີດແສງຈະຕ້ອງຈັດໃຫ້ສ່ອງໄປທາງທິດແຜ່ນຕັ້ງຖ່າຍສຳເນົາຊ້າຍ-ຂວາເປັນມຸມ45ອົງສາ.

◆ການຖ່າຍຮູບທີ່ໃຊ້ເຈ້ຍສາກຫຼັງ

ເລືອກເຈ້ຍສາກຫຼັງຕາມສີຂອງວັດຖຸຖືກຖ່າຍ, ແຕ່ໂດຍທົ່ວໄປແລ້ວ ເພື່ອບໍ່ໃຫ້ສີຂອງສາກຫຼັງສາຍໃສ່ວັດຖຸຖືກຖ່າຍມັກຈະໃຊ້ສີຂາວ ຫຼືສີຂີ້ເຖົ່າເຊິ່ງເປັນສີທີ່ບໍ່ມີສີສັນ. ການສາຍແສງກໍຂຶ້ນກັບຂະໜາດ ແລະໂຄງສ້າງທີ່ເປັນມິຕິຫຼືບໍ່, ແຕ່ໂດຍພື້ນຖານແລ້ວ ຈະສາຍແສງທີ່ປະກອບມີແສງທ້ອຍ ແລະ ແສງເມນ.

8.ໂຄງປະກອບຂອງພາບ

ຮູບພາບເປັນການເອົາວັດຖຸຖືກຖ່າຍເຂົ້າໄປຢູ່ໃນກອບທີ່ກຳນົດໄວ້. ວິທີການເອົາໃສ່ກອບ ໝາຍຄວາມວ່າ ໂຄງປະກອບພາບຈະເຮັດໃຫ້ຮູບພາບນັ້ນມີພາບລັກທີ່ຕ່າງອອກໄປ.

*ໂຄງປະກອບແບບ1/3 :

ເປັນວິທີການຈັດວາງວັດຖຸຖືກຖ່າຍໃສ່ໃນ ໜ້າຮູບທີ່ແບ່ງທັງທາງຕັ້ງທາງນອນເປັນ 1/3ເທົ່າກັນ.

*ໂຄງປະກອບພາບທີ່ຈັດວາງວັດຖຸຖືກຖ່າຍໃສ່ໃຈກາງ :

ໂຄງປະກອບພາບທີ່ຈັດວາງວັດຖຸຖືກຖ່າຍໃສ່ໃຈກາງໜ້າຮູບ. ສາມາດສະແດງສິ່ງທີ່ຢາກຖ່າຍ, ສິ່ງທີ່ຢາກບອກໄດ້ໂດຍກົງ. ກໍລະນີຂອງການຖ່າຍຮູບວັດຖຸເອກະສານຂອງຫໍພິພິດທະພັນ ສ່ວນຫຼາຍຈະໂຄງປະກອບພາບນີ້ໃນການຖ່າຍພາບ. ຍ້ອນວ່າຖືກນຳໃຊ້ເປັນເອກະສານໃນສິ່ງພິມ, ຈຶ່ງຈຳເປັນຕ້ອງຖ່າຍຮູບໃຫ້ມີສີຂາວຢູ່ອ້ອມຮອບຊ້ຳໃດຊ້ຳໜຶ່ງໄວ້.

*ມຸມເງີຍຂອງກ້ອງຖ່າຍຮູບ :

ໃນເວລາຄິດໂຄງປະກອບພາບວ່າ ຈະວາງຫຍັງໃສ່ບ່ອນໃດນັ້ນ ເປັນສິ່ງສຳຄັນ,ນອກນີ້ ຈະຖ່າຍວັດຖຸຖືກຖ່າຍຈາກບ່ອນໃດ ໝາຍຄວາມວ່າ ມຸມຈະເປັນສິ່ງສຳຄັນ. ຈາກມຸມສູງ ຫຼື ຈາກມຸມຕ່ຳ ຫຼືວ່າ ຖ່າຍຈາກດ້ານກົງໜ້າໃນມຸມເງີຍໃດນັ້ນ ມັນຈະເຮັດໃຫ້ພາບລັກຂອງຮູບພາບປ່ຽນໄປທັນທີ. ນອກ ນີ້ ເມື່ອຖ່າຍຮູບໂດຍປ່ຽນມຸມຊ້າຍຂວາລອງເບິ່ງ ກໍຈະເຫັນວ່າການເບິ່ງເຫັນວັດຖຸຖືກຖ່າຍປ່ຽນໄປ.

9. ເລັນ

ໃນເລັນຈະມີຄ່າມມໝາຍຢູ່ນຳ.ຄ່ານີ້ແມ່ນໄລຍະໂຟກັດ(ຈຸດສຸມ) ຖ້າຄ່າມມຂອງໄລຍະໂຟກັດນ້ອຍຈະຖ່າຍຮູບໃນມູມກວ້າງ(ເລັນມູມກວ້າງ)ໄດ້, ຄ່າມມໃຫຍ່ຈະສາມາດຖ່າຍຮູບໃນຂອບເຂດທີ່ຈຳກັດໃດໜຶ່ງ(ເລັນຊູມ). ນອກຈາກນີ້ ຍັງມີເລັນທີ່ສາມາດຖ່າຍຮູບໄດ້ໃກ້ຄຽງກັບສິ່ງທີ່ຕາມະນຸດເຫັນ ເຊິ່ງເປັນເລັນມາດຕະຖານ.

ເລັນຊູມ

ເລັນມາດຕະຖານ

ເລັນມູມກວ້າງ

10. ການຈັດການຮູບພາບ

ກໍລະນີຂອງຟິມ, ຈະດຳເນີນຂະບວນການປັບສີເຂັ້ມຈາງໃນເວພິມຮູບ. ກໍລະນີຮູບດີຈິຕອນ ຫຼັງຈາກຖ່າຍຮູບແລ້ວ ຈຳເປັນຕ້ອງໄດ້ໃຊ້Photoshop ຫຼືໂປແກຣມຈັດການກັບຮູບພາບອື່ນໆມາຈັດການກັບຮູບພາບ. ການຈັດການແບ່ງອອກເປັນ “ການປັບ” ແລະ “ການຕົບແຕ່ງ”. ວິທີປະຕິບັດໃນການຈັດການຂອງແຕ່ລະໂປແກຣມຈະແຕກຕ່າງກັນ ສະນັ້ນ ຈຳເປັນຕ້ອງໄດ້ອ່ານຄູ່ມືຂອງໂປແກຣມແລ້ວໃຊ້ໃຫ້ລຶ້ງເຄີຍກັບມັນ.

◆ການປັບ

ການປັບໝາຍການປັບການສະແດງໂທນສີ-ຄວາມເຂັ້ມໃຫ້ຖືກຕ້ອງ ຫຼືການຕັດເອົາແຕ່ພາກສ່ວນທີ່ຕ້ອງການ. ໃນເວລາລ້າງຮູບດີຈິຕອນຈຳເປັນຕ້ອງມີຂະບວນການນີ້ຢ່າງແນ່ນອນ. ສຳລັບພາບດີຈິຕອນເພື່ອການເກັບຮັກສາຍາວນານ ດີທີ່ສຸດແມ່ນ ບໍ່ຈຳເປັນຕ້ອງປັບປ່ຽນຫຍັງເກີນຄວາມຈຳເປັນ. ສະນັ້ນ ສິ່ງທີ່ສຳຄັນແມ່ນການຄຳນຶງເຖິງສະພາບເງື່ອນໄຂຂອງການຖ່າຍຮູບກ່ອນການຖ່າຍຮູບ.

◆ການຕົບແຕ່ງ

ການຕົບແຕ່ງໝາຍເຖິງ ການລົບວັດຖຸທີ່ເຂົ້າມາໃນຮູບໂດຍບໍ່ໄດ້ຕັ້ງ, ການປັບປ່ຽນໂທນສີ ຫຼືປັບປ່ຽນສີສັນຂອງວັດຖຸຖືກຖ່າຍເປັນພື້ນຖານ, ຕົບແຕ່ງຮູບພາບໂດຍໃຊ້ແອຟເຟັກພິເສດ ເຊິ່ງເປັນໃຊ້ຮູບໃນຂັ້ນຕໍ່ໄປ. ການຕົບແຕ່ງຮູບພາບວັດຖຸເອກະສານທາງດ້ານວັດທະນາທຳ ເຊິ່ງເຮັດໜ້າທີ່ທີ່ສຳຄັນໃນການບັນທຶກນັ້ນ ຈະມີຫຼາຍບັນຫາ. ດັ່ງນັ້ນ ຕາມປົກະຕິຈະບໍ່ຕົບແຕ່ງ.

IV. Participants' Reports

Bandit PHOMMACHAN

Technical Staff

Savannakhet Museum

I am Ms Bandith PHOMMACHANH, 24 years old and a technician of Savannakhet Province Museum. I am very proud to be trained in this project seminar, which was organized on 1 - 6 November 2010, because such a seminar provided us with an opportunity of knowledge and understanding, especially of the pottery measurement, registration on ceramic artefacts, taking photographs of ceramic antiques and protection of national heritage, all of which was full of great worth. This seminar we have participated included many activities useful for cultural heritage protection which is being in our charges and based on technical and practical aspects.

By taking this opportunity, I would like to express my thanks and high appreciation to the party-state organization that provided us with the seminar facilitation, including the Ministry of Information and Culture, Heritage Department, National Museum and related authorities especially to the teachers and experts, who provided the technical and special living assistance. I appreciate very much that Japanese Government, as well as ACCU, supported us and brought the fund for this training project.

I promise to achieve it; the lesson acquired by this workshop shall be effectively used in my work. I wish all of you related in this seminar to be healthy, successful in business and at home, and see you in the next time.

Kaisone KHANKEO

Director General

Saiyaboury Museum

I am Ms Kaisone KHANKEO, the technical chief of Xayabouly Province Museum. I feel very proud to have the chance to participate in this training for Lao heritage protection, which was organized on 1 - 6 November 2010, by Cultural Heritage Protection Cooperation Office of ACCU jointly with Heritage Department of Ministry of Information and Culture, Lao P.D.R.

This seminar provided me with a good opportunity to learn documentation of artefacts for the personnel who have not been learnt on measurement theory before. In the workshop, I practiced measured drawing, registration of ceramic artefacts, and learned the theory of photography of objects and practiced taking photographs of objects. All what I have learnt is useful for the protection of national heritage and valuable artefacts. In this seminar, I have participated in many activities for the technical development and learnt a lot from experts.

In this opportunity, I express the thank and high appreciation on all organization levels, especially ACCU Nara and Heritage Department of Ministry of Information and Culture, which have provided me with the technical support and fund for better living.

I promise to make use of this acquired knowledge and techniques by the teachers who have kindly imparted their expertise to us. I shall effectively use it in my museum work. I wish all of you with this seminar to have happiness in life and success in businesses. Especially, I wish Mr. Nishimura and his team to have the safe trip. I hope another opportunity to work with you in the future.

Khampan VILAPHANH

Deputy Director

Huaphun Cultural Section

I, Mr Khampan VILAPHANH, have been working in Huaphun Province Information and Culture Department. After participating this training workshop for heritage protection, dated 1-6 November 2010, co-organized by ACCU and Heritage Department of Ministry of Information and Culture, in cooperation with Culture Department of Vientiane Capital, I greatly feel proud to have a chance of participation in this new study. In the past, especially in Houaphan province there is always shortage of qualified technical staff who can manage heritage protection work, and this workshop seems an ideal opportunity not being performed before.

When I participated in this training, I soon found out that all teachers and experts from Japan are very experienced, who kindly provided us with knowledge and lessons as well as practical techniques on observation, measurement, drawing, recording of antique information gathering, and also taking photographs of artefacts. All lessons that I have studied in the workshop was necessary knowledge and relative to my work, and I shall effectively use it back in my province.

I express my gratitude and high appreciation to the Heritage Department of Ministry of Information and Culture, which has given me the chance for this training. I also express thanks and high application to all Japanese lecturers, who taught me kindly and patiently. I wish we could have another chance in technical supports and cultural heritage protection training in my province.

Finally, I wish all in charge of this training workshop, Heritage Department of the Ministry of Information and Culture, to be healthy and success in your businesses, wish all teachers and staff of Japanese party to be healthy and lucky for a safe trip.

Bounpheuth XAYSINGDYKEO

Technical Staff

Museum of Vientiane Capital and Archaeological Site

First of all, I would like to thank Mr KhoJohn Keomanivong, Board of Party and Division of Ministry of Information and Culture (MIC), who is also taking the lead on mass organization work as well as the Director of Vientiane Antique Museum that provided me the opportunity to take part in this training. I also would like to extend my gratitude to Mr Thongsa Xayavongkhamdy, Director General of Heritage Department, MIC, who has closely cooperated with ACCU of Japan.

As this training course was deemed extremely benefiting, it invited a participant from Vientiane Antique Museum as well as the relevant agencies from most provinces. I am grateful to ACCU Nara (Japan) for organizing this training course. I also extend sincere thanks to Professor Nisimura Yasusi, lecturers and their colleagues for rendering their time in transferring their valuable knowledge to us. Warm thanks would be also passed on to Ms Vanpheng Keonakhone, National Assembly's Member of Zone 1, who is also the Director of Vientiane Municipality Information and Culture Department, for organizing us the warm welcome party which was meaningful and impressive for us. And last but not least, I extend warm thanks to all officials in facilitating for this training course.

This training course was filled of good atmosphere, enjoyment, and friendship. In addition to the theoretical training part, the practical training was also provided to make the participants better understanding. It was the first chance for anyone too. Even though the participants gained not much understanding from theoretical part, they understood more and better during practical session. This training course gave us extreme benefits, aside from the lessons; we particularly learned on Japanese methods and some of Japanese culture which we can apply this new knowledge to our technical works for maximum benefits. We also will transfer this knowledge to our officers within our responsibility.

Some other interested people and I, even though there were many good aspects, felt there were some shortfalls i.e. the time for training course was too short that we could not gain much more knowledge. However, we would like to have the training course like this being organized again and we also hope to receive cooperation from ACCU office and other stakeholders who are interested to transfer us knowledge, which we are always welcome.

Finally, we wish to have god bless all professors, their colleagues, and all participants with good health, great success in work and family life. Bon Voyage. Thank You.

Khamphone INTHAVONG

Technical Staff

Bolikhamxay Cultural Section

I am Mr Khamphone INTHAVONG, the technician working at Information and Culture Department of Borikhamxay province (Culture sector). I feel glad to participate in the training of Lao heritage culture protection, especially on the ceramic artefacts, on behalf of the department and personnel, because this is my first time to join such a practical training on the theme. Such work is very important within Lao P.D.R.; there are many ceramic artefacts left without identification and registration, and they are mostly kept after discovery and just known for their oldness, age, and time. So, it is difficult for us to protect them and know their values. This training was implemented with the cooperation between the Heritage Department of Ministry of Information and Culture of Lao P.D.R. and ACCU Nara of Japan. In spite of the relatively short periods of the training duration, knowledge and practical techniques on documentation were fully communicated to us by lecturers, Mr IRIKURA Norihiro, Mr NAKAJIMA Kazuhiko and Mr SUGIMOTO Kazuki, and together with all staff members from Japan and Lao P.D.R. I have acquired much knowledge in the program such as how to measure, draw and duplicate the ceramic artefacts and their parts. In addition, I have also leant how to take photographs of artefacts effectively, which is the most important subject of my work of cultural heritage protection.

After the completion of this training, I shall take this knowledge to disseminate and use into the further professional work. I hope the next training opportunity to be conducted by ACCU Nara once again, especially on the theme of Lao heritage protection. Finally, I wish all teachers, experts and staff from Japan and Laos to have happiness and prosperity.

Khamlai VANNALATH

Technical Staff

Khammouane Cultural Section

I am Mr Khamlai Vannalath, an official working in Information and Culture Department of Khammuan Province, which is responsible for Heritage Management. Through participating in training course for 6 days, 1-6 November 2010, I am very happy for having a chance to participate in the course of heritage protection in Lao P.D.R. organised by ACCU Nara with cooperation of Department of National Heritage, Ministry of Information and Culture.

During the theoretical and practical training session, I was very happy and leant a lot on recording of artefacts. Upon returning to our province, we will apply it to have better results.

Thus, I hope that another training opportunity will be provided on the heritage and culture management in the future.

I would like to thank all relevant stakeholders, Heritage Department, MIC, Cultural Heritage Protection Office, Asia-Pacific Cultural Centre for UNESCO.

Thank You.

Mailo KHAMPHOUVONG

Technical Staff

Archaeological Research Division

Ministry of Information and Culture

First of all, I would like to thank Heritage Department, ACCU Nara team, and the responsible committees for organizing the training course for giving me an opportunity to gain knowledge and technical know–how in international level.

Through the training period, from 1 to 6 November 2010, I am very proud for having opportunity to take part in the training to share the lessons and techniques on heritage conservation from the Japanese experts. All of the lessons were new to me and they attracted my interests to learn as I would like to apply them into everyday works. Even though this training course equipped me with many lessons, unfortunately there were some limitations during the lesson as they were too short and I was unable to clearly understand in some parts. I hope that ACCU will provide us with the valuable opportunity like this again in Lao P.D.R. to learn more about documentation of artefactrs.

Finally, I would like to wish god bless Mr Nishimura Yasushi, Head of ACCU, Mr Viengkeo Souksavath, Ms Vanpheng Keonakhone, all professors, organizing team, and all participants to be prosperous, healthy, and happy forever.

Mien LOVANKHAM

Director

Luangnamtha Cultural Section

I am very proud of having a chance to participate in this training course and I would like to thank ACCU Nara and Heritage Department, Ministry of Information and Culture.

I would like to have some comments for this training course as follows:
From this training, I have learned more about the meanings and importance of heritage works which have the historical values. The training workshop was particularly on the measured drawing of heritage objects, data collection and registration of artefacts as well as recording of the object characteristics. In addition, I have also learned about the principles of photography and the heritage object photographing methods in particular. I felt that this training was very important because the professors from Japan taught us with much attention and patience in this training course. They devoted their capacities for imparting their knowledge to us and for making the participants understand and able to do in practice i.e. drawing and photographing.

Even though I could not fully gain 100% from this training, I feel that I can apply what I learned into my work in my place and I promise to bring this knowledge to be effectively applied in my work.

Norseng SAYVONGDOUANE

Director General

Luang Phabang Cultural Section

For six days training, I learned more on how to conserve cultural heritage, particularly for conservation of antique object, artefacts, and religious monuments in our province in order to continue the cultural fighters' mission to stand in the international level. I did not have much experience in the past. After taking part in this training, I will try to apply this valuable knowledge to effective implementation for cultural heritage protection.

I am very proud of the participation into the training workshop and I also would like to thank all level of authorities in bringing knowledge to each province on the importance of antique objects.

I hope we will receive more support from ACCU again in the future. I myself would like to have this training workshop organized in each province.

Phaivanh SIVANNALOM
Technical Staff
Cultural Section, Vientiane Province

I, Mr Phayvanh SIVANNALOM, would like to thank organizers of this workshop on behalf of personnel as well as the representative of the Information and Culture Department of Vientiane Province. I am proud and glad to have the opportunity to participate in this training of ACCU Nara dated 1- 6 November 2010. Even though this was a short period, it was valuable time, because all learnt subjects were very important to protect Lao cultural heritage.

Once again, I am thankful of Japan, as well as ACCU Nara which has provided me with this project for training, full of knowledge and worthy lessons. I shall utilize acquired lessons by teachers to contribute in my work of cultural heritage protection as possible as I can. On the other hand, I sincerely hope that Japan as well as ACCU Nara shall provide me with the good projects and another lesson for the protection of cultural heritage for Information and Culture Department of Vientiane Province.

Finally, as the representative of Information and Culture Department of Vientiane Province, I wish all teachers and representatives of ACCU Nara from Japan to be healthy and have a safe trip.

Vanhsay CHEU

Technical Staff

Oudomxay Museum

I am Mr Vanxay Chue, a participant from Oudomxay province Museum. I appreciate that the Heritage Department, Ministry of Information and Culture, concerned with the northern and southern provinces which still lack human resources on heritage protection works and organized a training course for staff in those provinces.

I am very proud having a chance to take part in this cultural heritage protection training course organized by ACCU Nara and Heritage Department. The committee and leadership organized this training workshop with reasonable long period of six days (1 – 6 November 2010), in which staff of Heritage Department in collaboration with the experts from ACCU Nara served as the lecturers and tutors to teach participants. I found out through this training course that it was very meaningful and important for our works.

Thus, I would like to appreciate and thank the organizer, namely ACCU Nara, as well as the professors from ACCU Nara in rendering their time for transferring their expertise to the participants. I promise to bring newly acquired knowledge from the experts to apply to our works.

Finally, I hope that the Ministry or Department and ACCU Nara from Japan will organize this kind of training again. I would like to wish god bless the organizer (Heritage Department) and ACCU Nara from Japan to be healthy and successful in the works and always provide guidance to us.

Somsavanh INDAVONG

Deputy Head

Province Museum Unit

Information and Culture Department of Bokeo Province

I was very proud of having a chance to participate in this training under the theme of Cultural Heritage Conservation in Lao P.D.R. through the support from ACCU Nara. I have never learned these lessons before in the past. The lessons you taught us this time made our technical staff from the provinces learned new techniques such as drawing and measuring of antique objects and their photographing for documenting and keeping the records. Our Bokeo province really requires this technical aspect.
Even though we sometimes experience a language barrier, but all professors made all possible efforts on clear explanations. I thus almost understood the lessons through this training course. Unfortunately, I could not greet the presenters by myself.

I thus would like to take this opportunity to appreciate and thank the sponsor (ACCU Nara), Mr NISHIMURA Yasusi, all lecturers and their colleagues from Japan. I also extend my gratitude to the Heritage Department and training organizing team. I also would like to take this chance to have god bless the sponsor, the professors, and the authorities of Heritage Department to be happy, healthy, and successful in the works and life. I hope to have the support on building local human resources with knowledge and capacity in the future.

Thank You!

Thongthinh PHOMPHAKDY

Director General

Pakse Historical Museum

I am Mr Thongthin Phompackdy, a participant from Historical Museum of Champasak province, who had the opportunity taking part in the training course on heritage protection in Lao P.D.R. (1 – 6 November 2010), which was organized by ACCU Nara and Heritage Department, Ministry of Information and Culture.

It was my first experience to participate in such a training on learning how to measure the pottery; measuring of perfect shape of pottery and those are in pieces; how to observe the pottery and record their details for reference; how to photograph a pottery of perfect shape and in pieces. Thus, it took considerable time to follow the lessons and understand them. However, I am thankful that the professors paid intensive attentions and consideration on teaching, even though it was short period of time and rushed too.

In addition, I would like to thank and appreciate ACCU Nara and Heritage Department of Ministry of Information and Culture for giving me the opportunity to take part in this training course. I will bring this lesson for effective use.

Vilayvan VILATHAM

Technical Staff

National Museum

Ministry of Information and Culture

I am Ms Vilayvanh Vilatham, a technician from National Museum. I graduated from Hanoi Culture University in Vietnam in the field of museum study. I am very hounored that Heritage Department and ACCU Nara provided me the opportunity to take part in this heritage protection training course. Even though it was six days training course, but it was meaningful and important for me. I learned a lot from technical knowledge by Japanese experts, particularly measurement of pottery, how to draw pictures, how to measure, how to copy, and how to photograph both indoors and outdoors, and other valuable methods.

For these valuable lessons and their efforts, I would like to thank ACCU Nara, Mr Nishimura (Head of ACCU), and the lecturers. I wish them good health and also hope to have this training project will continue forever.

Khamleuane APHAYAVONG

Technical Staff

Xiengkhouang Cultural Section

I am Mr Khamleuan Aphaiyavong from Heritage Unit of Information and Culture Department of Xiengkhouang province.

I am very proud for having a chance to participate in the cultural heritage protection training in Lao P.D.R. from 1 to 6 November 2010 in which Japanese experts transferred their knowledge. I learned lots of new things, particularly the principles on drawing of the antique objects and also the practical techniques regarding how to draw ceramic artefacts and their pieces as well as copying the pieces of artecacts, including the theory and practice of using the camera. In addition, the lecturers did their best to make us understand the subjects very well. I promise to bring this knowledge to effectively implement in my local place.

I would like to appreciate and thank ACCU Nara and Heritage Department for organizing this training course. I hope to have other chances to take part in this kind of training in the future.

V. Appendix

Makong River

1. Participants

1) **Bandit PHOMMACHAN**
Savannakhet Museum

2) **Kaisone KHANKEO**
Saiyaboury Museum

3) **Khampan VILAPHANH**
Huaphun Cultural Section

4) **Bounpheuth XAYSINGDYKEO**
Museum of Vientiane Capital and Archaeological Site

5) **Khamphone INTHAVONG**
Bolikhamxay Cultural Section

6) **Khamlai VANNALATH**
Khammouane Cultural Section

7) **Mailo KHAMPHOUVONG**
Ministry of Information and Culture, Archaeological Research Division

8) **Mien LOVANKHAM**
Luangnamtha Cultural Section

9) **Norseng SAYVONGDOUANE**
Luang Phabang Cultural Section

10) **Phaivanh SIVANNALOM**
Vientiane Procinve, Cultural Section

11) **Vanhsay CHEU**
Oudomxay Museum

12) **Somsavanh INDAVONG**
Bokeo Museum

13) **Thongthinh PHOMPHAKDY**
Pakse Historical Museum

14) **Vilayvan VILATHAM**
Ministry of Information and Culture, National Museum

15) **Khamleuane APHAYAVONG**
Xiengkhouang Cultural Section

2. Lecturers

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Souliya BOUNXAYTHIP

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Ministry of Information and Culture

Souliphane BOURAPHANE

Staff

Division of Archaeological Research Dep. of Culture Heritage

Ministry of Information and Culture

TOSHIHARA Kayoko

JICA La os senior volunteer

(Lao National Museum)

5. Collaborators

Ministry of Information and Culture (National Heritage) [Co-organiser]

Thongsa SAYAVONGKHAMDY, *Director*

Viengkeo SOUKSAVATDY, *Deputy-Director*

Ministry of Information and Culture

Phitounnaleth LASAPHO, *Deputy Permanent Secretary*

National Assembly in VI ligistration of Lao P.D.R. /
Department of Information and Cultural of Vientiane Capital
Vanhpheng KEONAKHONE, *Member / Director*

Ministry of Education Lao National Commission for UNESCO
Khamphanh PHILASAVANH, *Deputy Secretary-General*

National Monument and Museum, Information and Culture Vientiane Capital
Khojohn KEOMANYVONG, *Director General*

Lao National Museum
Bounsanong SIHALATH, *Director*

Embassy of Japan in Lao P.D.R.
KOBAYASHI Shigeki, *Counselor*
SHIOHATA Mariko, *Second Secretary*

Lao National Cultural Hall
Bounchanh PHANTHALUNGSI, *Director*

6. Staff Members, ACCU Nara

NISHIMURA Yasushi, *Director*
TAKAHASHI Wataru, *Deputy Director*
KOBAYASHI Ken-ichi, *Director*, Programme Operation Department
KATO Naoko, *Director*, International Cooperation Division
HORIKAWA Kazuko, *Chief*, Planning & Coordination Division
NISHIDA Michiko, *Staff*, Planning & Coordination Division
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Group photo at the opening ceremony (1 Novemver 2010)

MEMORANDUM OF UNDERSTANDING

Between
Department of National Heritage, Ministry of Information and Culture, Lao P. D. R.
and
Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO

The Cultural Heritage Protection Cooperation Office, Asia-Pacific Cultural Centre for UNESCO (hereinafter referred to as "ACCU Nara Office") has decided to hold the training workshop in Vientiane in Lao People's Democratic Republic, as part of its cooperation for cultural heritage protection in the Asia-Pacific region in partnership with Department of National Heritage, Ministry of Information and Culture of Lao P. D. R. (hereinafter referred to as "Heritage Department"). The main themes of this workshop will encompass the measured drawing of archaeological artefacts and the photographic technique for recording /documenting artefacts.

The purpose of this Memorandum of Understanding between Heritage Department and ACCU Nara Office is to establish a mutual understanding concerning the implementation of the training programme as noted below.

1. Date and Venue
Date: From 1 November (Mon.) to 6 November (Sat.) 2010
Lecture Hours: Morning 9:00 －12:00
Afternoon 13:30 －16:30
Venue: Lao National Culture Hall in Vientiane, Lao P. D. R.

2. Participants
Fifteen researchers, engaging in investigation, research and preservation of cultural properties in Lao P. D. R., who belong to research institutes, the management and preservation office for cultural properties or museums. Those participants are finally decided by ACCU Nara Office based on the recommendation by Heritage Department.

3. Training Curriculum
- Introduction to Measured Drawing of Earthenware (whole and shards of earthenware/ design layout/ a descriptive method of observed details)
- Introduction to Measured Drawing and Ink Rubbing of Roof Tiles (observation and a descriptive method/ an ink rubbing and its backing)
- Making Layout Plate for Publishing Reports (making a plate based on drawings)
- Photographic Technique for Artefacts (Theory and Practice)

4. ACCU Nara Office's Responsibility for Implementation
- Dispatching a group of instructors from Japan
- Preparation of a training venue with necessary installation
- Procurement of the necessary tools for the workshop
- Provision of lunch and daily allowances to all participants during the workshop
- Provision of travel allowances and accommodations (including breakfast) to participants living outside Vientiane Municipality.
- Employment of a Japanese-Lao interpreter
- Hiring a venue for the workshop

All the expenses required for the items listed above shall be borne by ACCU Nara Office.

5. Cooperation of the Department of Cultural Heritage for Implementation
- Selection of fifteen participants as mentioned above in item 2, in consultation with relevant organisations in Lao P. D. R.
- Preparation of the classroom and earthenware as teaching materials
- Providing ACCU Nara Office with possible assistance for the implementation of the training programme

6. Language
Lao is the working language of the workshop.

IN WITNESS WHEREOF, both ACCU Nara Office and Heritage Department hereto have executed this Memorandum of Understanding in duplicate by placing their signatures, and each party shall keep one copy of the originals.

18 August 2010

NISHIMURA Yasushi
Director
Cultural Heritage Protection Cooperation Office,
Asia-Pacific Cultural Centre for UNESCO,
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Memorandum of Understanding