

# **Tour Handbook for the Comprehensive Centre for Cultural Properties**

**Gangoji Institute for  
Research of Cultural  
Property**



## Greetings

The Comprehensive Centre for Cultural Properties of Gangoji Institute for Research of Cultural Property opened in November, 2016. The Institute itself marked the 50th anniversary of the foundation in 2017 by realising a number of projects focusing around research, conservation treatment and restoration of cultural properties. During this time, the Institute has undertaken research and care of many cultural properties, and published the results thereof through reports and papers. Furthermore, in the field of conservation treatment/restoration, the Institute is working on development of new conservation treatment methods in addition to the evolution/improvement of practical work. Moreover, some of the historical materials for which the Institute had undertaken conservation treatment/restoration were designated as national treasures and Important Cultural Properties. However, such work including investigation, conservation treatment, restoration, etc. are the accumulation of slow, steady and low-key works in every respect.

The centre buildings are designed to open such workplaces to the public so that visitors may see the processes involved in the investigation and repair of cultural properties. The unembellished and detailed works have been accumulated, and enable exhibition of historical materials at museums in a secured manner.

Meanwhile, we have created this handbook in the hope that it will not only facilitate the convenience of visitors during their tour but also deepen our visitor's understanding of cultural property protection by re-reading it after going home.

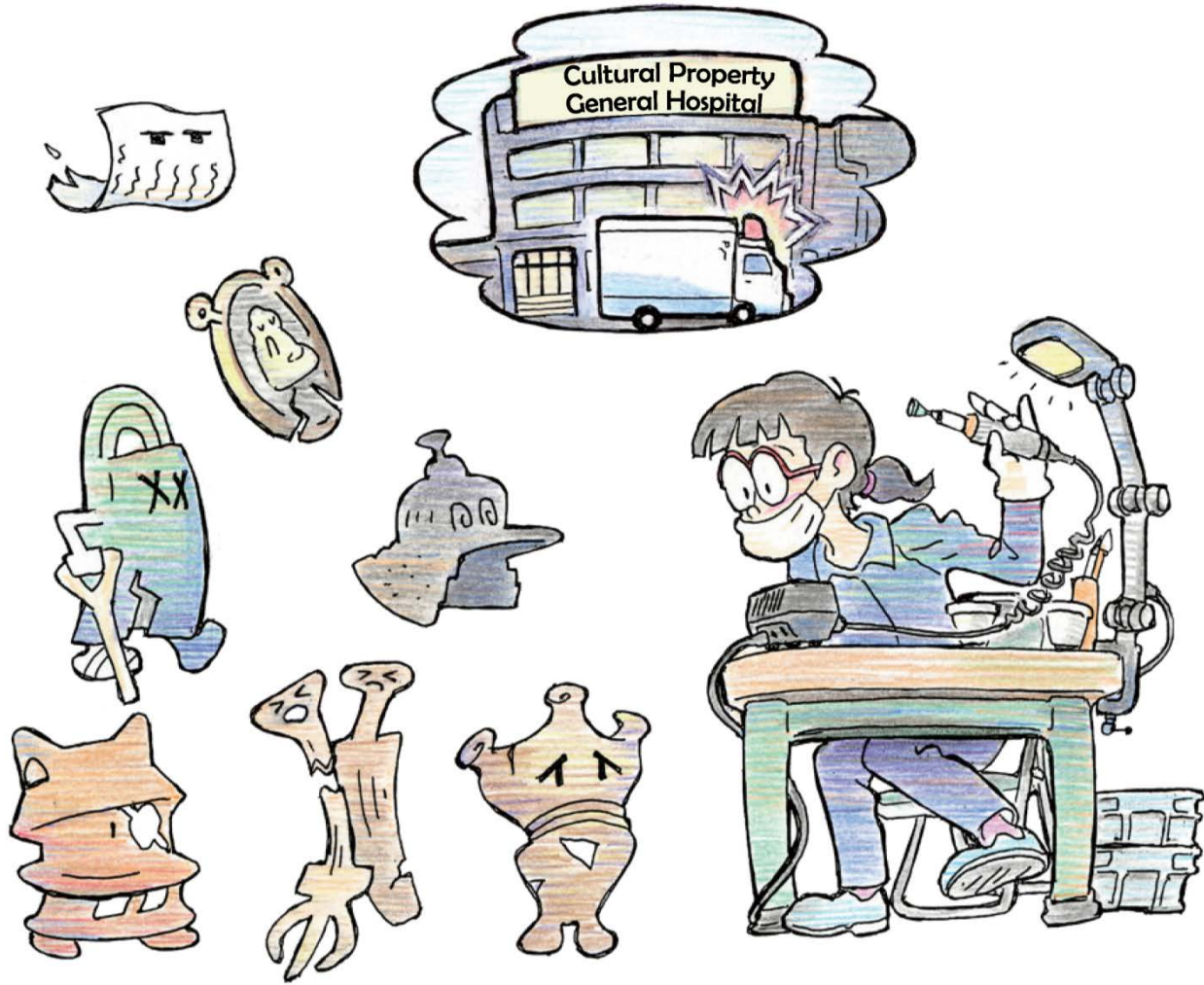
Notwithstanding that the details of the work including research, conservation treatment, and restoration are extremely technical and professional, the Institute would be grateful if you can appreciate the necessity and significance of the efforts to pass cultural properties down through the generations by visiting the Centre or by reading this handbook.

August, 2017

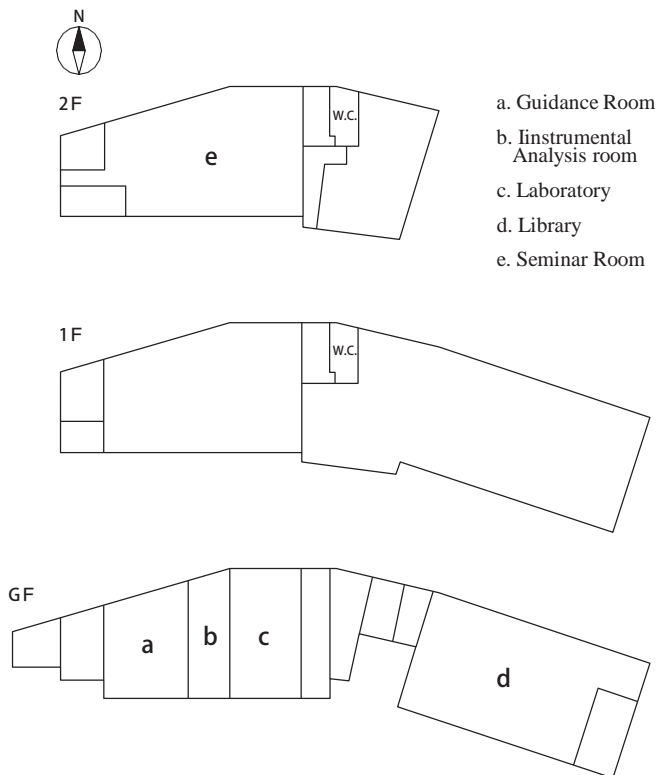
Taizen Tsujimura,  
Chairman of the Board of Directors,  
Gangoji Institute for Research of Cultural Property,  
A public interest incorporated foundation

### Abridged Chronology of Gangoji Institute for Research of Cultural Property

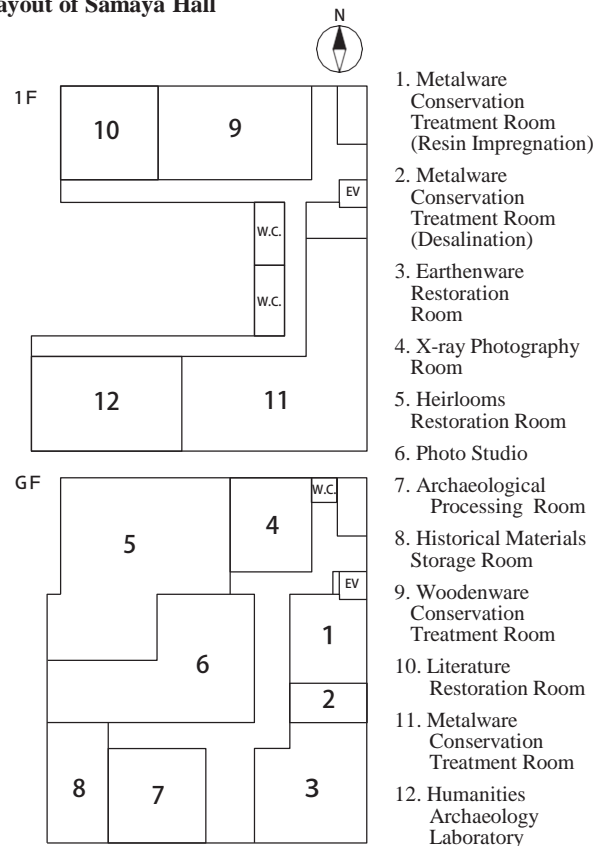
- 1961 Establishes Buddhistic and Folkloric Relics Research Division in Gango-ji Temple.
- 1967 Authorised by the Cultural Property Protection Committee (present-day Agency for Cultural Affairs) as an incorporated foundation, "Gango-ji Institute for Research on Buddhistic and Folkloric Relics".
- 1975 Opens Conservation Treatment Centre (in Motomachi, Ikoma city) centering on conservation treatment works. (This centre was renamed to "Conservation Science Centre" afterwards.)
- 1978 Changes its name to "Gangoji Institute for Research of Cultural Property", having been developed to an institute that may extensively handle a broad range of cultural properties.
- 2013 Authorised by the Cabinet Office as a public interest incorporated foundation.
- 2016 Establishes Comprehensive Centre for Cultural Properties (in Minami-kainozuka cho, Nara city). Opens to the public from November, this year.
- 2017 Marks the 50th anniversary of the foundation.



Layout of Rūpa Hall



Layout of Samaya Hall



In Sanskrit, “Rūpa” means the things that have a form. “Samaya” means “to collect the wisdom and time of people, to remove obstacles, to awaken each other and take positive action, and thereby to complete something significant. Furthermore, “Samaya Hall” means a space in which the vow is fulfilled.

# Science Eye on Cultural Properties

Natural scientific research on cultural properties makes it possible to acquire various information including structure, materials, etc. Through such information, one may understand how ancient people lived and thought.

Meanwhile, to hand down cultural properties, the skills/technologies for conservation treatment and restoration should constantly improve, and new methods should be developed.

Further natural scientific research is necessarily carried out in order to know storage environments in museums, etc. after being collected, and to estimate current deterioration status and to project possible deterioration likely to occur in the future.

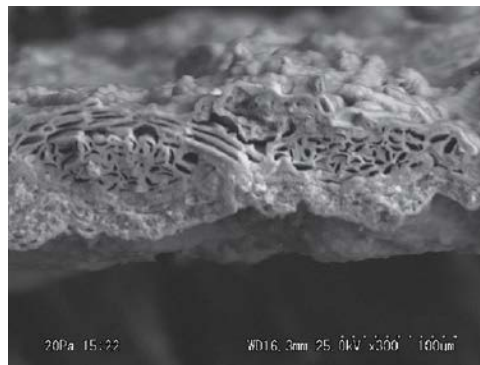


Visually inspecting if there are cloth or wood remains on an artefact

## Analysis of cultural properties

Although it is obviously important to analyse information gained from cultural properties by using cutting-edge devices, the most basic analysis method lies in observation with visual contact, photographs, and microscope (upper and lower right photos).

Incidentally, various devices are used for analyses. One of the analyses is material analysis using X-rays. In the example below, analysis of an ancient sutra text using X-ray fluorescence spectrometer elucidated that the characters are written in gold (lower right and left photos).



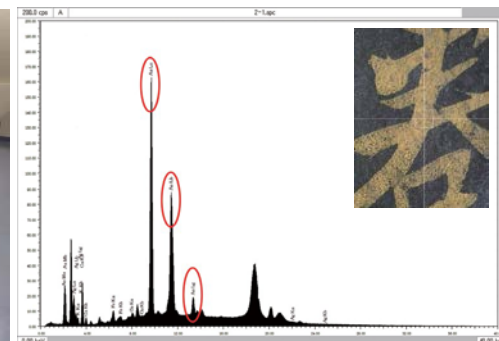
Cross section of a cloth (silk)



Cross section of pigment layers (Red mercury sulphide on the surface)



X-ray fluorescence spectrometer (centre)



X-ray fluorescence spectrum (Red circle indicates gold.)

## Improvement and development of conservation treatment methods

Generally, wooden objects being buried long under the ground are unearthed through excavation, on the condition that they have lost the most components, barely keeping a form depending on moisture contained inside. That is, for exhibiting such unearthed wooden objects, it becomes necessary to apply conservation treatment that keeps the form thereof without moisture (See p.12 and p.13). Several conservation treatment methods have been developed; and, even today, the Institute are working on improvement and development of more effective way for conservation treatment.

Moreover, at the work sites of conservation treatment and restoration of cultural properties, a wide range of resins are used, depending on applications. Selecting proper resins as adhesive agent, filler, etc. is one of the important roles of conservation science.

### Development/research themes that we are currently working on

#### Development of preparation method for pseud unearthed wood

To create artificial, pseud unearthed wood used for experiments of development of conservation treatment methods, preventing precious, real unearthed wood from consuming.

#### Study on conservation treatment method for unearthed wooden object

To develop a method using microwave heating (used for microwave ovens, etc.) combined with freeze-drying method

#### Study on acrylic resin for conservation treatment

To study how acrylic resin would deteriorate when used as an adhesive agent for conservation treatment and restoration of cultural properties

#### Study on new cleaning method

To develop a method using fine bubbles and hyperfine bubbles to clean cultural properties safely and effectively.

## Research on storage/storage environment

Every cultural property has more or less deteriorated. In order to hand such cultural properties down to posterity, it becomes important not to aggravate the present state. Even if you applied conservation treatment and restoration to them, if subsequent storage environments were improper, the deterioration could promptly progress. Since environment suited to storage differs depending on each cultural property, we propose an improvement plan to museums by investigating temperature, humidity, inhabiting situation of pests and moulds, pollution in the air, etc. in order to find out if their storage/storage environments are proper. (See two photos on the right.)



Mould investigation



Temperature/humidity monitor (left) and pest detector (right)

# Restoration of Heirlooms

“Heirlooms” may be an unfamiliar term. It is a term used in contrast to buried cultural properties (artefacts and historical articles unearthed in waters or under the ground). In short, it may be said that any and every article (historical articles) that people have inherited come under the heirlooms including folk materials, sculptures, stonework, craft works, etc. Folk materials refer to the various types of tools once used in the primary and manufacturing industries. Accordingly, the tools you use on a daily basis at this point in time may, over the course of time, become the objects stored at an historical museums, and referred to as folk materials.

Heirlooms tend to be easily broken through daily use. Alternatively, sculptures such as Buddhist and god statues, for example, are often worn from damage caused by insects and small animals without anyone realising it, because such sculptures are regarded as sacred items, and have, therefore, been stored.

Despite the extreme difficulty in restoring such historical articles, in order to pass those historical objects to posterity, the Institute is working day by day on the restoration by making full use of the methods and materials that apply conservation science perspectives in addition to traditional repair methods.



Conservation/restoration process for heirlooms

## Conservation of stone cultural properties

Some of the historical objects such as stone Buddhist statues, stone stupas, gravestones, etc. installed outdoors and exposed to differences in temperature/humidity and the weather, have become deteriorated, and partly lost, or the surface layers have flaked off.

For these historical objects, we strengthen the stone materials with chemicals, adhere the materials so as to prevent future damage, apply resin or other chemicals to cracked parts; then, apply an imitation stone finish in order to create the stone texture.



Strengthening the statue material with a reinforcing agent so as to prevent future damage.



Applying epoxy resin to the cracked part, then creating a stone texture that blends with the surrounding areas

Restoration of the Khitigarbha-bodhisattva statues carved on a rock face in Ishigatani (Owned by the Board of Education of Aritagawa town, Wakayama prefecture)

## Conservation/restoration of fishing tools

Fishing tools once used in the sea contain a large amount of salt. Salt not only causes metal to rust but promotes deterioration of wood. Accordingly, desalination is carried out as is the case in unearthed metal objects. Subsequently, damaged portions are restored. The conservation science principle requires visual distinguishability between the original material and the restoration material.

For example, in the photos of the restoration below, new wire mesh and bamboo used for restoration have different materials and colour tones from those of the original materials, in order to distinguish original historical objects from new materials used for restoration.



Desalination process to remove salt

Restoration of icefish fishing net (Owned by Rikuzen-takata city museum, Iwate prefecture)



Filling in the missing parts of a wire mesh with new stainless steel mesh coloured distinguishingly.

Fixing the mesh with gut thread concurrently on the both front and back sides of the net. It is an extremely detailed work.



Fixing the shape of wooden parts by using a vice



Restoration of "Hamdou" (a fishing tool)  
(Owned by Rikuzen-takata city museum,  
Iwate prefecture)



New and old original bamboo materials can be distinguished.

# Conservation/Restoration of Earthenware

In excavation surveys undertaken nationwide, a large number of earthenware is unearthed. The earthenware thus unearthed is restored by removing stains (dirt, etc.) first, joining cracked fragments, and filling plaster, etc. into missing portions.

When some earthenware is designated as Important Cultural Property, or when serious deterioration is observed in the material used for the previous restoration, such earthenware becomes subject to dismantlement restoration. Some fragile earthenware with fine cracks may be consolidated by using chemicals.

After the restoration, the earthenware is exhibited at various museums as precious historical articles for learning history.

## Pre-treatment investigation

Before starting conservation/restoration, photographing should always be carried out in order to record the pre-treatment state. Furthermore, X-ray may be taken so as to check invisible cracks or the range of a reconstructed portion. There are cases where X-rays have shown a pattern hidden under extraneous matter.

Preliminary investigation examines following factors for the preparation of restoration: (i) how scattered fragments should be joined; (ii) what percentage of an entire body the remaining parts account for; and (iii) if there is any earthenware with a similar shape unearthed at another site.



Pre-treatment investigation



Conservation/restoration process for earthenware

In addition, consolidation method should be considered by carefully observing the condition of fragile part or carbides on the surface (if any).. In case lacquer or pigment is coated on the surface, the component is analysed.

## Dismantlement

An adhesive agent that joins fragments should be softened by using an organic solvent such as acetone, etc. Plaster on reconstructed portions should be shaved off by using craft knife, scalpel, etc.



Fragments of dismantled earthenware are set out, matching positions.



## Cleaning/Consolidation

Adhesive agent or plaster remaining on the surface or cross section of fragments should be removed. In this case, if lacquer and/or pigments were coated on the surface, careful attention should be paid not to shave off such lacquer/pigments. When conserving fragile fragments or those coated on the surface, acrylic resin is permeated inside for consolidation.

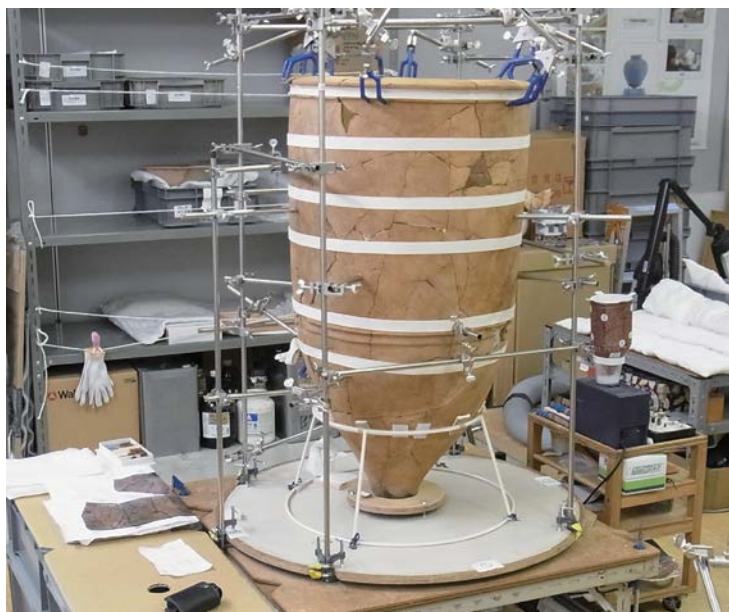


## Joining fragments

Fragments are joined with acrylic resin as an adhesive agent. In this work, it is required to pay attention to the balance of entire shape.



Joining fragments of earthenware



During the joining process, the object is firmly fixed until adhesive agent is completely hardened. (Owned by the Agency for Cultural Affairs; Stored by Kyushu Historical Museum)

## Restoration

Shape and patterns of missing portions are restored by using epoxy resin, etc. This restoration work requires extreme patience, especially when restoring Jomon earthenware with straw-rope patterns that are detailed and time-consuming.

## Colouring

Restored portions are finished by using acrylic paints and pigments.

## Post-restoration investigation

Every chemical used for consolidation and materials used for reconstruction are recorded and compiled in a restoration record. The facts that additionally became clear during the restoration work should be recorded as well. As the final step, photographs are taken.



Colouring reconstructed portions

What has been explained so far are the basic processes of dismantlement restoration of earthenware. The Institute has also undertaken conservation/restoration of large-size *haniwa* (clay figures) and a large casting mould of copper coins. As no two items are the same, it is necessary to be careful from start to finish while working. This work is very important for handing down to posterity precious historical objects that facilitate our knowledge of history.

### What is X-ray photograph section for ?

X-ray radiography is an inspection method to know information on the inside of an object by visualising the X-ray that penetrates the object via a detector. In order to confirm the conditions of a historical object, the Institute carries out X-ray radiography before undertaking conservation treatment. This is the same as people have an X-ray when they go to the hospital for treatment due to disease, breaking a bone, etc.

In some cases, the X-ray examination detects internal corrosion and cracks inside historical objects, even if they seem to be robust at first glance. In other cases, the X-ray examination may also reveal a visibly unrecognisable inner structure or a combination of parts made of different materials. Based on the results of this examination, the policy for a conservation treatment is decided.



Visible-light photography  
(Ordinary photography)



X-ray photography

Round pommel unearthed at Isobe-otsuka kofun(tumulus), Toyohashi city, Aichi prefecture

### X-ray tomography (CT scanning)

X-ray CT scanning was originally a technology to acquire a cross sectional image of a physical object. Thanks to improvement of image processing technology, however, it has become possible to show the image in 3D graphics. Nowadays, it is easy to know the inner structure of historical objects, and to confirm manufacturing techniques, history of repairs, and condition of insect damage.

In addition, as shown in the photos below, it has no trouble observing an object built in the centre of a Buddhist statue, retrieving data thereof as 3D information, and transmitting it through a 3D printer.



Wooden Standing Statue of Eleven-faced Goddess of Mercy (Owned by Daizen-ji Temple, Sakai city, Fukui prefecture)



X-ray CT image



Bronze head of Buddha inside the statue

\* The photos centre and right above are provided by Kyusyu National Museum.

## Roles of Photograph Section

After being brought into the Institute for conservation treatment, every artefact/historical object is photographed before and after the treatment. This process aims to enable comparison of how a historical object has changed in shape and conditions due to conservation/restoration work. In some cases, a historical object halfway through the treatment may be photographed.

The Institute also takes photos of artefacts unearthed through excavation surveys in order to create reports, as well as of heirlooms of Buddhist temples and Shinto shrines on the occasion of a survey. Every photo and image thus taken is stored at the Institute.



Photographing a picture scroll



Photographing earthenware

### Despite being subvisible

Buddhist paintings not infrequently remain on the pillars and walls of Buddhist halls. However, in most cases, their original images have become unidentifiable due to dirt/stains accumulated over time and peeling. Even subvisible portions of such paintings may become clearly visible by photographing them by using X-ray or near infrared rays.

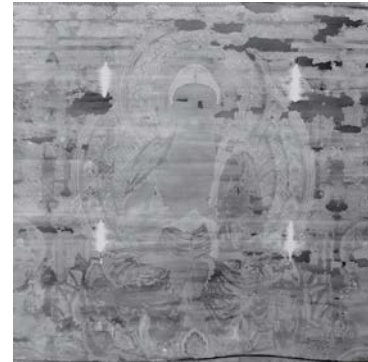
The photos below are of “Chiko Mandara (Important Cultural Property, Kamakura Period)”, an artwork on wood owned by Gango-ji Temple. The photo taken using near infrared rays shows the original image clearly; meanwhile X-ray photography proves that the wood board was nailed.



Visible-light photography  
(Seen in the same way as unaided eye)



Near infrared rays photography  
(Original image appears clearly.)



X-ray photography  
(Structure shows clear.)  
“Chiko Mandara”, an artwork on wood owned by Gango-ji Temple

# Conservation and Investigation of Historical Documents

The high temperature/humidity climate endemic to East Asia and pests are great risk to ancient Japanese documents. Even though various things have been done to protect ancient documents from the humidity and pests since ancient times, many of early-modern documents remaining in local regions have been so damaged due to humidity and insects that they have become useless unusable. The Institute carefully selects materials and skills safe for historical documents, conforming to the four restoration principles, a world standard; preservation of original form, reversibility, safety, and documentation.

## *Sukibame* (leaf casting) method for historical documents damaged by insects

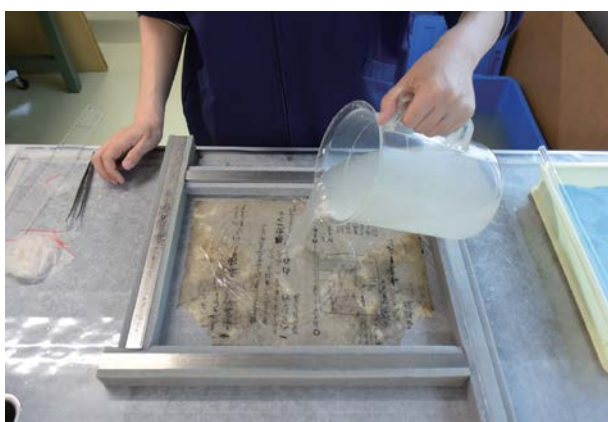
Many of documents damaged by insects including deathwatch beetle (Anobiidae) have the problem that the pages thereof have stuck together due to stains or feces of insects. For such historical documents damaged by insects, the stuck paper sheets should be cleaned and separated one by one with a pair of tweezers and a spatula, then, the fragments are temporarily fixed. Next, fibre of *washi* (Japanese traditional paper) diffused in water is poured onto the damaged paper sheets from the reverse side. By making use of flow of the water, the fibre of *washi* paper fills in bug holes and surrounding areas. In the final step, each paper sheet in which the holes were filled with fibre is pressed for smoothing, and is allowed to dry naturally. Consequently, the *washi* paper fibre of the document body and the poured fibre cohere due to hydrogen bonding, completing the repair of the bug holes without glue. This restoration skill is referred to as “*Sukibame* (leaf casting) method”. After being repaired by this leaf casting method, a slight margin is added to each paper sheet and is cut. Thus, the original form is restored.



Separating the paper sheets of the document stuck together due to bug holes, paying careful attention not to tear the paper.



Temporarily fixing fragments, paying attention so that the characters are properly lined up.



Pouring *washi* paper fibre onto the original. Too much fibre may excessively thicken the sheet.



Making holes to bind papers to restore the document

In addition, historical objects in the form of paper are in danger of various crises of collapse; for example, some have become fluffy like cotton having being left neglected in wet conditions; areas coloured with patina containing copper have turned brown, or fallen off; inks that contain iron have corroded; etc.

### Investigation on conservation conditions of historical documents

To draw up a conservation plan, investigations are undertaken on deterioration/damage conditions of the historical documents stored in archives or other institutes. They check the type of paper and medium such as pigments, and degree of deterioration or damage, measure acidity on the paper surface, and make observations via a microscope. Furthermore, they digitise the investigation results, summarise the characteristics of the deterioration/damage of the historical documents, and examine the necessary conservation treatments.



Observing the surface of a paper via a microscope



### Restoration of coloured pictorial maps

When restoring pictorial maps coloured with pigments and dye, those prone to lose colours are lined; and those resistant to water exposure are treated using the *sukibame* (leaf casting) method. To this end, a test on the water resistance of pigments is conducted before the treatment; and, if necessary, they undertake a process to prevent colour blurring with animal glue or synthetic resin. As shown in the photo on the right, a large pictorial map is divided, and treated with *sukibame* (leaf casting) method.



A pictorial map is divided, and treated with *sukibame* (leaf casting) method.

### Conservation treatment of modern/post modern historical documents

Some official documents and books made with western machine-made paper in the modern/post modern period need chemical treatment, especially to suppress the deterioration of acid paper. To neutralise the acid contained in the paper, an alkaline chemical is sprayed on the document. This life-prolonging treatment properly conducted at the earliest opportunity makes it possible to hand down these historical documents to posterity.



Deacidification

# Conservation Treatment of Wooden Objects

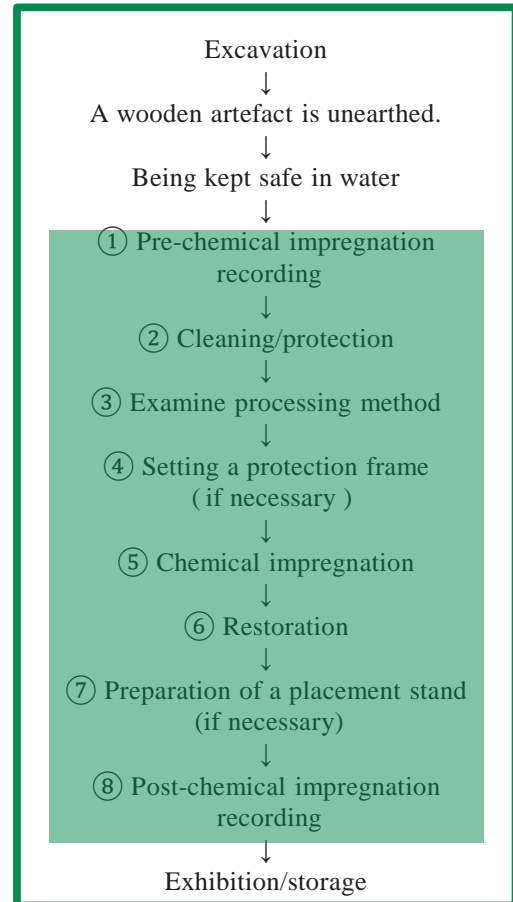
Wooden objects unearthed during excavations barely maintain their form with the moisture contained. Consequently, such wooden objects should be soaked in water immediately after being dug out, or it will dry and become deformed through shrinking, warping, and twisting.

To maintain the original shape, a measure called “chemical impregnation” is applied through which the wooden objects are immersed in a chemical solution so that moisture contained therein and the chemical are forcibly replaced with each other. Subsequently, the chemical solidifies therein, and maintains the shape of the wooden objects, protecting it from deformation without water. After that, cracked or broken portions are restored as far as possible. Upon treatment, storage becomes easier, and the wooden objects become exhibitable at museums, enabling the public to see them.

It is also imperative to record new findings together with the documentation of conservation treatment; because such data accumulation supports the development of new conservation treatment methods and archaeological studies.

## Investigations, documentation, cleaning, etc.

As a first step, wooden objects are carefully examined and recorded with regard to the condition of any damage, number of fragments, and remaining lacquer, *sumi* ink, etc. After that, they remove dirt and sand, plant roots, etc. Furthermore, seriously damaged or fragile areas are protected. Finally, the appropriate treatment is decided, depending on the type of wood, the shape of object, etc.



Conservation process for wooden objects



Cleaning before conservation treatment



Pre-treatment documentation

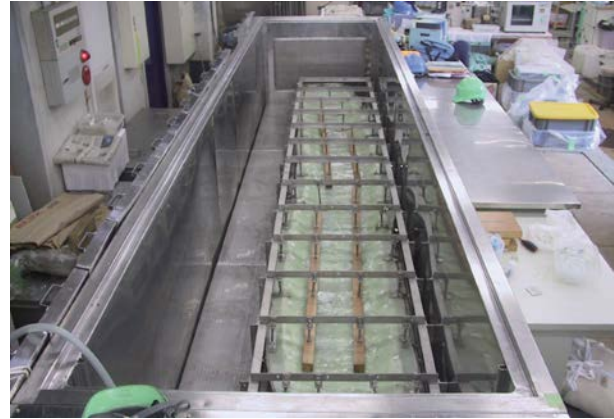


Protecting a wooden object so as not to peel off the lacquer film

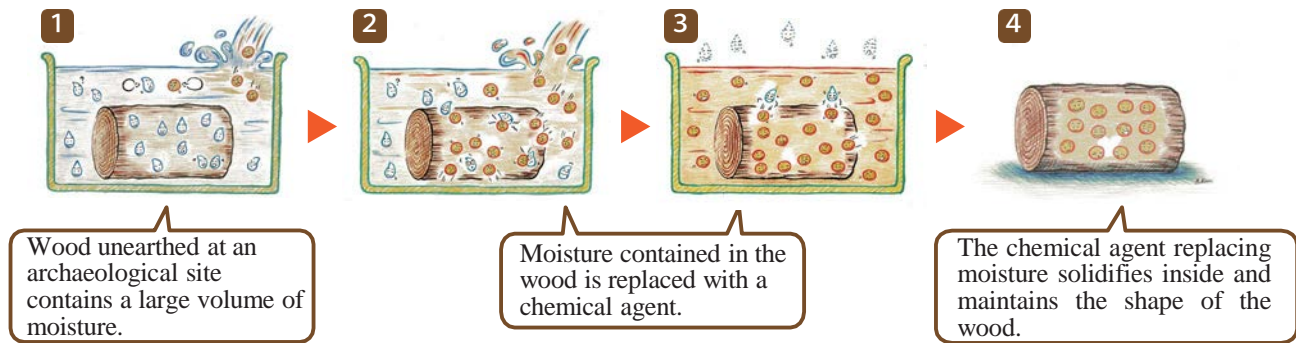


## Chemical impregnation

Considering the results of the initial investigation, the appropriate method of conservation treatment is selected. Large-size or three dimensional artefacts are impregnated in a chemical solution for a certain period of time after being framed for protection. After completing the chemical impregnation, the object is inspected to ensure that there is no change in shape or other elements, referring to the pre-impregnation record.



Under impregnation



Mechanism of chemical impregnation

## Restoration, investigation, and documentation

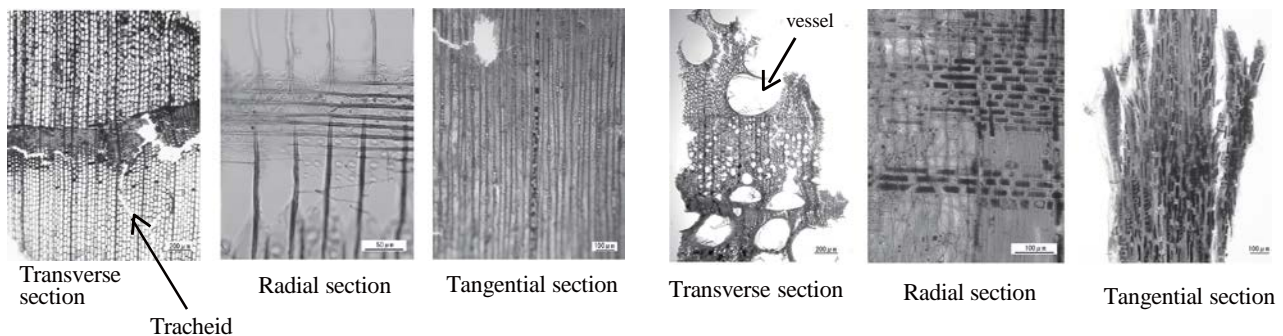
Cracked or broken portions are joined by using an adhesive agent. Cravices are filled in with resin. The filled portions are shaved along the grain, moulded so as not to look unnatural, and coloured with paints. As the final step, the condition of the object is carefully examined and compared down to the finest detail with the pre-impregnation records before recording post-restoration details.



Colouring the resin-filled portions

## Identification of tree species

Generally, tree species is identified based on external features including leaves, petals, fruits, bark, etc. However, as unearthed wooden object has already lost such information, the tree species is identified by observing the anatomy of the wood via microscope. In general, coniferous wood is mostly (90 – 95%) composed of tissues called tracheid. Meanwhile, hardwood has tissues called vessels. Roughly speaking, the wood containing vessels is hardwood; if not, it is coniferous wood.



# Conservation Treatment of Metal Objects

Various tools (artefacts) used by ancient people and discovered through excavation surveys include metal objects such as weapons, farming tools, mirrors, etc. These artefacts are extremely valuable in that they describe a range of aspects of the lives of ancient people.

However, some metal artefacts have seriously corroded while being buried in the ground. There are cases in which the excavation triggers corrosion of the objects.

Conservation treatment for metal objects aims to pass on such artefacts to the next generation by removing rust, preventing the progression of rust, and thereby maintaining a stable state thereof.



Conservation process for metal objects

## Investigation, documentation and cleaning before conservation treatment

It is necessary to examine an artefact in various aspects before conducting any conservation treatment.

First, photographs are taken as a record of the state of the item prior to the conservation treatment. X-ray photography is effective for revealing the state of the inner structure and the degree of deterioration of an item covered with rust (For further details please refer to p. 8, “X-ray photography room”).

Observation using the naked eye or a microscope is also important. Sometimes wood, cloth, leather, lacquer, etc. are identified as the parts originally associated with the metal tools. Based on the results, a conservation treatment plan is determined, and carefully carried out with removing rust and dirt.

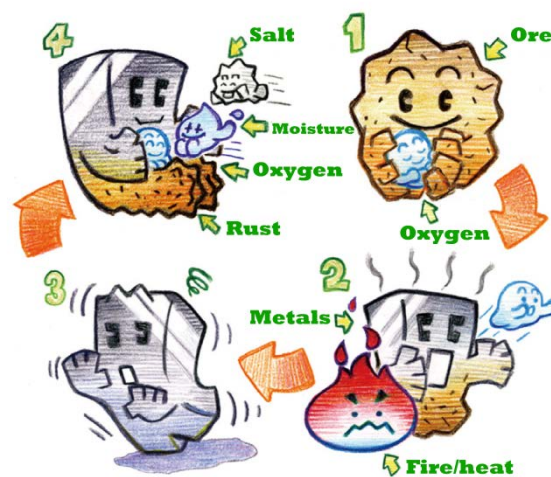
## Rust-proofing/Strengthening treatment

Metals exist in the natural environment as an ore combined with oxygen and other elements in a chemically stable state. To extract a target metal, energy (fire/heat) is applied to the ore.

However, most of metal elements are unstable, so the extracted metal tries to return to the stable state as an ore by combining with moisture, oxygen, and salt. This phenomenon is termed “rusting”.



Desalination treatment



Why do metals rust?



The metal object conservation treatment prevents rust by removing the cause of rust existing in a metal, and insulating the metal from causes of rust existing in the environment.

### Desalination

In desalination, iron objects are immersed in a chemical solution to remove the salt contained inside. For copper objects, the treatment aims to stabilise their condition. (BTA treatment) <sup>(1)</sup>

(1) BTA (benzotriazole) treatment

Prevent corrosion and discolouration by forming a molecular film of cupric BTA, based on chemical reaction with copper.



Applying resin

### Resin impregnation

Next, in order to strengthen an artefact as well as to insulate it from oxygen and moisture, the artefact is impregnated with acrylic resin in a vacuum state. After that, acrylic resin is coated on the surface of the artefact. As acrylic resin is removable by using an organic solvent even after having hardened (reversibility), it will not damage the artefact in conducting future conservation treatments.



Resin impregnation

### Joining/Restoration

After undergoing the rust-proofing and strengthening through chemical treatment, the pieces of artefact are joined with an adhesive agent so that entire shape of the artefact becomes comprehensible. Missing portions are restored with resin. Restored portions are coloured, so as not to look much different from the original.



Rust removal

### Investigation after conservation treatment

After completing the conservation treatment, photographs and X-ray radiography are taken again. Conservation treatment records are compiled for future reference, including the knowledge obtained through the processing and procedures/methods used.



Colouring restored portions

### 3D measurement

Digital archives using 3D laser measurement devices is a new digital documentation method for tangible cultural properties including buried cultural properties (e.g., archaeological sites, structural remains, unearthed artefacts), folkloric cultural properties (e.g., Buddhist statues, stone monuments, folk articles), etc.

Such 3D digital data is widely used not only for creating digital contents and conducting researches, but also for making digital replicas and exhibition stands for artefacts to facilitate the opening of cultural properties to the public.

#### Creation of a replica of the internal condition of stone chamber when it was unearthed (Chasuriyama Tumulus, Asago city, Hyogo prefecture)



Measurement using 3D measuring device



Colouring the replica, while carefully referring to photos



Completed replica of the unearthed condition

#### Recording the unearthed conditions of the sacred core pillars in the precinct of Izumotaisha Grand Shrine (Izumo city, Shimane prefecture)



Measurement using 3D measuring device



3D data of the sacred core pillars

## Production of exhibition/storage stands

Some artefacts subject to conservation treatment are originally three-dimensional objects, or have become deformed while they were buried. To secure the stable storage for the objects, or to help the understanding of their original shape: dedicated stands are made for such artefacts.

### Producing exhibition stands for the armour unearthed at Chasuriyama Tumulus, Asago city, Hyogo prefecture



Setting positions for a helmet, armour, etc.



Stand for expanded artefact



Stand for assembled artefact

## Production of replica

In cases visitors may find it difficult to understand the original shape or appearance only by looking at the artefacts themselves, some owner institutes or museums request us to produce replicas. The artefacts are carefully examined before commencing conservation treatment; and the knowledge obtained through the process is exploited in determining the details of the replicas.

### Producing a replica of armour unearthed at Imashirozuka Tumulus (Takatsuki city, Osaka prefecture)

#### 《Reconstruction of a helmet》



Beating out an iron plate of armour



Tacking down the parts of armour

#### 《Reconstruction of an armour》



Tying kozane (small iron scales) one by one with leather straps



The iron scales horizontally tied are further tied vertically with braided cords



Replica of armour unearthed at Imashirozuka Tumulus (full set)

## Research of Cultural Properties

In our Humanities Archaeology section, experts belonging to a range of fields including archaeology, philology, folklore, art history, Buddhist studies, etc. conduct cross-over studies in cooperation with each other. For example, after surveying a site, conditions of the site left under the ground can be elucidated through archaeological research; however, it requires further information from ancient documents to understand the social background or related social trends in that time. Furthermore, folkloric information is necessary for establishing how an unearthed artefact was used. Such multilateral, interdisciplinary analyses is a distinctive feature of the work of the Humanities Archaeology section.

### Comprehensive research on cultural properties owned by Buddhist temples and Shinto shrines

The Institute undertakes comprehensive interdisciplinary research extending across the fields of history, Buddhist studies, art history, folklore, and archaeology on cultural properties owned by temples and shrines. The research targets everything relevant to the history of the temples/shrines, ranging from important articles including ancient documents, sutras, sculptures, paintings, stonework, to those that tend to be depreciated as cultural properties including Buddhist altar articles, mortuary tablets, printing blocks, votive picture tablets, gate tablets of temples, wooden tags, etc. Through such comprehensive research, the Institute aims to evaluate the values inherent in cultural properties from a technical perspective, as well as to elucidate and restore their history.

Furthermore, we facilitate the conservation and management of cultural properties owned by temples/shrines by creating an inventory, and establish the value of hidden cultural properties and make this information public. This leads to conserve and utilise cultural properties as public properties for many years to come.



Research on craft work (Senryu-ji Temple, Shikoku-chuo city, Ehime prefecture)



Photographing sutras (Kannon-ji Temple, Kannon-ji city, Kagawa prefecture)



Researching a printing block by doing rubbing (Kannon-ji Temple, Kannon-ji city, Kagawa prefecture)



Research on Buddhist statues (Jurin-in Temple, Nara city, Nara prefecture)

## Excavation survey and organising artefacts

As excavations are irreversible that, once conducted, cannot be undone, and thus require staff with appropriate knowledge and experiences. Furthermore, excavations involve not only digging but keeping meticulous records of the archaeological site that will be destroyed, creating drawings and photos covering every element such as the shape of structural remains, unearthed state of artefacts, landform, etc. Research on an archaeological site is not complete when the excavation winds up. The research is only completed when a detailed catalogue is created based on the records obtained through the research, and an official report that makes public of all such matters is published.



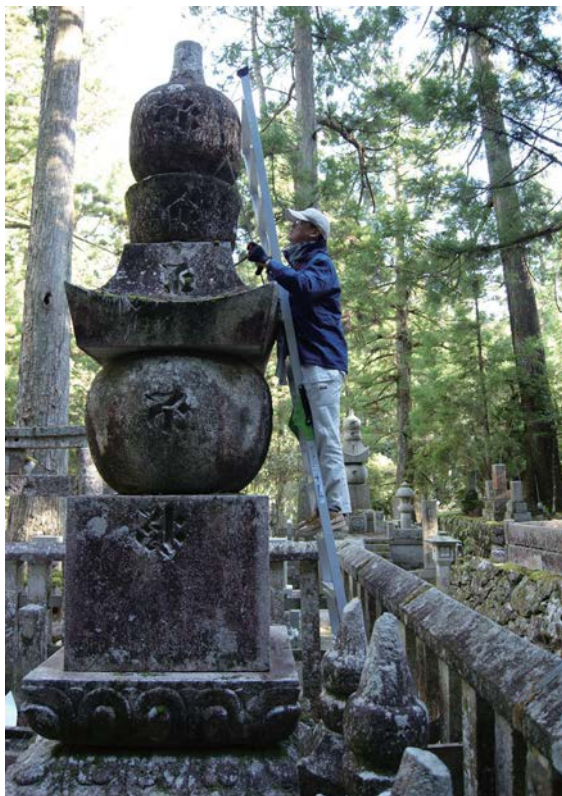
Photographically recording how the structural remains were buried



Measuring unearthed artefacts

## Research on stone monuments

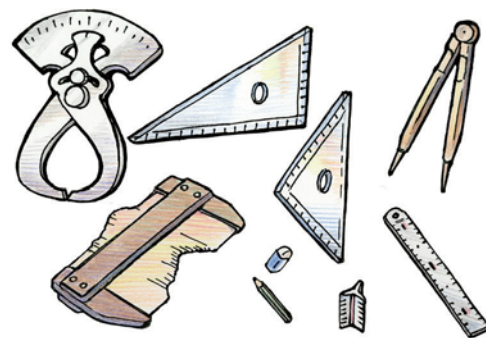
Research on stone cultural properties is one of the specialties of the Humanities Archaeology section. Besides being a precious historical heritage, stone monument is a familiar cultural property that people can touch. The Institute works for making a list of stone cultural properties, taking photos thereof, preparing measured drawings to record their shapes, and thereby organise basic information for utilisation.



Measurement of a stone monument  
(Koyasan-Okunoin Temple, Koya-cho, Wakayama prefecture)



Doing rubbing in stonework research



## Organising exhibitions and supporting displays

Twice every year, in the spring and autumn, the Institute makes public work/study results at the special exhibition room of the Horin-kan Hall of Gango-ji Temple, a world heritage site. Furthermore, the Institute provides support for exhibitions held nationwide at public facilities/museums, utilising its accumulated experience of exhibitions, etc. The support covers a broad range of works including not only exhibiting work for cultural properties but borrowing and return of historical articles to be exhibited, creation of exhibition panels and captions, designing exhibition stands safe enough for exhibits, and packing and transportation of historical articles.



Packing



Creating a display

## Cultural Property Transportation Vehicles

Transportation is indispensable for the management of cultural properties to transport them from all corners of Japan to the Institute for the purpose of conservation restoration, repair, research, etc., or for lending cultural properties to various exhibitions held nationwide as effective utilisation thereof.

We own two cutting-edge cultural-properties transportation vehicles that ensure safer transportation of cultural properties, while responding to present-day environmental fluctuations and social needs as well as considering global environments.

These cultural property transportation vehicles (named “Shvara”\*) enable on-the-spot scientific research and elucidation on the materials, structure, etc. of cultural properties difficult to transport, by using an X-ray diffractometer and others installed inside the vehicles.

Continuing into the future, we will actively work for conservation, opening to the public, and utilisation of cultural properties existing all over the country, making good use of our past results and achievements.

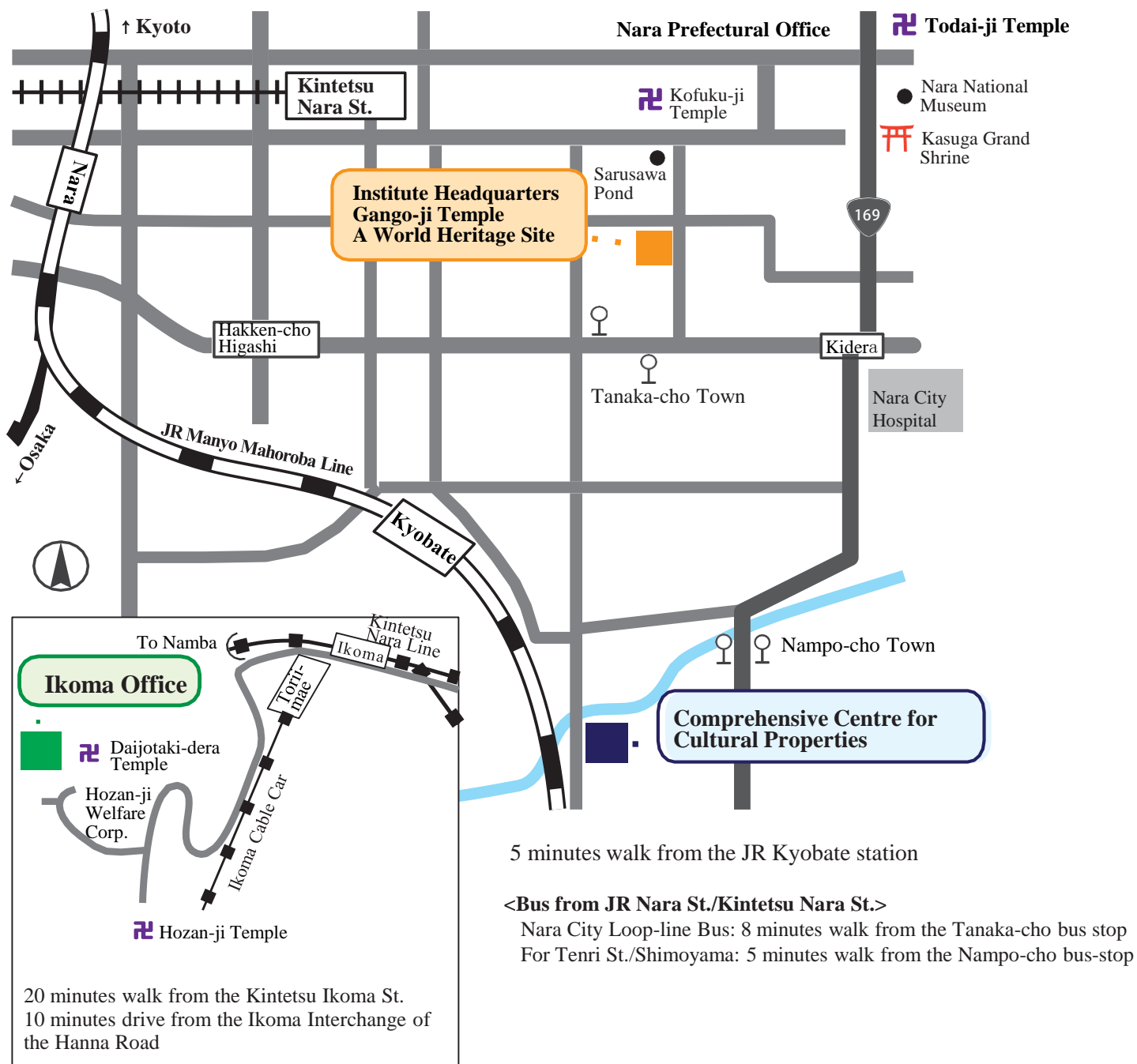
\* Shvara I and II were subsidised by the Japan Lottery Association. Incidentally, “Shvara” (Sanskrit) is a name after “Avalokiteshvara” that literally means “exquisite contemplation; exquisite sound”.



The vibration isolator and monitoring system ensure safe transportation. (Shvara II)



A 24-hour air conditioning system using solar panels is built in. (Shvara II)



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