Conservation and Restoration of Internal Features









Independent Administrative Institution
National Institutes for Cultural Heritage
Tokyo National Research Institute for Cultural Properties

Conservation and Restoration of Internal Features

Edited by

Tokyo National Research Institute for Cultural Properties
Center for Conservation Science, Restoration Techniques Section

Foreword

The Tokyo National Research Institute for Cultural Properties is presently involved in research of various tangible cultural properties including methods for their preservation and restoration. Particularly regarding fundamental studies with the aim of protection of diverse cultural heritage properties from Japan's Modernization period following the Meiji Restoration in 1868, a project titled "Research on Conservation and Restoration of Modern Cultural Properties" was established in 2001 when the institute became an independent administrative institution. Since then, an annual theme has been set and study meetings have been held, inviting guests from Japan and abroad, to share information so that further advancements in our studies could be made.

In the meantime, in 2006, so as to convey our strong focus on preservation and restoration of cultural properties from the Modern era, the name of the section in charge was changed from Restoration Techniques Section to Modern Cultural Heritage Section, and the organization has been reinforced.

Topics that have been dealt with pertaining to modern cultural properties are vessels, aircraft, large-scale structures, steel structures, and concrete structures. Additionally, we have focused on media for recording audio and video including records, film, and tape. Preservation issues that were focused on regarding works that employ such materials as oil paint, Western paper, or modern textiles have been published as a series of reports.

Although the basic principles regarding protection of Modern heritage as cultural properties have already been provided by Japan's Agency of Cultural Affairs in 1996 in a report titled "Preservation and Adaptive Use of Modern Cultural Heritage," twenty years have passed since its publication. Since then, preservation of cultural properties has come to include cases in which working properties need to be protected with their original functions intact or while requiring enhancement, rather than as mere monuments. They also may involve changes in use or planning for adaptive use. Today, various flexible measures need to be derived for each property according to their characteristics. Therefore in 2015, a study meeting with the theme of principles for preservation and restoration was held, to summarize the outcome of the past projects, which was published as "Principles for Conservation and Restoration of Modern Cultural Properties." Nevertheless, it cannot be denied we are still only at the beginning of our studies on modern cultural properties.

From fiscal year 2016, as the fourth mid-term (a five year period from 2016-2021) in the schedule planned by the institute was about to begin, the Modern Cultural Properties Section in order to further promote the deepening of our research into a wider field, focused on brick structures. As a result of their comparatively successive national cultural properties designation, brick masonry structures have been restored and much experience has been gained over the years. The outcome was compiled into a report titled "Conservation and Restoration of Brick Masonry Structures" and "Conservation and Restoration of Steel Structures." This fiscal year, we decided to concentrate on concrete structures, focusing on internal fixtures inside architectures such as floors, walls, ceilings, or light equiptment. Presented in this report are papers gathered from leading specialists who are well informed on cases in Japan together with case studies documented by the Modern Cultural Properties Section over the past year.

I would like to thank all of those who took part in this research and seminar and hope that full use of this report would be made in the actual practices of preservation and restoration of concrete structures.

Our institute intends to proceed with studies on theory and methods for protection of modern cultural properties through involvement in actual cases of restoration. We would like to ask you for your continued support and cooperation.

Saito Takamasa

Director General
Tokyo National Research Institute for Cultural Properties

Table of Contents

Introduction

Introduction

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1. Background

In the three years from fiscal year (FY) 2016 to FY2019, the Tokyo National Research Institute for Cultural Properties researched the problems related to preservation and restoration caused by each of the materials (brick, iron, concrete) that comprise Important Cultural Buildings and their solutions. It created a report that can be used in the practice of preservation and restoration work.

For FY2019, we conducted a research study focusing on internal features that were not much reflected upon rather than the materials that comprised the Important Cultural Buildings up to that point. There can be various points of discussion regarding internal structures. However, regarding preservation and restoration work, the processing related to the structure of the building itself is the inevitable focus. If anything, building structures were often considered good if they were created to be beautiful, and their artistry was often considered an accessory. However, the internal features are the parts most often seen and are also the most used part of the building. People who view the building as a cultural property imagine the worlds of the people who might once have gathered there. They are compelled to wonder about the lives of these people from the past when they look at the interior wallpaper, ceiling decorations, chandeliers, lighting equipments, and other interior artifacts while marveling at the exterior as well . It is the internal structure that contributes to the endurance of the past the most, which is a significant factor.

Instead of dealing with these internal features as an adjunct, as mentioned above, there are many attempts to restore buildings. These entail effectively verifying their histories using documents, specifications, old photographs, etc., during construction and using the materials and techniques of the time as much as possible during preservation and restoration.

In this research study, focusing on such cases and while listening to the owners or managers and the people in charge of restorations at the site, we understand the problems that occurred during each preservation and restoration work and discover how to solve them. Subsequently, we summarize the results for contributing to the practice of the preservation and restoration work of other Important Cultural Buildings.

2 .Currerrnt Status

In conducting this research, it is necessary to understand the current situation. Therefore, we examined the restoration work report centering on a western-style building that had been preserved and repaired thus far and listed the properties that show descriptions of their internal features. In addition, we contacted the owner or manager and the person in charge of the restoration work to consider whether to investigate it.

Table 1 shows the list of properties surveyed on-site during this investigation.

For each property, we investigated the degree of historical verification and the method of restoration work while conducting on-site interviews, but the following problems generally existed in all properties:

- We would try to understand the original aesthetics based on the original documents, specifications, old photographs, etc.. However, in many instances, there were no materials, and the degree of historical verification was not uniform.
- The coloring of things, such as carpets and curtains, in particular, needed to be affirmed by referring to old photographs; however, it was difficult to identify the colors from black-and-white photographs.

- The same product could not be obtained because the manufacturer of the product (wallpaper, carpet, curtain, linoleum, lamps, etc.) used for the internal structure no longer existed.
- Production manufacturers of things, such as the window shutters and chandeliers, were also out of business; it was difficult to find a contractor who would repair them to restore their design aesthetic and function.
- It was difficult to find a company that could produce plaster decorations, such as for walls and the central decorations on ceilings.
- While respecting the specifications that were employed when the buildings were first constructed, it was necessary to select the optimum specifications while considering the future utilization of the building.

Although it was an issue in the survey reports until last year, there is a serious shortage of engineers in the field of the restoration work of internal features as well. It is considerably difficult to restore the functionality of these buildings as many product manufacturers have gone out of business. Currently, we are asking the iron factory in the town to repair it, but the challenge surrounding the inheritance of technology is huge, even in these small regions.

3 .Structure of this Book

Based on the above, from Chapter 1 to Chapter 3, this book contains articles based on the experience of those who were actually involved in the preservation and restoration work. In Chapter 4, a collection of case studies is provided that summarizes the contents of the field survey.

In Chapter 1, Mr. Tsumura Yasunori, who was in charge of design supervision during the preservation and restoration work of the Bank of Iwate (Former Morioka Bank) Main Office Main Building, summarizes the preservation and restoration of the internal structure of the building. The Bank of Iwate's Main Office Main Building was completed 100 years ago. Although it functions as the same bank, minor changes have been made, and it was under repair at the time. Our team, therefore, searched for references of the original specifications to compare them to the afterimage drawings, photographic historical materials, and traces (current situation) during dismantling . In addition, he introduced restoration work that will lead to the present era when utilization is important, such as deciding specifications while considering its utilization.

In Chapter 2, Mr. Fukuda Kazuya—who was mainly in charge of repairing lighting equipments during the restoration work of western-style buildings conducted in various places—summarizes the repair of lighting equipments. Various parts of the western-style building were yet to be prepared. Lighting equipments that did not match the original room, such as those that were lost or replaced, were used, or the purpose for which the room was used changed. Therefore, he repaired the remaining fluorescent lamps while they were in use and restored the lost ones from the materials and old photographs of the time. Alternatively, he restored the lighting equipments with ones suitable for the western-style building and, thereby, reproduced the atmosphere of the building by selecting suitable products from the manufacturer's catalog while considering the zeitgeist of the time.

In Chapter 3, Mr. Matsushita Michio of Meiji-mura summarizes the graining applied to the fittings of "No. 25, Nagasaki Foreign Settlement" that has been relocated to Meiji-mura. This graining also remains in the "Mie Prefectural Office" of Meiji-mura, "Meiji-maru," which is preserved at the Tokyo University of Marine Science and Technology, the "Former Tsurushima Lighthouse Keeper's Residence" in Ehime Prefecture, and the "Kuroshima Cathedral" in the Nagasaki Prefecture. However, the graining applied to the fittings of "No. 25, Nagasaki Foreign Settlement" is considerably precise. This is a valuable example of starting with a past situation survey, such as collecting coating film pieces, referring to the graining conducted during relocation and subsequent restoration work. Further, it is an example of researching and reviving lost techniques while verifying the past painting history by rubbing, etc., and considering differences in the depiction of wood grain such as doors and skirts.

Chapter 4 references cases surveyed in the field to introduce the cases based on this theme and grasp the current situation. As mentioned in the introduction, the

internal structure is only a part of the restoration work of the building and is often not mainstream. However, in terms of the impression given to the viewer, it is an extremely impactful part and can be considered to occupy a significant portion. Research studies focusing on this have not been published thus far, and we hope that this report will be useful in the practice of conservation and restoration work in the future.

table1　List of Propetries visited for Research

Date	Name of the properties【current name】	Designation
2019.09.11	Former Residence of Prince Asaka【Tokyo Metropolitan Teien Art Museum】	Nationally Designated Important Cultural Property
2019.09.30	The Former Hong Kong and Shanghai Bank, Nagasaki Branch	Nationally Designated Important Cultural Property
2019.10.01	Former British Consulate in Nagasaki	Nationally Designated Important Cultural Property
	Glover Garden	Nationally Designated Important Cultural Property
	Higashi-yamate No 12 Building	Nationally Designated Important Cultural Property
	Minamiyamate Rest House	
2019.10.09	Bank of Iwate (Former Morioka Bank) Former Main Store Main Building	Nationally Designated Important Cultural Property
	Former Ikeda Family House Western-style house	Nationally Designated Important Cultural Property
2019.10.10	Chido Museum (Former Tsuruoka Police Station, Former Nishitagawa District Office)	Nationally Designated Important Cultural Property
	Former Prefectural Office and Assembly Building【Bunshokan】	Nationally Designated Important Cultural Property
2019.10.16	Former Iwasaki Family House Western-style house, Former Maeda Family House	Nationally Designated Important Cultural Property
2019.10.17	Meiji-mura Former Ise Post Office(Uji-yamada Post Office)	Nationally Designated Important Cultural Property
	No. 25, Nagasaki Foreign Settlement	Nationally Registered Tangible Cultural Property
2019.11.17	Mojiko Station (former Moji Station)	Nationally Designated Important Cultural Property
2020.01.07	Former British Consulate of Hakodate	City Designated Important Cultural Property (Hakodate City)
	Tachikawa Family's House	Nationally Designated Important Cultural Property
2020.01.08	Old Public Hall of Hakodate Ward	City Designated Important Cultural Property (Hakodate City)
	Iai Gakuin (Former Iai Girls School) Main Building	Nationally Designated Important Cultural Property
2020.01.09	Ōtani Hongan-ji Hakodate Betsu-in	Nationally Designated Important Cultural Property
	Former Soma House	Nationally Designated Important Cultural Property
2020.01.10	Hakodate Orthodox Church	Nationally Designated Important Cultural Property
2020.01.15	Former Nippon Yusen Otaru Branch	Nationally Designated Important Cultural Property
2020.01.16	Hoheikan	Nationally Designated Important Cultural Property
	Former Hokkaido Government Office Building	Nationally Designated Important Cultural Property
2020.01.17	Sapporo Agricultural College Drill Hall(Clock Tower)	Nationally Designated Important Cultural Property
2020.01.28	Dōgo Onsen Honkan	Nationally Designated Important Cultural Property
2020.01.29	Tsurushima Lighthouse Old lighthouse building	City Designated Important Cultural Property (Matsuyama City)
2020.01.30	Bansuisou	Nationally Designated Important Cultural Property
2020.02.03	Miuracho Catholic Church	
2020.02.04	Kuroshima Cathedral	Nationally Designated Important Cultural Property
2020.02.05	Former Sasebo Naval District Triumph Memorial Hall	Registered Tangible Cultural Property
2020.02.12	Former Zentsuji Kaikosha	Nationally Designated Important Cultural Property
2020.02.13	Former Hadari Hydroelectric Power Station	Registered Tangible Cultural Property
2020.02.14	Kagawa Prefectural Government Building East Building	

Chapter 1

Conservation and restoration of internal features in the Bank of Iwate (Former Morioka Bank) Former Main Office Main Building

Conservation and restoration of internal features in the Bank of Iwate (Former Morioka Bank) Former Main Office Main Building

Tsumura Yasunori

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1. Introduction

As a member of the Japan Cultural Heritage Consultancy, the author was in charge of the planning, design, and construction management of the Bank of Iwate (former Morioka Bank) Former Main Office Main Building from 2007 to 2016. In this regard, this paper discusses the conservation and restoration of the internal construction of the building.

The Important Cultural Property Bank of Iwate Former Main Office Main Building is located in 1 chome Nakanohashidori, Morioka City, Iwate, and is now open to the public as the Bank of Iwate Red Brick Building (**photos 1** and **2**). It is a two-story brick building with an octagonal tower on its the southeast side and a spire on its south side. The copper tile bar roof has a gentle slope in the center; the rounded part of the roof, the octagonal tower, and the spire are natural slate thatched roofs. It was designed by the Tatsuno & Kasai Architecture Office, known for designing the Tokyo station building, and was completed in 1911 as the second-generation Morioka Bank Main office building. The building is often characterized by its appearance, which is said to reflect the "Tatsuno-style renaissance" with red-dressed brick and white granite belts, and it has been a landmark in the center of Morioka City, the capital of the Iwate Prefecture, for over 100 years. Kasai Manji, who was a good partner of Tatsuno Kingo —an architect representing modern Japan—is from Morioka.

In December 1977, based on the "Morioka City Natural Environment and Historical Environment Preservation Ordinance[盛岡市自然環境及び歴史的環境保存条例]" established by Morioka City to protect historical buildings with a long history and origin in the city and historical buildings that need to be preserved in the city landscape, the building was designated as the first "preserved building" in Morioka City. It was classified as a national Important Cultural Property in December 1994.

photo 1 Exterior, Bank of Iwate (former Morioka Bank) Former Main office Main Building (taken in 2016)

photo 2 Morioka Bank inauguration ceremony (photographed in 1911, Bank of Iwate collection)

2. Background of conservation and utilization

In 1931, 20 years after the building's completion, Morioka Bank virtually went bankrupt. The newly established "Iwate Shokusan Bank" was established in May 1932 under the initiative of the prefecture. In August 1936, the building, which had been abandoned for some time, was purchased by Iwate Shokusan Bank along with the land on which it was built and was repaired, after which it was taken over as the main office in May that year (**photo 3**). During the reparation process, the outer walls were painted with white finishing material, and a second-level floor was installed in the octagonal tower in the southeast section and the atrium of the public space on the east side.

During World War II, which occurred after the aforementioned restoration, not only were decorative hardware such as hallway railings and counter screens lost in order to donate metal, but some roofing materials were also altered. Presumably, the metal decoration on the roof was also lost during this period.

After the war, modifications were made to coincide with the 25th anniversary of the establishment of Iwate Shokusan Bank. In 1956, the wooden partition that separates the three rooms on the west side of the first floor and the brick wall between the room and the guest room on the west side and the southwest staircase room were removed. Further, a sales counter for the National Treasury and the Government Housing Loan Corporation was set up. In 1958, the headquarters building made of reinforced concrete was expanded by connecting it to the north side; the white finishing material on the outer wall of the brick building was removed to return it to the original reddish-brown facing brick finish. An opening was provided on one part of the wall surface on the north side for traffic to and from the headquarters building. In 1960, the "Iwate Shokusan Bank" was renamed "Bank of Iwate," and the building became the Bank of Iwate's Main office (**photo 4**). Subsequently, the roofing material of the large roof was also changed. Although it is not clear when exactly this took place, by this time, the original floor finish and lighting equipments had changed, with some exceptions. As there are almost no records of such changes to date, these findings are often made by investigations in the conservation business.

More than 20 years have passed since the completion of the headquarters building, and business expansion has hindered the operation of the main office in the building. Therefore, a new main office made of steel-frame reinforced concrete was completed in 1983, away from the site. With the completion of the new main office, which is also part of the 50th-anniversary commemorative project, the former Main office sales department line building (the building concerned) became the "Bank of Iwate Nakanohashi Branch" during the same year. Further, the former headquarters building became the office of the "Iwate Economic Research Institute," also established at that time. Afterward, the building continued to operate as the Nakanohashi branch. In 1991, the year before its designation as an Important Cultural Property, the west side window corner on the 1st floor was renovated into a civic gallery called "Red Brick Gallery." From 1981 to 2000, the same construction company conducted minor repairs for maintenance

photo 3 Iwate Shokusan Bank (photographed in 1943, Bank of Iwate collection)

photo 4 Bank of Iwate (photographed in 1959, Bank of Iwate collection)

(replacement of roofing, replacement of rain gutters, repair of internal leaks, etc.).

Gradual deterioration and damage, mainly from the exterior, became noticeable at the dawn of the 21st century. Discussions have, therefore, been held with the Agency for Cultural Affairs, the Prefectural Board of Education, the City Board of Education, and Bank of Iwate Ltd., since 2007. It was decided that the Bank of Iwate Nakanohashi Branch's (Important Cultural Property Bank of Iwate (Former Morioka Bank) Former Main Office Main Building) preservation and utilization plan would be formulated to achieve both the value preservation and utilization of branch sales, which was created between June 2008 and October 2009. Along with the formulation of the plan, a survey and partial repairs (survey and partial replacement of exterior wall decorative bricks, test construction to prevent peeling, restoration of damage to eaves gutters, replacement of all copper gutters, repair of external fittings) involving construction work were conducted as an independent project. The preservation and utilization plan mainly indicated the need for the partial repair of roofs and outer walls and called for a seismic diagnosis. Therefore, prior to the preservation and repair work, a survey and seismic diagnosis involving the work were conducted between November 2010 and March 2012 with the assistance of the Agency for Cultural Affairs. Various sample extraction inspections were conducted within a range that does not interfere with branch office sales. Structural surveys, such as ground surveys and seismic diagnosis, were conducted, and the necessity and method of reinforcement were examined. A design plan for preservation and repair work was created from the collected information.

3. Outline of conservation and utilization

The Great East Japan Earthquake occurred on March 11, 2011, during the investigation work. Although the building itself had no noticeable abrasions, there was damage to the part that connected it to the headquarters building, which had been expanded by connecting to the north side of the building. Therefore, it was decided to demolish the headquarters building, build a new store on the site, and move the sales division of the branch office to the new store. It was the only active building classified as an Important Cultural Property that operates as a bank teller. However, there are many parts that are incompatible with modern bank counter sales, and until then, the way of disclosure to the general public, other than bank users, was also an issue. Therefore, it was decided to stop the business and make the office space a public facility.

On August 3, 2012, the Nakanohashi branch was closed. For disclosure,a conservation business plan that enhances the historical value and structural safety, while premised on maintaining its current status, was conducted between April 2013 and March 2016. The content of this plan included the following procedures: (1) clarified the part that is causing the water leakage and other damage, repaired the necessary foundation, waterproof it, and replaced the roof; (2) to avoid the risk of peeling off the dressed bricks, conducted a full-scale percussion survey to identify areas where the peeling of the dressed bricks was remarkable; strengthened the fixation of the decorative bricks and the brick skeleton; (3) generated structural reinforcement—which reduces the stress in the out-of-plane direction—on the skeleton wall by suppressing the deformation of the wall head. This is because the seismic diagnosis reflected a concern that the brick skeleton would be damaged by a local fall in the out-of-plane direction during an earthquake.

Owing to the investigation accompanying this conservation work, the appearance of the building at the start of construction and its transition to the end of construction were generally clarified. Therefore, the appearance was restored to its original state as much as possible. As for the interior, a part of the area around the sales office, which is a characteristic part of bank architecture, had been restored to its original appearance, considering that the usage of the interior would change from a business store to a public facility.

For the outer wall on the north side, after removing the old reinforced concrete headquarters building that was in direct contact with the north side, we investigated the openings that were changed due to later remodeling, restored the openings to the old state, and maintained the status quo as much as possible for the

exterior wall finish (**photos 5** and **6**). In addition, the brick wall of the partition between the civic gallery on the first floor and the west side public space and the brick wall of the former general meeting room on the second floor, which was lost due to remodeling in later generations, were restored to their old states as structural reinforcement (**photo 7**).

The contents of utilization were significantly changed from the time of formulating the preservation and utilization plan in 2009. Therefore, in 2014, a revised version of the utilization plan was formulated, and utilization work were conducted from 2015 to July 2016 through an independent project and a regional revitalization assistance project utilizing cultural property buildings, etc. (**figures 1–5**). The main contents of this procedure were that slopes were to be provided on the west side to smoothly eliminate the steps to accommodate potential visits from various users. In addition, a benefit facility was set up on the adjacent site, and passages were improved for the limited use of users and managers as a public facility.

4. Features of internal fixtures

The building was completed in the late Meiji era. Although it was built when the era was gradually breaking away from historicism, it was designed by Tatsuno Kingo, a first-generation architect of Japan. Therefore, it is a typical historicist architecture, and the interior is decorated throughout. These designs, which are expressed in reliefs made of wood carving and plaster, are either Japanese or Western, concrete or abstract, and are difficult to comprehend.

It has been 100 years since the construction was completed, and although the building has remained a bank, its name has changed from the Morioka Bank Main office to the Iwate Shokusan Bank Main office. The expanded Bank of Iwate Main office has changed to the Nakanohashi Branch, and although no major modifications were made, some specifications were modified. To confirm whether its current status upholds its initial design, it is necessary to collate the materials from its initial build to the present version. Mainly the "Morioka Bank Architectural Plan[株式會社盛岡銀行建築圖]" (hereinafter "Architectural Plan") was used, which consists of a remaining 16 sheets showcasing its original status, which are thought to be blueprints and old photos. While collating with the traces found during the dismantling process, we searched for specifications based on these sheets and repaired them accordingly (**photos 8** and **9**).

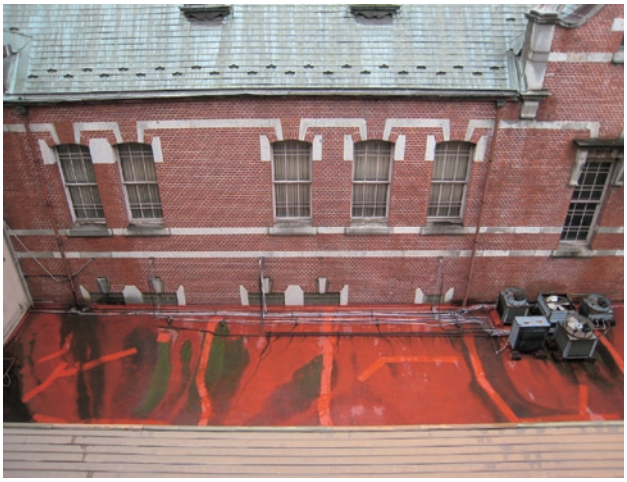
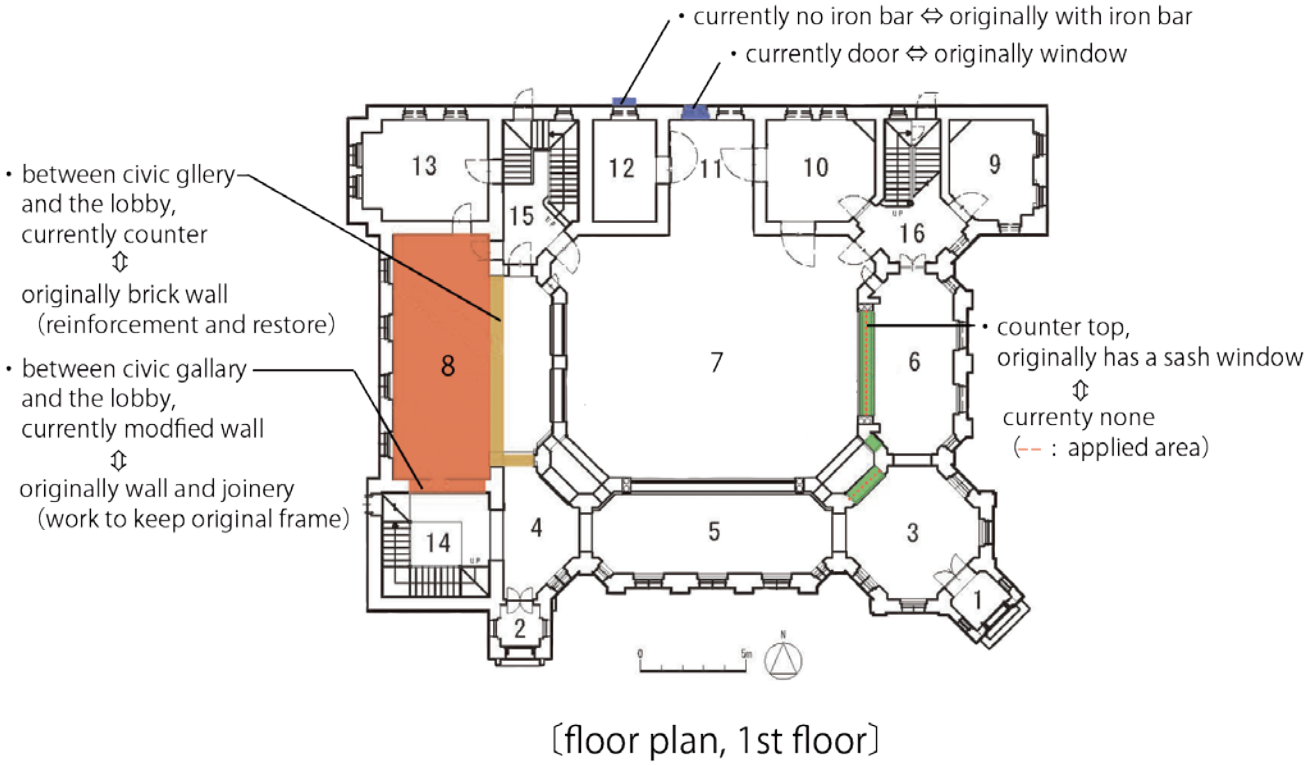


photo 5 North outer wall before conservation (photographed in 2008)

photo 6 North outer wall before conservation (photographed in 2012)

photo 7 Civic gallery before conservation (photographed in 2008)

Applications for change in current status （inside）



〔floor plan, 1st floor〕

List of rooms

No,	Current name of rooms (at the time of 2012)	At the time of Morioka Bank, Ltd. [() is estimated]	No.	Current name of rooms (at the time of 2012)	At the time of Morioka Bank, Ltd. [() is estimated]
1	East side windbreak room	Entrance	14	Front staircase	Front staircase
2	West side windbreak room	South side entrance	15	First back staircase	First back staircase
3	Lobby 1	Public space of cash cleark	16	Second back staircase	Second back staircase
4	Lobby 2	Public space of cash cleark	17	Exhibition room	—
5	Public space 1	Public space of sales department	18	Spare room 1	—
6	Public space 2	Public space of national treasury	19	Spare room 2	Cloakroom
7	Business office	Office	20	Spare room 3	—
8	Civic gallery	Smoking room	21	Gallery	—
		Supply section room	22	Meeting room	General meeting room
		Reception room	23	Gift room	First reception room
		Public space of savings department	24	Women's common room	Branch manager's room
9	Branch manger's office	Second reception room	25	Men's common room / Library	Office
10	Reception room	Executive room	26	Canteen	Waiting room
11	Anticum of vault	Manager's room	27	Corridor	Corridor
12	Vault	Vault	28	Second floor staircase	Upstairs staircase
13	Miscellaneous articles storage	Excutive meeting room	29	Warehouse	Third floor of octagonal tower

figure 1　Locations of applications for change in current status (inside) 1

Applications for change in current status （inside）

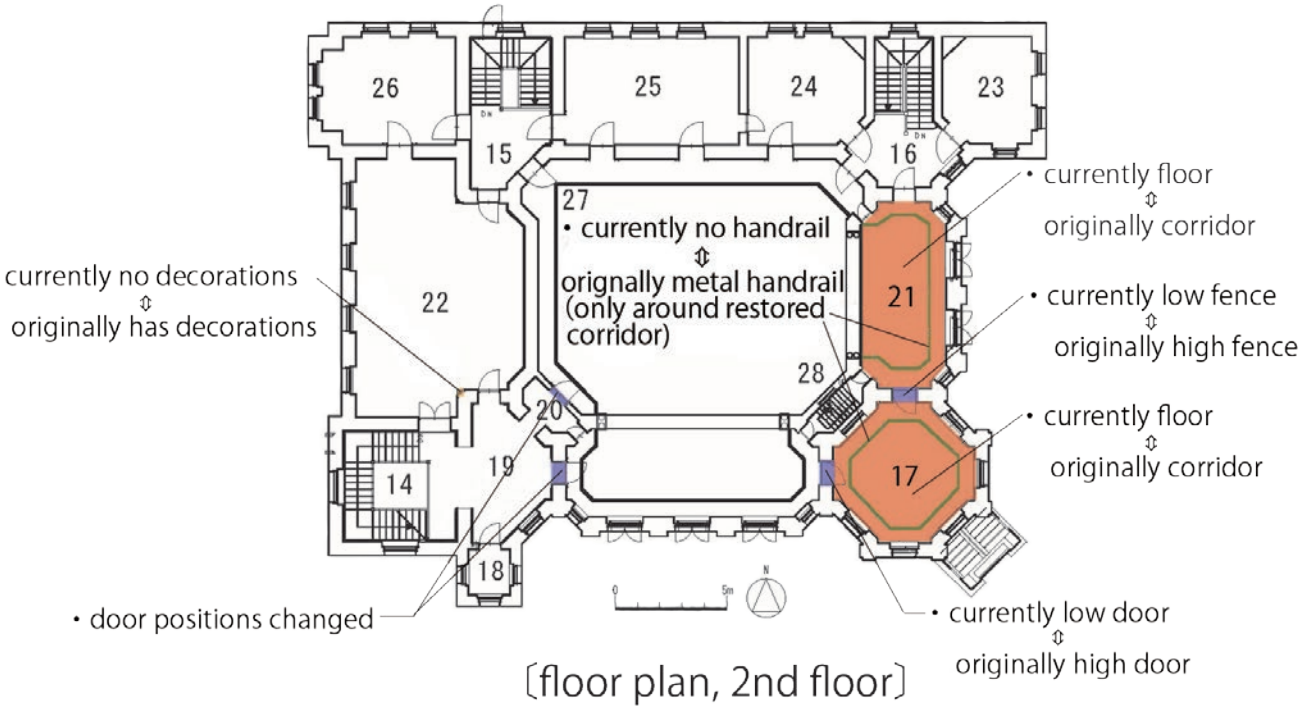


figure 2　List of locations of applications for change in current status (internal) 2

Applications for change in current status （inside）

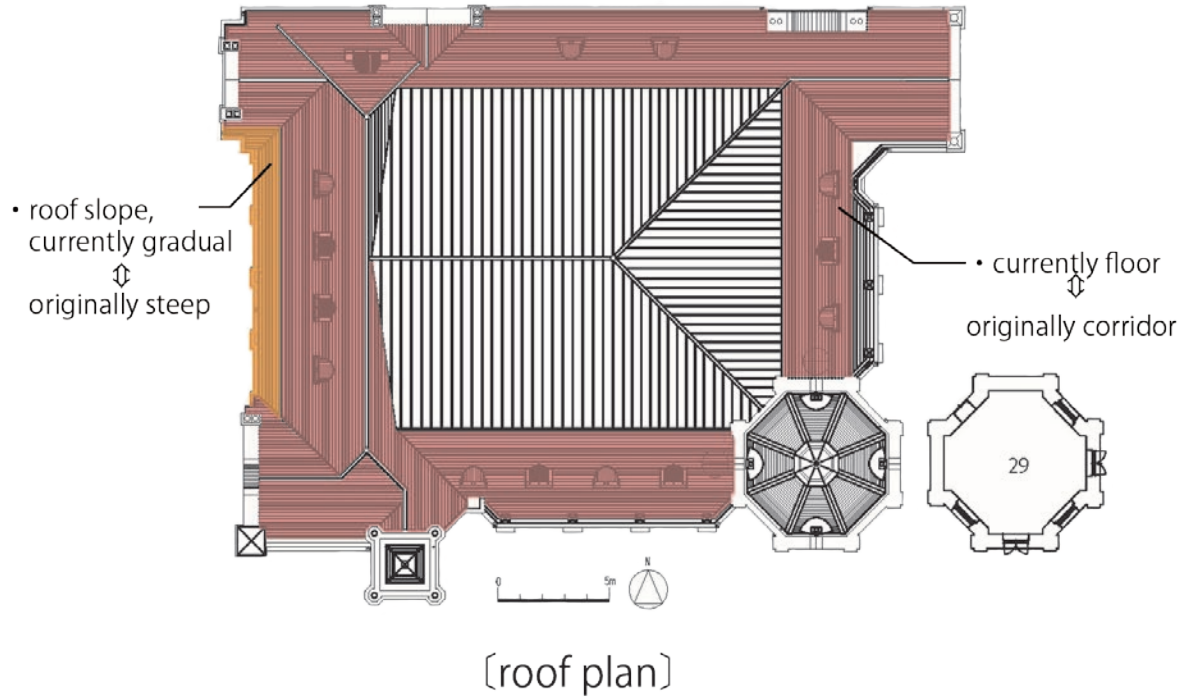


figure 3　List of locations of applications for change in current status (internal) 3

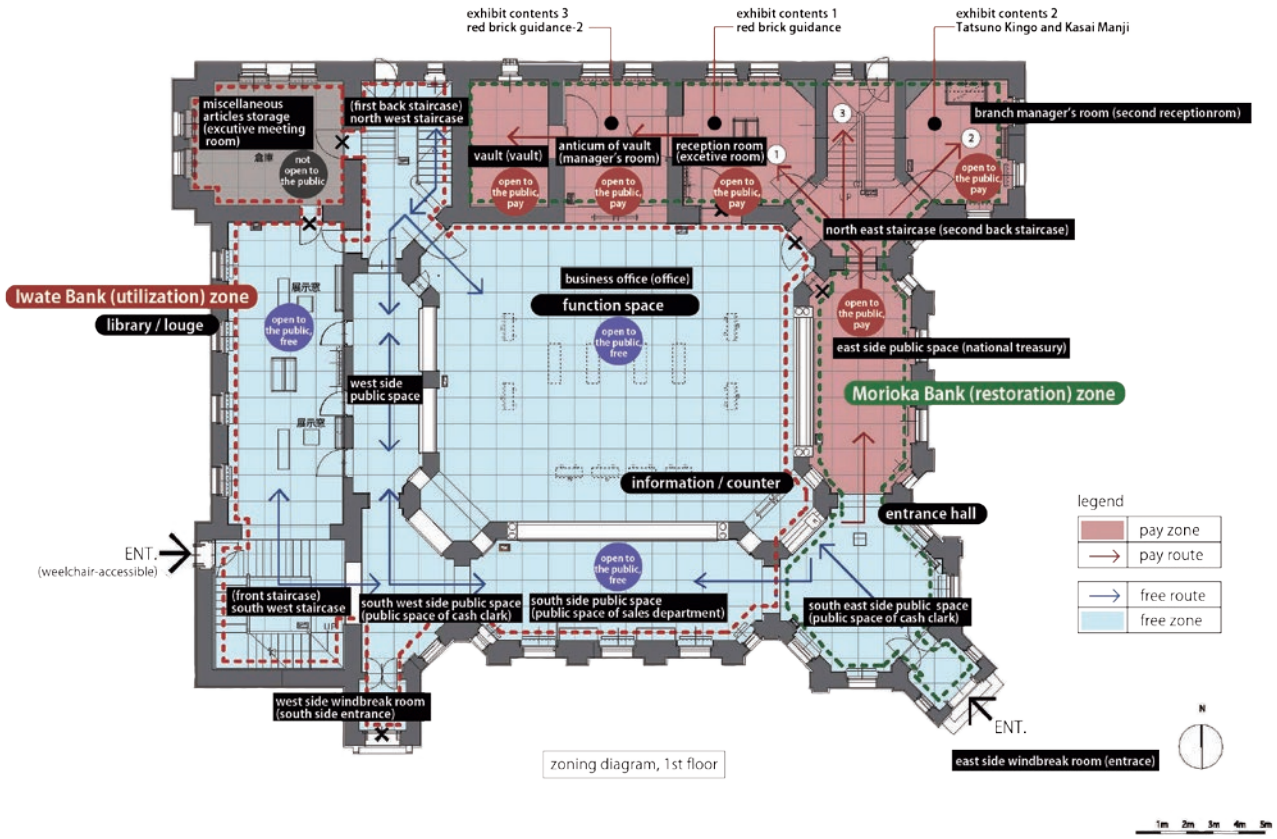


figure 4 Utilization plan of first floor

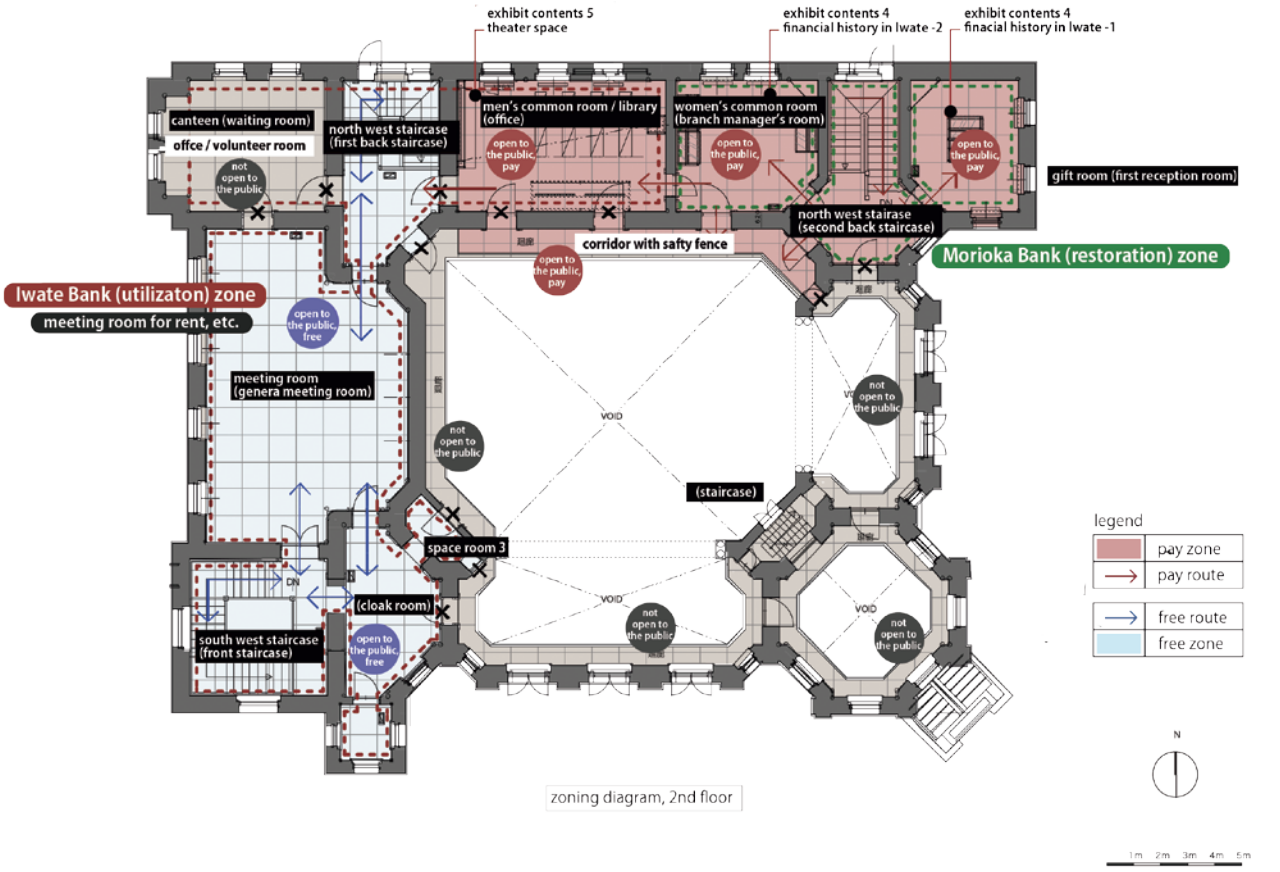


figure 5 Utilization plan of second floor

5. Changes in the Specifications of Main Internal Fixtures and Specifications for the Implementation of the Restoration

5-1 Floor

Before the repair, linoleum, linoleum-like vinyl sheets, and tile carpets were added in later generations and glued directly on the floorboard or the plywood. It seems that it was probably replaced twice: first, a brown linoleum sheet was used, followed by a linoleum-like vinyl sheet with a strong yellow color. Some rooms had tile carpets on top of these sheets. No major defects were found in each part, but the surface of the finishing material was aged, damaged, worn, and modified in later years. The initial floor finishing materials, for floors other than natural stone paving, were gone, except for the warehouse (octagonal penthouse).

The floor finish linoleum of the warehouse (octagonal penthouse) had a linen base, a width of approximately 1,800 mm, a thickness of 2.5 mm, and a dark brown color (**photo 10**). From its state, it seems it was the original material, and it is assumed that it was made from natural materials (linseed oil, etc.), but the ingredients were not tested. Iron nails were hammered in as appropriate, but it is believed that they were made in later generations to prevent the base from rolling up. This room will not be open to the public; therefore, we decided to maintain its current status.

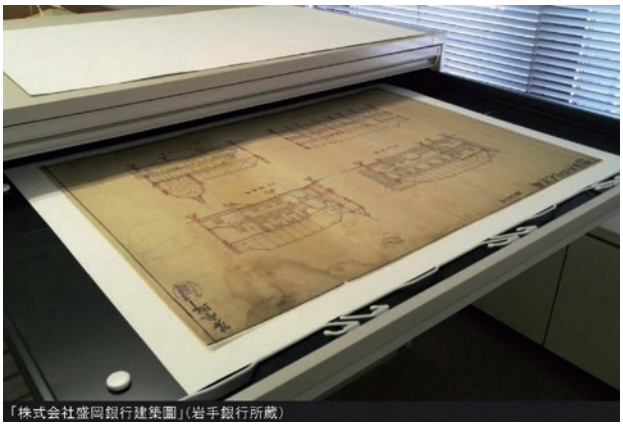
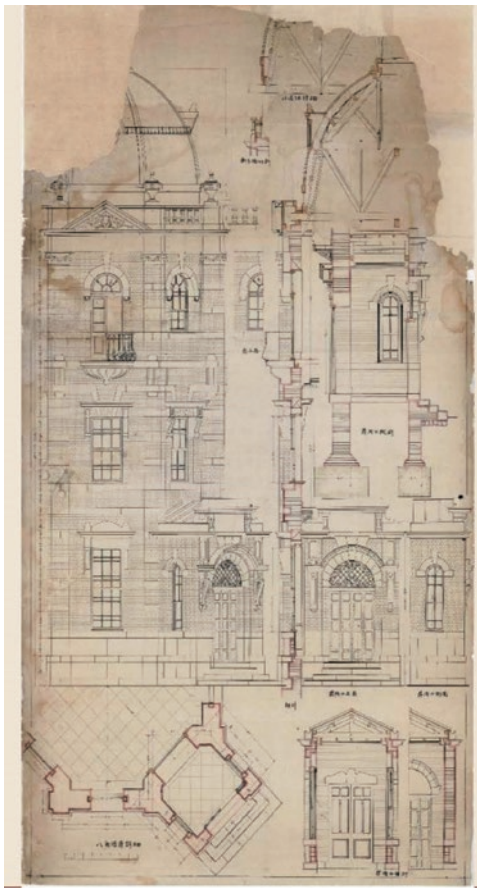


photo 8 "Architectural Plan" storage status



No,	Drawing number	Drawing name	Scale	Size (mm)
1	第弐號 No. 2	株式會社盛岡銀行建築圖 (Morioka Bank Architectural Plan	百分之壱 one hudredth	648 × 954
2	第参號 No. 3	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan)	百分之壱 one hudredth	648 × 954
3	第五號 No.5	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	743 × 1052
4	unknown "6" in handwritting	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	742 × 1054
5	第七號 No. 7	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	746 × 1050
6	第八號 No. 8	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	746 × 1048
7	Unknown (lost)	株式會社盛岡銀行建築圖 (lost)	弐拾分之壱 (lost)	743 × 1358
8	第拾號 No. 10	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	745 × 1050
9	第拾弐號 No. 12	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	745 × 1054
10	第拾参號 No. 13	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	746 × 1056
11	第拾四號 No. 14	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	740 × 1042
12	第拾五號 No. 15	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	738 × 1049
13	第拾六號 No. 16	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	740 × 1050
14	第拾七號 No. 17	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	740 × 1046
15	第拾八號 No. 18	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	738 × 1048
16	第拾九號 No. 19	株式會社盛岡銀行建築圖 Morioka Bank Architectural Plan	弐拾分之壱 one twentieth	738 × 1049

photo 9 "Architectural Plan" list

The pre-repair finishing material, which was significantly damaged, was removed and unified with a linoleum sheet (Forbo, Germany). The linoleum sheet was made by applying a chloroprene solvent type adhesive and an acrylic resin emulsion type adhesive to the base before laying it down, bleeding air with a roller, and crimping it. The ends were cut with a cutter, and the joints were grooved with a U-shaped cutter and welded with a heat welding rod. Finally, wax was applied to the surface (**photo 11**).

When the finished tile carpet of the branch manager's room (former second reception room) was peeled off, the zelkova parquet was exposed (**photo 12**). As there is no historical material and no trace of replacement when observed from below the floor, it was judged to be the original floorboard. Before the restoration, the adhesive on the tile carpet was removed, after which a disc sander was swept along the direction of the flooring, carefully roughened and polished; the nail holes were filled with wood repair putty. Subsequently, undercoating and intermediate coating were added with urethane resin coating, and after drying, they were polished and then finished with urethane resin coating.

It can be inferred that the gift room (formerly the first reception room) was carpeted with a slightly regular pattern on the floor of the old photos. However, currently, it has a tiled carpet on the floorboard. No fragments or traces of the carpet were found (**photo 13**).

5-2 Walls and ceilings

・Wooden part

Most of the wood parts, such as the waist-high partitions of the room for continuous use wall, are coated with varnish, and the surface of the varnish coating from later generations is often cracked in a scale-like manner (**photo 14**). Although there are no major problems overall, there are areas of peeling paint and deteriorated wood on both the first and second floors, mainly on the waist-high partitions of the wall on the north side of the room, which may have been caused by water leakage. There were also many stains, including tape marks, due to postings. The missing part was supple-

photo 10 Linoleum with floor finish of warehouse (octagonal penthouse)

photo 11 Linoleum finish

photo 12 Branch manager's room (former second reception room) parquet floor

photo 13 Old photo of first reception room (Bank of Iwate collection)

mented with the same types of materials and finished. All other areas except the above were basically maintained in their current state.

The interior of the partition wall between the civic gallery and the west side public space and the vault and the interior of the opening of the anticum of the vault, which was altered in later times, were restored with the installation of a wooden waist-high wall partition in accordance with the old regulations. The colors were mixed (yellow, black, blue, and cherry red) and painted to match the surroundings (colored with water-based pigment colorant). Further, a water-based urethane clear for wood with a five-units gloss finish and a matte finish was mixed to achieve a three-unit gloss finish.

Only in four rooms, wooden ceiling vents (with nets attached to the back) with transparent carvings of botanical patterns were placed at the four corners of the ceiling, and these were maintained as before.

・Plaster part (general part)

The brick skeleton base plaster finish on most rooms for continuous use walls were repainted with water-based paint, and stains believed to be caused by lifting, cracking, peeling, and water leakage on the painted surface were scattered in various places. The damage was particularly noticeable on the exterior of the inner walls. The damage was caused by water leakage from the roof base underneath its eaves, rainwater intrusion from the outer wall, and water jetting through the gap between the outer fittings. Only scant dirt was visible on the interior surface of the business office . The release agent was applied stepwise, and the investigation revealed that the original plastered surface was overcoated with three to four layers of paint, at least.

The plaster finish on the interior walls was removed only where it was noticeably damaged or stained. However, the areas where there was peeling from the brick wall surface of the building frame and the wall was restored with new bricks were plastered with coating. For the parts where only the paint film applied in later generations was peeled off, we tried to peel off only the paint film using chemicals to keep the original plaster finish as much as possible. However, it was found that the plaster surface also became rough. Therefore, after carefully peeling off the paint film with a leather paring knife or spatula, the groundwork was adjusted appropriately and refinished with paint. In addition, the walls without significant damage and stains were maintained as before, as much as possible.

The ceiling of each room was decorated with water-based paint on the original wooden plaster base, and the floating, peeling, cracking, water leakage, and age-related stains of the coating film were observed in various places (**photo 15**). There were cracks that reached not only the paint film but also the plaster, but many of them remained around the central deco-

photo 14　Scale-like cracks in wooden parts of the wall

photo 15　Southeastern public space ceiling

ration. As they were all hair cracks, none of them were considerably serious. Cracks of 0.1 mm or more were putty-treated and painted (white synthetic resin emulsion paint). After removing the deteriorated part of the existing coating film (EP) on the surface with a leather paring knife, the cracked part was V-cut with a flat chisel, after which a sealer and putty base were applied. Further, the EP paint and bond were mixed, and a mesh sheet was attached. The putty finish was filled with paper and polished to make it smooth. Subsequently,

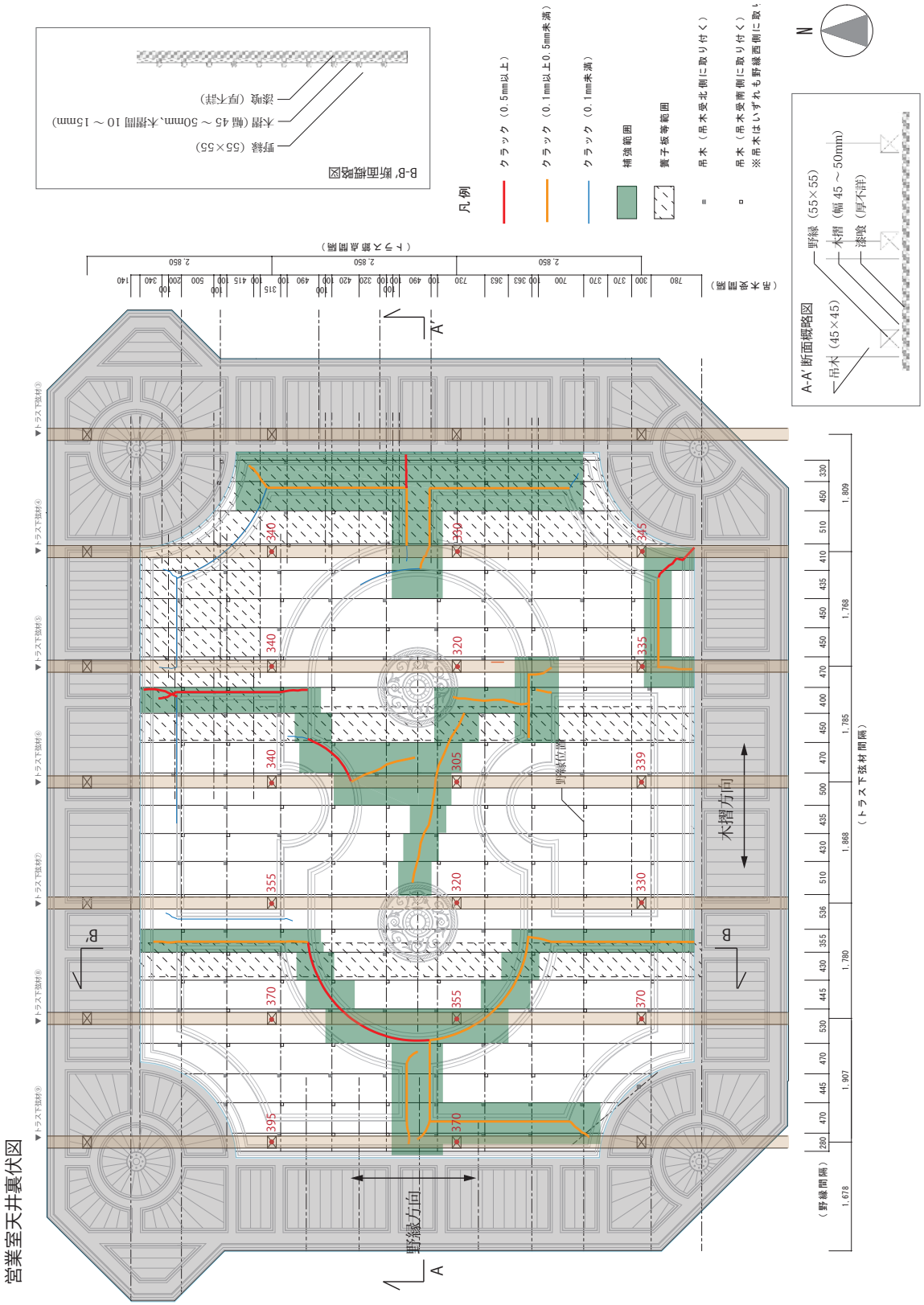


figure 6 Cracks in the woodem plaster ceiling of the business office

the undercoat was applied with a sealer, and the intermediate and top coats were applied with EP paint. In the upper part of the doorway, where noticeable cracks and plaster had peeled off, the top coat was removed to plaster it.

The ceiling of the business office was large, and its cracks were not limited to hair cracks alone. It also had bigger cracks of 0.5 mm or more (**figure 6**). The ceiling of the business office is approximately 9 meters high. To prevent human casualties from a large area of plaster potentially falling during an earthquake, while the room might be used by numerous visitors, only the existing cracks at the back of the building were reinforced, and plastering was done. The positions of the cracks were recorded from the business office side, and the plaster layer thickness, the thickness of the wood slide, etc., were measured. The locations and depth of the perforation were examined, the worn areas were marked in accordance with their locations, perforation was performed using a drill (powder was removed after perforation), and reinforcing acrylic resin was injected with a syringe for follow-up. After repeating the resin injection once more, the viscous acrylic resin finishing was injected into the perforated part, and a hemp string was inserted.

The civic gallery and the west side public space were remodeled in a later period; therefore, they were dismantled during the investigation. To apply a new plaster ceiling, the height of the old ceiling was checked, and after installing the base materials such as wood railings, the ceiling was finished smoothly with plaster (**photo 16**).

photo 16 West side public space ceiling

・Plaster part (decorative part)

Decorative parts such as the upper part of the arch opening were painted with water-based paint on top of plaster, and some cracks, peeling, and missing parts were seen. The cartouches at the top of the south exit corner of the meeting room and the plaster decoration on the arch of the west side public space were missing. The cartouche has a vertically long ellipse with a beaded border in the center, with a wavy pattern running from the lower left to the upper right. A paper band with acanthus leaves on both sides is wrapped around it from the top leaf via a scroll (vortex pattern), and a bell-shaped pattern that becomes smaller vertically downward is a series of designs. The remaining decoration on the north side has a wavy pattern in the center that rises to the right; even in the "Architectural Plan," only the design that rises to the right is drawn (**figure 7**). The arch decoration between the west and southwest side public space and the cartouche of the meeting room, which had been lost due to these later modifications, were restored with plaster. We adopted a method of molding with plaster at the same shape in the existing plaster decoration. The arch decoration between the west and southwest side public spaces was molded using silicon in the plaster decoration of the northeastern staircase, where the paint film applied to posterity was less likely to come off. The cartouche in the meeting room was also molded using silicon in the existing plaster decoration on the north side of the room (**photo 17**). Two layers of plaster were applied to the silicon molds, and after drying, the molds were removed and screwed into place, and the joints and screw heads were filled with plaster (**photo 18**). As it is highly unlikely that the plaster and trowel could be used to create the same shape of decoration, and as the south side may be symmetrically raised to the left, but this is not known, only the shape of the north side was reproduced.

There is a corbel-shaped plaster decoration on the west wall of the former executive meeting room and the part in contact with the ceiling beam (two places on the north, south, left, and right). It is scroll-shaped as a whole, with petal-shaped medallions on the spiral part, petals (presumably tulips) on the sides, and acanthus

leaves on the bottom. A palmetto is arranged at the lower end. As it is in good condition, only the surface was cleaned, and the current paint was repaired (white synthetic resin emulsion paint). When painting the plaster decoration, care was taken not to make the edges of the decoration dull as much as possible.

Most rooms with plastered ceilings have plaster decorations (central decorations) at the base of the hanging light fixtures (**photo 19**). Several layers of water-based paint were applied on top of the plaster finish. Although the edges lacked their sharpness from the original design when it was made, it was still present in all rooms except the civic gallery. There are several types of designs and many with botanical patterns. As with the balustrade decorations, there is no description of whether each design has a meaning related to the use of each room. Therefore, it is not clear, but the intentions of the designer or the client are reflected in the design. The central decoration was painted several times in later generations. It was maintained to preserve the current situation because there were concerns that the corners and edging of the original decoration would become dull if painted further.

figure 7 Cartouche design

・Wallpaper

Old photos of the gift room (formerly the first reception room) at the time of its completion shows that it was covered with patterned wallpaper (probably fabric). However, the plaster walls are currently in place, and no traces of fragments could be found during the survey.

・Stone part

The walls between the civic gallery (former smoking room, former supply section room, former reception room) and the west and southwest side public space

photo 17 Cartouche molding

photo 18 Cartouche installation

photo 19 Central decoration of the first reception room

have been removed, resulting in the loss of serpentine and marble on the west side public space side waist-high wall partition. A stone material was pasted on the waist-high part of the restored wall partition in accordance with the old regulations (**photo 20**). The serpentine was from Greece, and the marble was from Macedonia.

5-3 Interior fittings

・Wooden frame board door

Losses, open-ended modifications, dimensional modifications, etc., were found everywhere, and all original locks were replaced. There were single or double swinging doors, and although they were worn and damaged due to long-term use and distortion of the installation, none of them were unusable. There were some places where the original wood end plate was replaced with template glass around 1955.

All fittings were adjusted so that they could be opened and closed, and the decayed parts of the wood were repaired (**photo 21**). Hardware was reused as much as possible, and only the missing or damaged parts were replaced. The two fittings in the southeast side public space corridor had been shrunk due to the addition of floors, but partial repairs were conducted to restore the previous dimensions. New auxiliary material was added in areas where deterioration was significant and in areas where holes in the hinges had been filled due to changes in the openings, and finished with the same paint as the wall material.

・Decoration of transom

The decoration fitted in a semi-circular shape between the arches and that attached to the windows and doorways are referred to here as the decoration of transom. Among these, various designs can be seen in each room. The decorations on the windows and doorways range from luxurious ones with triangular pediments (gables) on the top and scroll-shaped (vortex pattern) corbels on both sides and reliefs of palmetto (palm motif pattern) and scallops (shell-like leaf decoration) to simple ones. Many have embossed or openwork boards attached to the edging of the mold. The decorative fretwork on the three doorways on the north side of the business office (former office) seems to imitate a peacock with spread wings. However, this is the only animal motif design (**photo 22**). Others are assumed to be iconography with plants such as lilies and irises as motifs. Somewhat Japanese-style iconography can be seen. Since ancient times, the elegant appearance of a peacock has been regarded as a symbol of wealth in China; therefore, it may be that the peacock motif was used in the former office. Nevertheless, it is unclear whether each room has any meaning.

The wooden decorative portion of the exterior windows in the southwest public space was restored by taking a plaster mold from the same design and carving the wood to match. The wooden decoration section above the entrance between the south side public space and the east side windbreak room was restored following the “Architectural Plan.” The wooden decoration of the petals on the removed interior fixture frames was also restored in the same manner as above, by plaster molding the remaining parts and carving them out of wood (**photos 23** and **24**). All were finished with the same paint as the other wooden parts.

photo 20 West side public space waist wall stone construction

photo 21 Wooden fittings supplement / adjustment

・Shutter winder cover

The lid of the shutter winder for the public space and corridor on the first floor is made of iron, and the lid of each other room is made of wood. The iron lid was found to have been damaged, such as the paint film peeling off significantly and the screws holding the four corners missing partially. However, the wooden lid was confirmed to have a missing lid, a crack, a broken hinge, and a missing knob. The lid of the shutter winder that had been deleted was repaired. The parts where the knobs are missing on the same lid (nine places on the 1st floor and eight places on the 2nd floor) were supplemented with the Sentoku-finished knobs (ϕ 18) (**photo 25**).

・Vault door

The vault integrated with the building is equipped with an inward-opening steel vertical lattice door inside the outward-opening steel door. Inside the outer door, there is a nameplate with an emblem indicating the manufacture of the Takeuchi Safe of Nihonbashi Bakuro-cho (**photo 26**). On the outside, there is a dial-type lock and keyhole engraved with "I / Ro / Ha ..." in katakana, making it a double lock. There is also a keyhole on the inner door, and the lid is engraved with "2563rd year of the ascendancy of Emperor Jimmu." As this is the 36th year of the Meiji era (1903), it was manufactured several years before the start of construction of the building in the 41st year (1908). As there was no major damage, the current status was maintained.

photo 22　Decoration of transom (business room, peacock)

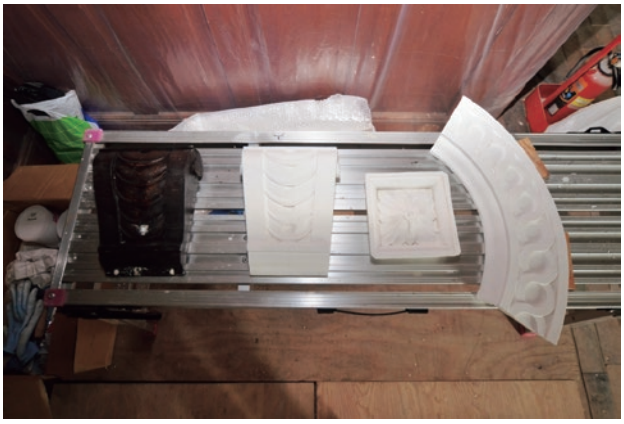


photo 23　Model of decoration of transom

photo 24　Production of decoration of transom

photo 25　Shutter winder lid supplement

photo 26　Vault room door emblem

5-4 corridor

・Handrail

The cross-section of the "Architectural Plan" was colored in the same color for each material of the same type, and it is probable that the cross-sections of all handrails were blue and made of the same material. The materials of the remaining supports indicate that crosspieces and decorations were also made of metal. When the floorboards behind the material exhibition room (2nd floor of the octagonal tower) were removed, the members that had been struck on the floor beams were perforated at a constant pitch. This hole is assumed to be for inserting a baluster, and its cross-sectional dimensions are almost the same as those of the wooden ground cover depicted in the "Architectural Plan" (**photo 27**). In addition, as the wooden cover of the auxiliary wooden handrail behind the corridor of the business office and the south side public space is the same as this, it is considered that all the existing wooden covers are the original ones. The support materials for the business office and the south side public space all remained in the same positions as at the beginning. Further, in the east side public room, only four support materials were diverted and remained. It was assumed that the handrail rail and the corridor floor would be tied together to play a role in preventing the handrail from tipping over, and two points were fastened to the beams of the corridor with hexagon bolts. There were 5mm holes in the upper and middle parts, which were tied to the vertical rail of the wooden railing with hexagon bolts. By checking the old photos, it was confirmed that the relationship between the support material and the crosspiece was the same as it currently is. Moreover, the "Architectural Plan" on each side is roughly the same, although the details and dimensions are slightly different. As no support material was drawn in the "Architectural Plan" in the southeast side public space, it was assumed that there was no support material similar to other corridors. The finish of the remaining support material was painted in the same color as the wooden handrail (greenish gray), but a dark green coating film could be seen on the bottom layer by rubbing. The same color as the safe door and shutter was determined to be the initial color of the handrail hardware. The corridor of the southeast side public space had no historical materials for photography, but the "Architectural Plan" has an elevation view and a cross-sectional view; therefore, these were referred to for making a restoration (**photo 28**). For the design of the east side public space corridor, the allocation of the handrail rail was confirmed from the above-mentioned mounting interval of the support material. As the elevation of the building was not the same as the one in the old photos, we drew the decoration based on the old photos, referring to similar parts, and processed the steel material with a laser cutter in a special factory (**photo 29**). As the baluster and decorative parts have small cross-sectional dimensions, it is difficult to process the edges. Therefore, attention was paid to the processing of pointed corners and rounded shapes. There are no traces of the ends (points of contact with the wall), and the old photos are not clear. In the "Architectural Plan," it was drawn as if it was in direct contact with the wall surface.

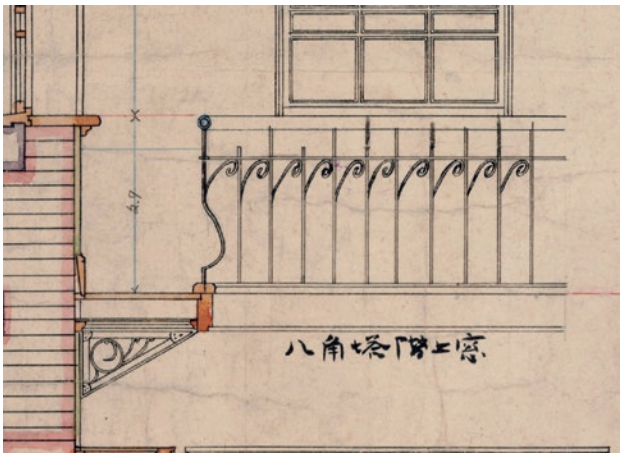


photo 27 "Architectural Plan" octagonal tower handrail

Both the southeast and east corridors were brought to the site after being painted in the factory to prevent rusting (**photos 30** and **31**). The support material for the eastern corridor handrail was installed in advance, and a 20 mm wire was inserted into the joint between the cross rails to penetrate the handrail and fix it. For the joint part of the handrail, a receiving round pipe, which is smaller than the round pipe of the handrail, was installed to fix both handrails. The support material and the gallery were carefully fixed with hexagonal nuts after inserting all the screws, and the joint part was puttied to complete the installation. Finally, synthetic oil paint was applied, with a Munsell value of 2.5G3/4,

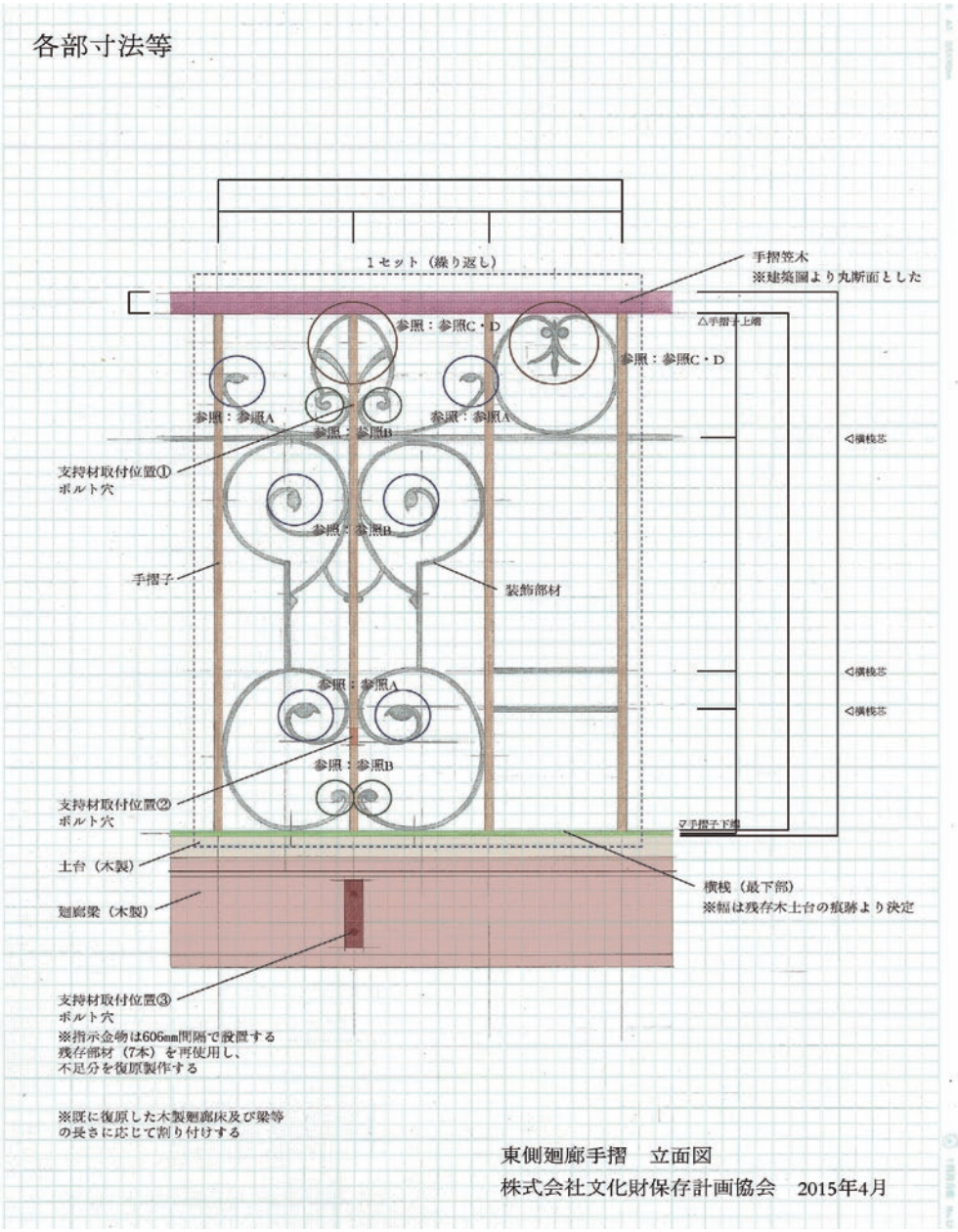


photo 28　Examination of eastern corridor handrail design

photo 29　Handrail production

photo 30　Handrail installation

following the dark green color of the lowest layer of the remaining material (**photo 32**).

・Bracket hardware

When the second floor of both the southeast and east side public spaces were enlarged by removing the corridor, the second floor and the ceiling of the first floor were built without leaving the hold-down brackets. To integrate the two structural pillars and floor beams added to support the floor with the existing brick frame, the brackets at the north and south ends of the building were removed. The floor beams were inserted in the places where the brick frame had been removed and anchored at both ends. It is estimated from the situation that these two missing bracket hardwares had the same dimensions, shape, and design as the existing hardware in the east side public space. Therefore, it was manufactured following the existing one, and a new bracket hardware was installed with a post-construction anchor. synthetic oil paint was conducted for the new corbels, and the paint color was 2.5Y5 / 4 in the Munsell value, following the current color tone because there are many places where the paint was applied in later generations on the original surface. The part where the paint film in later generations had peeled off with the existing steel material was also synthetic oil paint painted with the same color.

5-5 Stairs

・Wooden handrail

Aged deterioration and wear were seen in various places, but there was no major damage or falling parts, and there was no problem with normal use (**photo 33**).

photo 31 Handrail installation

photo 32 Octagonal tower handrail completed

photo 33 Stairs

At the top of the stairs leading from the cloister to the warehouse, the handrails and balusters were missing, but the end posts were kept in the warehouse. As it is a place that is not normally used, the current status was maintained. The handrails in the corridor at the top of the atrium of the business office and the south side public space and top of the gallery on the second floor were wooden handrails except for the supporting hardware of the columns. The supporting hardware seems to be the original one, but the wooden handrail was replaced later. The synthetic oil paint was applied several times, and there were some spots where the coating film had peeled off, but there was also pillars installed, and no loosening of the fixing was observed. However, as the height from the floor to the top beam does not meet the current Building Standards Act, the corridor is not open to the public. A wooden handrail was added to the upper part of the handrail on the second floor of the southwest staircase to prevent it from falling. The handrails, balusters, and main pillars of the three staircases are all zelkova wood carvings. The southwest staircase (former the front staircase) is used by guests to go to the general meeting room. The balusters are rhythmically lined with elliptical carvings, and a pot-shaped pinecone-like wood carving sits on the top of the main pillar at the border where the handrail breaks. The two stairs on the north side are for daily use by employees, and the balusters are monotonous, but the arched board under the handrail has a spade-shaped carving. On the main pillar, there is a wooden carving of a sphere with a bead-shaped band turned diagonally. It is unclear what the wood carving decorations on the main pillars, which look like Japanese designs, imitate. Basically, the current status was maintained.

5-6 Sales table (counter)

Sales tables (counters) are located on the east, south, and west sides of the business office (**photos 34** and **35**). The business office side of each top plate was scooped out, but there was no damage. A temporary aluminum frame acrylic plate was placed above the counter facing the west and southwest side public spaces, blocking the line of sight of the civic gallery from the office. Further, only the wainscot on the business office side of the sales table facing the south side public area was covered with plywood (the other two sides consisted of a stile and a mirror plate), and the wainscot, vertical stile, and skirting board were missing. The wainscot and stile were stored in the Bank of Iwate storage, which is separate from the building, and it was found that the parts were missing. Therefore, it was restored with these parts. However, as not all of them were stored, it was supplemented with a new supplementary material (manufactured by Aomori Hiba).

Both the wooden decorative sections and the screens that could be raised and lowered, which had been above the counters in the southeast and east public spaces and the southeast public space but had been lost, were restored (**photos 36-40**). After removing the buried wood on the top plate and the artificial stone polishing finish that were buried in the support position of the original support, the support was fixed to the top plate, the pulley was attached to the mullion, and the joinery frame was painted in advance. Subsequently, the fittings

photo 34 From the old southern side public space (Bank of Iwate collection)

photo 35 Old photo of business office (Bank of Iwate collection)

were attached, the string was hit into the pulley, and the chestnut stick was inserted into the hole and fixed. Next, a top beam was installed, and steel decorations made by a laser cutter at the factory were attached to the fittings. Finally, weights were attached to the strings.

On both sides of the sales table, which separates the east side from the south side of the public space, there are two cupped columns with Corinthian capitals (**photos 41** and **42**). Two types of relief petals were attached to the bottom of the pillar. The wooden part of the column head ornament on the sales table facing the south side public space was missing, but a piece of wood that appeared to be the part was stored in the storeroom. When it was checked, it matched, so it was installed.

5-7 Furniture and lighting equipments

・Curtain

Looking at the old photos from the west side in the early Showa period, the curtain is reflected in the conference room (former general meeting room); however, it is unclear whether they were originally used, and there is no trace of them (**photo 43**). The curtains on each window were later replaced with lace curtains and blinds. The gift room (the first reception room) is the only room other than the business office that has an old photo of its original interior specifications, and drapes and lace curtains can be seen in the east window, but both curtains are currently missing. Pulleys and hooks on the window ceiling and tassel fasteners were left on the wooden parting materials on both sides of the window. There was no trace of the curtain box.

・Fireplace mirror

A mirror can be seen hanging on the upper part of the mantelpiece in the old photos showing the inside of the gift room (formerly the first reception room), but it was missing during the investigation. However, two pieces of hardware that may have been used for mirrors can be seen on the wall. In the architectural drawings, mirrors are depicted above the fireplace in each room. Therefore, mirrors were likely present in the other rooms as well; nevertheless, there are no traces of this, so it could not be confirmed.

・Furnishings

Tables, chairs, long chairs, cloths, etc., were seen in the old photos showing the inside of the gift room (formerly the first reception room), but all of these are missing today. They could not be restored due to the required materials being unavailable.

・Roll screen

A woven roll screen still existed above the exterior windows of the warehouse (octagonal penthouse) and the branch manager's room (former second reception room). The former was black, and the latter was skin color. The take-up bar and bottom bar were made of wood. The winding rod had a spring inside, so it was most likely designed to wind up automatically. The end of the pull cord had a wooden pull ball attached to it. In addition, only the support hardware for the winder bars remained on the east, south, and west elevation windows. All the windows that did not have hardware still had traces of hardware attached to them, suggesting that the east, south, and west elevated windows were all originally equipped with roll screens. The two windows on the north side of the second-floor canteen (former waiting room) and the west side of the north side of the miscellaneous articles storage (former executive meeting room) directly below the canteen are exceptions. They had metal supports for wind-up rods, but there were no traces of roll screens on the windows of the other rooms on the north side. There were no traces of roll screens in the gift room either (the first reception room).

・Partitioning screen

In the reception room (former executive room), there is a partitioning screen with an openwork carving of a peacock with its wings spread, the same design as the railing decoration in the business office (former office). It is assumed to have been used in the anticum of the vault (former manager's room) to separate it from the business office (former office). It has been partially repaired and will continue to be used.

・Lighting equipment

There are three chandeliers in the southeast side public space (ceiling is installed later), two chandeliers in

photo 36　Screen hardware factory inspection

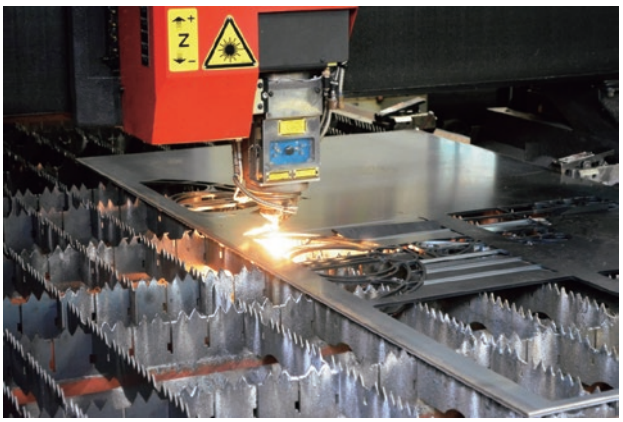


photo 37　Screen hardware laser cutter processing

photo 38　Screen frame mounting

photo 39　Screen hardware installation

photo 40　Counter remaining parts

photo 41　Decorative pillar stigma

photo 42　Decorative pillar decoration

photo 43　Old photo of west side (Bank of Iwate collection)

the southwest public space, and four chandeliers in the reception room, and they were used until just before the reparations were made. These were presumed to be lighting equipments from the beginning. The main components were flanges, stanchions, arms, center decorations, various decorations, holders, and gloves, each of which was numbered.

The specifications found from each are as follows. The material was made of brass and was spray-painted in gold in later generations; however, it is assumed to have initially been polished due to the condition of the joint part. The leaf decoration was casted, and traces of a mesh-like mold can be seen on the surface. The spiral decoration, which acts as a steady rest, was likely made by bending metal. It was a red bagging cord with a copper wire inside. The socket turned out to be manufactured by the company "FEDERAL ELECTORIC CO." in Chicago, USA. The globes were all glass spheres with a diameter of ϕ 201 mm and a milky white finish. It is unknown whether these are the original ones. The 12-light chandelier is assumed to have been hung from a beam in the back of the shed and fastened at the top. Only one metal washer remained, but the others were missing. Nine gloves are reflected in the old photo of the conference room, and it is highly possible that they were the original lamps (**photo 44**). However, no arms or decorations can be identified.

Apart from the lamps, as mentioned above, all the room's lamps were replaced with fluorescent ones. Further, fluorescent lamps were added to the ceiling and the sales floors where lighting equipments were not originally installed. It was stated in "Shokugin No. 15[しょくぎん 第十五号]" (issued on March 20, 1957) that "Recently, both the main office and other branches have been gradually refurbished with fluorescent lights, and the brightness of the rooms has made them more beautiful." The fact that the article was published in 1957 suggests that the lights were replaced around 1957.

For future safe use, all sockets and cords of the original lamps were replaced. The three-lamp chandelier was attached to the rear ceiling of the southeast side public space. However, as the rear ceiling was removed, it was attached to the ceiling of the southeast side public space. The 12-lamp chandelier, 2-lamp chandelier, and pendant in the business office were restored and installed based on old photos (**photo 45**).

6. Conclusion

This paper is based on the report on the preservation and repair of the Bank of Iwate (Former Morioka Bank) Former Main Office Main Building [岩手銀行（旧盛岡銀行）旧本店本館　保存修理工事報告書] (March 2016). The building was transformed from Bank of Iwate Nakanobashi branch into an open facility called Bank of Iwate Red Brick Building. The restoration of the interior design is based on maintaining the status quo as much as possible. However, the characteristic part of the bank's architecture, the business office, has been restored to its original appearance. As a landmark of Morioka, we hope it will continue to be a stage for various city scenes. Finally, we would like to express our heartfelt gratitude to the Japan Cultural Heritage Consultancy, Shimizu Construction Tohoku Branch, and Bank of Iwate, which is in charge of maintenance.

photo 44　Old photo of conference room (Bank of Iwate Collection)

photo 45　Restoration lighting equipment installation

Chapter 2

Restoration lighting historic house

Restoration lighting historic house

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1. Introduction

The interior design of historic buildings changes as the years pass from the time of their construction. It is no exaggeration to say that they change with life and the environment. Considering the changes of the interior lighting equipments due to the passage of time, it is necessary to guess what they first looked like when the buildings were constructed and install new ones that are reasonably alike. There is a concern that if we half-heartedly use equipments from manufacturers' catalogs because we do not know what the old ones were, there is a risk that when we look at them 20 or 30 years from now, we will be misled into thinking that this is what the equipments looked like when they were first built. We would like to leave behind equipments that look as close as possible to those from the original construction.

In the Meiji era, people's lives completely changed when lights became widespread in ordinary households as a societal development. In the era of lanterns, there were not many bright places when the sun went down, and people relied on poor light sources, such as candles and moonlight. Eventually, oil lamps became the mainstream light sources, and soon after, gas lamps fueled by coal gas were used. The dimly lit rooms and shops were surprisingly bright and raised people's spirits.

The gas lamp was developed in Yokohama in 1872 by the Meiji government after inviting a foreign engineer from France, Henri Pélegrin. As it did away with conventional lights, it spread to Osaka, Kobe, and other regions as mainstream lights. Around 1897, the mantle of the luminous body was domestically produced and became extremely popular. This is called an incandescent gas lamp. It was mainly used in shops. It was popular as holl lamp, as written in "Things Western: Vol. 1[西洋事情　巻之一]" by Fukuzawa Yukichi published in 1866, "Coal is burned in a large furnance, the gas emitted from it is collected, an iron pipe is buried in the basement of the street, and the gas is received by the pipe and comes in contact with it, which is connected in the city. It branches out into smaller pipes that are pulled into each home in the city, where a fire is lit, and a light is made."

However, in the wake of the Great Kanto Earthquake of 1923, as gas lamps are prone to fire and explosions, have a strong odor, render rooms dirty, and take time to maintain, it suddenly lost its reputation. Eventually, it surrendered its position as a house hold room light to the new safe, odorless, and bright electric light at that time. Subsequently, the demand for gas changed as a heat source and combustion source for kitchens, and at the beginning of the Showa era, the role of gas in illumination completely disappeared.

Incandescent electric bulbs were being developed overseas when gas lamps were still popular in Japan. Joseph Swan invented carbon firament bulbs in the UK around 1878, and Thomas Edison invented carbon electric bulbs in the United States around 1879. Swan's bulb was of the spring stud and clip terminals (B type device named for Swan base), in which the mouthpiece was inserted straight into the base and rotated at the point of contact. However, Edison electric bulbs are popular because they use screws (E type device named for Edison base).

In 1913, the demand for tungsten firament bulbs, which was more advanced than the carbon firament bulbs used until then, increased sharply. Further, The Tokyo Electric Light Company, Inc. (later Tokyo Shibaura Electric Co., Ltd.)—the only company in Japan to develop and sell electrical equipment parts such as the sockets attached to electric bulbs, at that time—

leaped forward as an electric appliance manufacturer in partnership with the excellent technological capabilities of the United States (The company partnered with General Electric (GE) in 1906 and developed into a light bulb manufacturing and electric appliance manufacturing company using GE's excellent technology and machinery). Consequently, the electrical industry changed rapidly.

During this period, gas lamps and candles disappeared due to advances in electric bulbs and the wiring equipments around them. Gas lamps were replaced by electric lamps relatively quickly and without major reforms, probably because Japanese architectures included mostly wood structures with wooden ceilings and under-floors, leading to relatively easy wiring work.

As mentioned above, lighting equipments changed rapidly. It is natural that what is attached as a lamp is replaced with one that matches the light source if the light source changes. Either the entire equipment is replaced, or the wiring and lamp source are modified and used as is as a lighting equipment. It is unclear what happened to the former, which was completely replaced and discarded. However, the latter equipments that are still attached but with different light sources are recognized as having some value. Together with the building itself, it is considered historic, modern architecture and is designated as a cultural property.

The oldest lighting equipment in Japan is said to be the one at the Senpukan (1871), is a valuable legacy that still remains today (**photo 1**). The famous Rokumeikan (1883) replaced gas lamps with electric lamps, but some of them were left in place to prepare for power outages. This was in 1887 (Cited from: Transition of lights [燈火の変遷], by Seki Shigehiro, 1943). In addition, the lighting equipment of Hoheikan (1880), Important Cultural Property) was initially produced as a gas lamp; the arm has a cock for adjusting the gas flow and was installed as a weight telescopic lamp that can raise and lower the entire chandelier for lighting (**photo 2**). Hoheikan, which was later used as a candle lamp and eventually restored as an electric lamp, remains a stately historic building loved by the citizens. The State Guest House, Akasaka Palace, completed in 1909, has large and splendid chandeliers from the beginning, all the lights were electric and imported from France. There are nearly 350 chandeliers installed in the entire building, and some of them such as the Asahi-no-ma and Kacho-no-ma contain as many as 80 lights each . As the palace is currently open to the public, the presence and splendor of the lamps are being conveyed once again.

While wonderful lamps were installed in some

photo 1　Lamps of Senpukan that remained from the beginning: these were gas lamps in the beginning（photo provided by：Osaka City）

photo 2　Weighted telescopic lamp of Hoheikan

historical buildings, from the Taisho era to the Showa era, lamp umbrellas called "P-1 shades" became popular in ordinary households (**photo 3**). It is a reflective shade that efficiently uses the light of a electric bulb. When it first appeared, it was also used in living rooms and tatami rooms (rooms with straw floor covering). However, eventually, it was used more in places where glare was not relevant because the lights were lit on the underside of the kitchen and entrance. Nevertheless, glass, Japanese paper, metal, wood, etc., which are conscious of the appearance as anti-glare and light, are placed around the electric bulbs in the living room, the Buddhist altar room, and the tatami room that welcomes visitors. The wide variety of lighting equipments and the choice of Japanese and Western styles were born around 1935. Subsequently, around 1945 after the war, the era of fluorescent lamps began.

As mentioned earlier, the P-1 shade is a luminaire designed for efficient lighting in the home. Even in modern times, it is often used in old folk houses and public pub and restaurant that utilize it. It is inexpensive and the apt lamp for home use. However, if we occasionally see the P-1 shade used as a tatami room in a house of a historic building, we feel that the purpose may be different. Considering the context of the times, it is a construction example that makes one think it is used without considering the owner's thoughts during construction nor the purpose of use.

The historical and cultural value of buildings built from the end of the Meiji era to the beginning of the Showa eras has come to be recognized. Nearly 100 years have passed since the building was built, and it is now necessary to restore it for the next generation. Both the building and the interior should be restored in the same manner. In recent years, the lighting equipments of historic buildings, such as this, have been restored and repaired.

Just as a building has historical and cultural value, the interior of a historic building such as curtains, wallpaper, luminaires, etc., is considered to have similar value. The materials, techniques, wisdom, design, and ingenuity applied to the interior parts are wonderful, and many are left as crafts. Even if the interior is dirty, broken, or semi-disassembled, you should try to repair it and leave it there rather than throwing it away.

photo 3 P-1 shade

As more buildings from the Showa era are being designated as cultural properties, and as more of them are restored, the materials, designs, and finishes will inevitably change from when they were first made. Nevertheless, the goal is to preserve the lighting equipments, which are part of the interior of the historic buildings, in the best possible form for posterity. This is because we think there is a technology that can restore and repair them to maintain a strong presence even if they do not stand out. In the next chapter, we will introduce the procedure and technology.

2. Preservation and repair procedures

In modern times, when a fine building is completed, interior parts selected from the thick catalogs of many manufacturers are usually installed. The owner, designer, and carpenter did their best to construct the building at the end of the Meiji era. Of course, it was not satisfactory if the lighting equipments were simply bright. As with the building itself, the main work was craftsmanship, which was elaborate in design and materials, laborious, but economically affordable (**photos 4** and **5**). The essence of wonderful crafts and techniques is extremely personal, and the owners, designers, and artisans are tied together. The artisans steadily aimed for something that they were satisfied with, and when it was completed, they put it in a Furoshiki (Japanese wrapping cloth) and visited the builder and exchanged opinions while showing the finished product. Over the years, the original appearance of these handmade artifacts has changed due to various factors, such as changes in fashion, staining and aging due to inadequate management, metal recovery during World War II, and removal due to relocation.

lighting equipments are one of such interior decorations, but some of them have remained in the

present age without major modifications or alterations. The procedure for restoring/repairing to the style at the time of construction when the stage of restoration/repair is reached through history is see **figure 1** .

3. Confirmation of policy on lighting equipment for electrical equipment

Basic policy for repairing lighting equipment

There are six basic principles in the restoration of lighting equipments: 1) should the building be restored as it was completed, or other time)?; 2) should the lighting equipments be restored as the time of the building was completed?; 3) how to preserve the equipments that were attached to the building during demolition and before construction; 4) how to restore them? searching evidence from old photographs or other documents?; 5) what to do about the report; 6) what to do with the original equipments.

Repair method depending on the condition of the original lamp

For repairing the initial product, the way of working differs depending on the remaining condition of the equipment at the beginning. However, this can be roughly classified into the following four methods: 1) maintain the initial product in accordance with the electrical standards for consumables such as cords, sockets, etc.; 2) restore the original shape of the product (check for missing parts, broken glass, fabric, and finish); 3) production and restoration based on documents such as old photographs, documents, etc.) when the original equipments are unknown; and 4) specify the equipment, which was used in other place, by the government because the original equipment was unknown.

Survey work

All target instruments were investigated individually, and a survey table was created (**figure 2**).

photo 4　Lamp of Former Ikeda Family Western-style House

photo 5　Lamp of Former Ikeda Family Western-style House

Repair / Maintenance

Check → Confirm the work contents → Disassembly → Dismantling → Design → Parts manufacturing → Finishing → Assembly → Delivery

* Cleaning dirt / Cleaning metal / Shortage of parts / Arrangement for confirmation of falling and breaking

Restoration / New production

Check → Planning → Designing → Drawing → Mold-making → Parts manufacturing

* Old photographs / Read from documents / Design Drawing / Check the detail of design drawing / Arrange

figure 1　Preservation and repair procedure

4. Lighting equipment components and restoration artisans

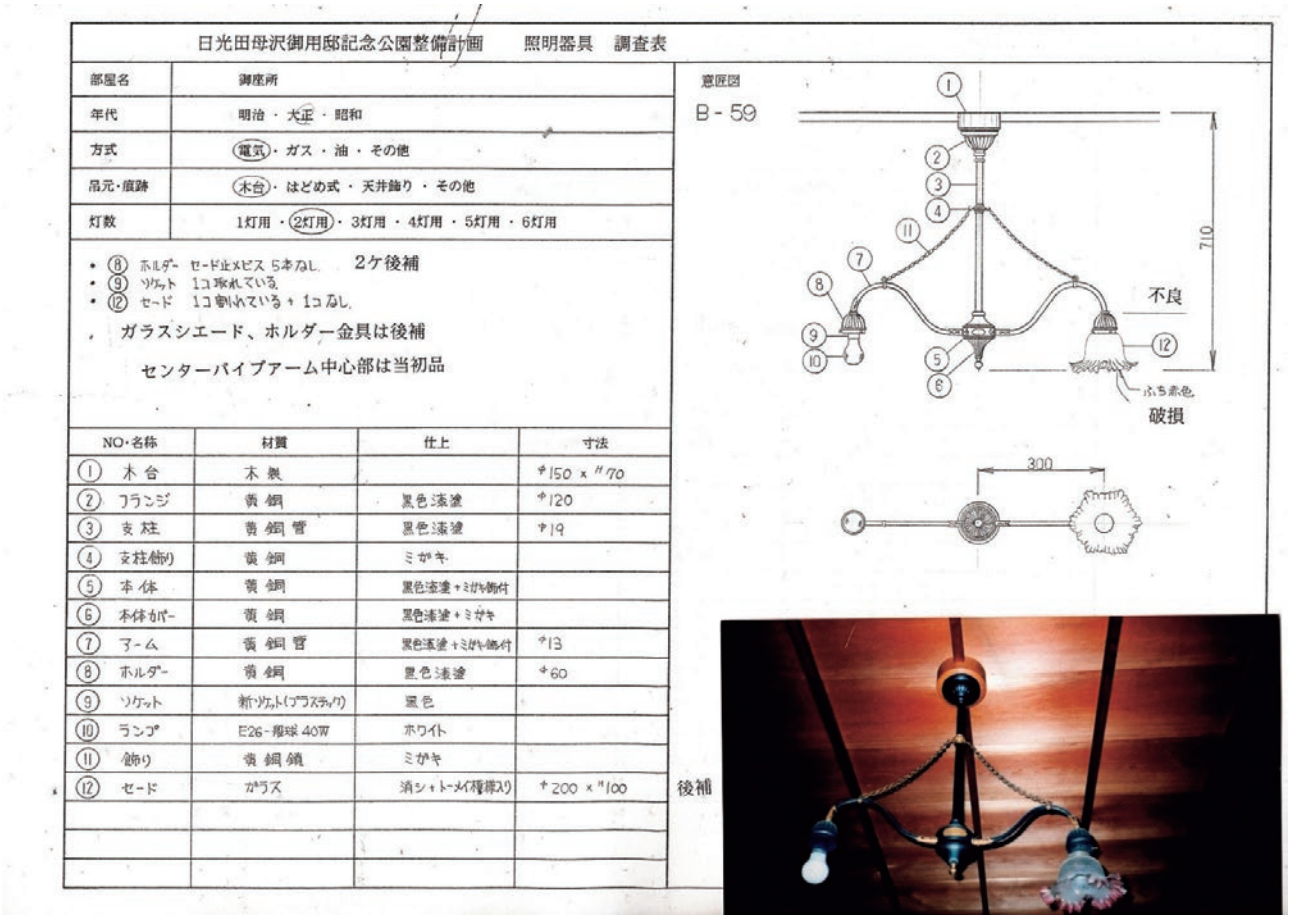
Lighting equipments, like other general household appliances, are made up of several small, industrialized parts and components that have a unique design. To complement the light, the light bulb is made into a decoration by surrounding it with various ornaments and designing the overall shape.

The structure of lighting equipment can be divided into wiring device that conduct electricity, metal bodies, and decorations. Even if there are few components, there are still approximately 30 types in one model, and if there are many, there are about 100 types. Restoration/repair begins with disassembling it into individual parts. At that time, it is necessary to confirm the fitting of the screws and nuts.

In restoring and repairing, it is important to connect with the artisans who manufacture and repair those parts. These artisans are generally single-owners and masters of their craft and specialize in one job. Regardless of how small the cast parts are, they start from a wooden mold and cannot be completed without the help of several specialized artisans. It takes 15 to 25 artisans to complete a single part (**photos 6–11**).

In the case of glass parts, it is not simple to say that any glass artisan can do the job. It is necessary to find the best artisan for the job based on their understanding of the glass molding method (different factories use different methods), processing methods, and the instruments to be used. Lighting equipment such as bamboo work, joinery, fabric, silk tassels, anchor metal fitting, woodworking wheel, etc., are manufactured using various materials and techniques. Therefore, you must have considerable wisdom.

Of course, when arranging, it is a major premise that the manufacturing design and production design drawings are reliable. It is impossible for any artisan to bring only the actual item and make it as is, and it is necessary to specify the proper dimensions and curves. Restoration and repair of joinery hardware requires artisans who can respond to reuse as well as function and shape. The individual parts completed by such



日光田母沢御用邸記念公園整備計画　照明器具　調査表

部屋名	御座所
年代	明治・大正・昭和
方式	(電気)・ガス・油・その他
吊元・痕跡	(木台)・はどめ式・天井飾り・その他
灯数	1灯用・(2灯用)・3灯用・4灯用・5灯用・6灯用

- ⑧ ホルダー　セード止メビス 5本ナシ　2ケ後補
- ⑨ ソケット　1コ取れている
- ⑫ セード　1コ割れている＋1コナシ

ガラスシエード、ホルダー金具は後補

センターパイプアーム中心部は当初品

NO・名称	材質	仕上	寸法
① 木台	木製		φ150 × H70
② フランジ	黄銅	黒色漆塗	φ120
③ 支柱	黄銅管	黒色漆塗	φ19
④ 支柱飾り	黄銅	ミガキ	
⑤ 本体	黄銅	黒色漆塗＋ミガキ飾付	
⑥ 本体カバー	黄銅	黒色漆塗＋ミガキ	
⑦ アーム	黄銅管	黒色漆塗＋ミガキ飾付	φ13
⑧ ホルダー	黄銅	黒色漆塗	φ60
⑨ ソケット	新ソケット(プラスティック)	黒色	
⑩ ランプ	E26-球球 40W	ホワイト	
⑪ 飾り	黄銅鎖	ミガキ	
⑫ セード	ガラス	消シャトーメイ模様入り	φ200 × H100

意匠図 B-59

figure 2　Survey table

artisans are assembled. Each part must be a product that meets the requirements, and there is a splendor that cannot be achieved with machine-produced products with uniform specifications.

However, what can be said for various occupations is that the number of masters who retire every year has increased, and the world has changed to cutting inefficient things with each changing generation. Therefore, the number of artisans who undertake contracts has decreased. We hope that the work of restoration will continue sustainably.

5. Lighting equipment components and eras

Wiring device

As a basic process of attaching lighting equipment, all electrical work will be undertaken. Many cultural property buildings do not have ceilings, and there are many exposed wirings where cords crawl on the beams behind the hut. The original wiring that crawls neatly was also done artistically, whereas nowadays, it is sometimes sufficient to roll the cable behind the ceiling. This wiring work seen during restoration/repair seems to be destined to be dismantled as it is with little interest. Insulator pulling work is a technique that can only be performed by skilled artisans (**photo 12**). It is a wonderful skill that neatly connects the four types of red waxed lines of cleats (things that hold down the lines), knops (things that keep the lines away from the ceiling), porcelain tubes (things that prevent the lines from being damaged), and cords with white porcelain.

photo 6 Joiner

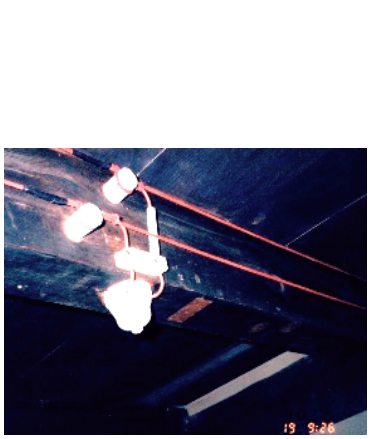
photo 7 Bamboo craft

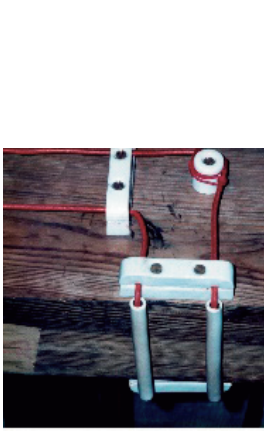
photo 8 Locksmith

photo 9 Tassel

photo 10 Lace

photo 11 Raising





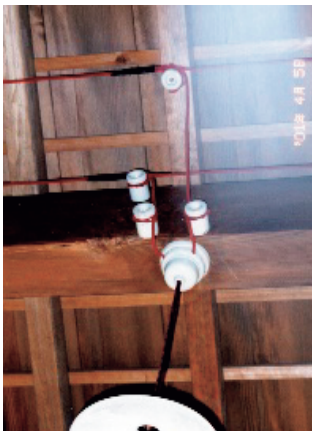


photo 12 Insulator wiring work construction example, Yachiyoza（Photo provided by：Yamaga City Board of Education)

Wiring device

Lighting equipment comprise various components as shown below (**photos 13–23**).

* Eyelet type

This is a part that penetrate the protect wire and rod edge The lamp cord and the primary cord are jointed behind the ceiling.. The design is beautifully finished. It will be appealing when used for the wicker ceiling, ship bottom type ceiling, rod edge of polished log, and modified rod edge.

* Electric wooden stand

This is fixed to the rod edge according to the height of the rod edge. It is also used for switches.

*Cluster device

Two or three wires are taken out from one place, and the equipment is lowered. The pedestal is made of marble or porcelain, and the box cover is made of brass.

* Porcelain rosette

This is attached with the wooden stand on the pottery stand and jointed with the primary cord. At the beginning of the Showa era, a chrysanthemum shape was also made from a mould (made of resin).

* Code adjustment

This is an elevating device that winds up the cord with a spring and a pulley behind the ceiling. At some sites, they are left unused in the ceiling. This is a device in which a weighted ceramic or metal object is hung from a cord. There is also a version of this with two holes drilled in an oval piece of wood or a hook attached to a wooden ball.

* Free hanging tool

A sturdy hook is put out from the ceiling, and a current is flowing through the hook itself. A similar hook is provided on the appliance side, and as the current is flowing through it, electricity can flow through it when the hook is attached. As electricity is flowing through the hook itself, it does not require much restoration.

* Cord pendant

There are two types of cotton cords: rounded and bagged cords. Rounded cords are insulated cords with interlocking cotton threads for suspending heavy objects. A bagged cord has no intervening cotton thread and can withstand some bending, twisting, and pulling. It is used for electric kotatsu heaters.

The bag-type cord pendant has been replaced and is not the original one.

* Brass shell socket

This was manufactured in 1908 by Tokyo Electric Light Co., Inc. (Tokyo Shibaura Electric Co., Ltd.) in partnership with GE of the United States. A brass cover was supplied by GE for socket parts, assembled by Tokyo Electric Light Co., Ltd., and used for high-end lighting equipment (brass keyless socket, brass key socket, brass receptacle, etc.). The carved seal is as follows:

660 W 250 VOLTS TOKIO ELECTRIC CO　東京電燈株式会社
660 W 250 VOLTS GENERAL ELECTRIC CO　Ｇ．Ｅ會社

This stamp was used until 1925, after which it used the Mazda trademark. This socket-specific device is definitely the original product. However, as the insulation of the brass socket is inadequate, there are few appliances that remain in use. As it is not suitable for the electrical equipment law, it is not reused for restoration/repair. In addition, many appliances that remain with this socket attached are not lit. Resin mold sockets have been produced domestically since about 1930. However, the resin mold sockets are Japanese-style with key sockets and two-pronged two-lamp sockets, and the chandeliers are made of brass.

* Shade holder

Shade holders such as chandeliers were used as decorative metal fittings, and the caliber dimensions were determined. The large caliber is approximately 80 ϕ and the small about 55 ϕ ; however, to be exact, there are fine dimensions.

There was a Victorian type used for small cord pendants where the shade was fixed with three screws,

which was also made of brass. Later, a plastic version was produced.

* Metal fitting material

The material of the metal is brass, casting, or bronze, and it is a fine part. All pipes, decorative metal fittings, and metal castings are made of brass bronze. For pipes, there are parts soldered by rolling the base material of the flat plate instead of the drawing method, and the connection surface is seen to come off due to aging. Thus, it needs to be repaired.

Since 1938, the government has issued a ban on the use of copper, brass, bronze castings, etc., such as lighting equipment, and various parts have been replaced with different materials.

* Acrylic reflective umbrella

By around 1965, industrial products made of acrylic

photo 13 Eyelet

photo 14 Cluster

photo 15 Rosette

photo 16 Code adjustment

photo 17 Free hanging tool

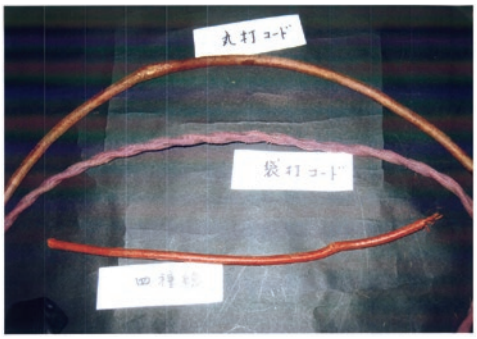


photo 18 Cord pendant

photo 19 Brass socket

photo 20 Victor shape holder

photo 21 Shade holder

photo 22 Gang switch

photo 23 Acrylic reflective umbrella

began to appear, and they changed their shapes and came out as lighting equipment such as fluorescent lamp covers. Acrylic fluorescent lamps were on the market around 1965. It is a reflective umbrella that uses a light bulb and is patterned with an acrylic string. Although it is not subject to restoration, it uses acrylic instead of bamboo and rattan and resembles an antique at first glance.

6. Japanese-style lighting equipment

Typical lighting equipment used in Japanese houses such as “shoin-zukuri” (drawing room) style and “sukiya-zukuri” (tea-ceremony room) style is called a garment girder chandelier (**photos 24–27**). It is a beautiful handicraft instrument unique to Japan and is usually found in a tatami room. It is from the end of the Taisho era, around 1940, during the World War Ⅱ. It used numerous old and precious materials and was used in high-class Japanese-style houses made by shoin-like sukiya-style, in the guest rooms and Japanese rooms of restaurants. The wonderful alcove pillars between the alcove, the works of famous sculptors in the alcove, and those not inferior to the ceiling decorations were appointed by artisans such as carpenters.

In the restoration of the building, attention is paid to the wood and other materials, but not many designers go to the extent of this kind of lighting equipments. The design of this garment girder chandelier is made from the garment girder used to organize Japanese clothes. In rooms that require brightness, such as large and important rooms, there were many cases where a dish-shaped glass was attached to the center of the arm of the girder, and the number of electric bulbs was increased with a stable design to create a luxury atmosphere. The shade is made of the finest outer glass, transparent glass with milky white glass wrapped around it, with a hand-cut pattern or a combination of glass and metal decoration. Arm metal fittings such as arm lights were punched out with brass material and

photo 24 Japanese-style lighting equipment example

photo 25 Japanese-style lighting equipment example

photo 26 Japanese-style lighting equipment example

photo 27 Japanese-style lighting equipment example

processed, such as metal fitting turning, casting, metal engraving, and finishing. In addition, textiles and strings were made with special techniques such as decorative tufts and decorative strings. Beautiful and elaborate lighting equipments, such as silk tassels, were made by skilled artisans of the time.

In the historic building, wonderful lighting equipments are installed in Japanese-style rooms and corridors. Lighting equipment that expresses the high level of skill of hardware artisans, such as strings, tufts, and glass cuts, was used. Brackets with a design that applies a clothing-type chandelier were also used at the entrance, giving a high-class impression. The pendant for one light also had a shade design for multiple lights.

These are unique Japanese lighting equipments that give us a glimpse of the excellence of artisanship, and we hope that they will be preserved for future generations.

7. Repaired glass

Glass is an indispensable material for lighting. The glass used for lighting has a strong presence, starting from the oil pot of an oil lamp to various reflective shades and chandelier parts. All kinds of glassware have been altered to bring out the human sensibility, from the utilitarian to the beautiful, with the addition of artisanship, polish, corrosion, faceting, and oxides.

The attraction of glass called “ruri”, “hari”, “giaman” , “vidro", crystal, etc., is light—it is the presence of the reflected light, the refracted light when passing through, and the presence of light emitted from the glass itself. The glass restoration of the lamps is an important task (**photos 28–33**). First, it is necessary to confirm the original glass. Various confirmations are required for restoration production, which requires the same glass even if there is an original, according to the age of the equipment. It is necessary to check the material, molding method (molding, air-spraying, or pressing), processing method (erasing glass, internal erasing, or external erasing), pattern (cutting face or acid etched), and polishing of the finish. Therefore, the production drawing is extremely important, and it is a prerequisite to give the manufacturer the one in which the fitting with the lighting equipment is clearly indicated in addition to the fine dimensions such as angle and radius.

The lighting equipment of the combination of each part is based on the premise that each part is firmly made, but it must be firmly fitted to the later assembly. The matching part of the glass and the equipment must


photo 28


photo 29


photo 30


photo 31


photo 32


photo 33

also be firmly defined. After the glass is formed, it can be sandblasted or chemically erased, but whether the glass is inside or outside must be checked to ensure that the finish is the same.

Glass is a considerably stable material, and even if it is used for a long time, the material itself will not change and will almost always return to its original beautiful state after cleaning. Among the glass of the original lighting equipment of the historic building, there is wethering that has cracks and fractures like fine cracks on the surface of the glass and is rough with wrinkles. Some glasses in the Meiji, Taisho, and early Showa eras have inferior durability due to poor material composition and have the above symptoms (this state is called the crizzling phenomenon). Unless this is also a historical proof and cannot be used unless it is replaced and discarded, it can be used by restoration/repair; therefore, we think it is better to continue using it.

There is a decoration method in which the crystals of polyhedral octagons, usually of 32 mm to 12 mm in size, are connected with copper pins to form a gradation in a crystal glass chandelier. The octagon is disassembled, washed, and then connected with a copper pin to restore it. However, the connection method has changed to a simple method of omitting the letter C.

8. Restoration/repair work contents

There are various tasks for the restoration and repair of lighting equipments and fittings.

* Survey form: This is based on residual products, literature, old photographs, and interviews.
* Construction table: Various arrangements such as construction drawings are made based on the survey form.

*Casting process
Wooden mold: This is used for making full-scale samples of model patterns and molds.
Replace wooden molds with resin molds and casting molds depending on the quantity and shape.
Casting method: There are casting methods depending on the complexity, pattern, quantity, material, etc., of the product, such as raw mold, gas mold, wax mold (lost wax), etc.

* Sheet metal processing (**photos 34–41**)
Metal drawing: Bowl-shaped and curved metal fittings are manufactured from steel plates and brass plates. As the dimensions and shapes can be diversified, there is a considerable demand for hinge metal fittings. It is also used to reduce weight.
Lathe processing: This includes the threading of pipes and rod-shaped metal fittings, production of small metal fittings, and copying lathes.
Bending processing: This refers to the bending of threaded pipes (bender).
Welding processing: This entails the welding of individual parts.

* Engraving
Copper plate: Notches such as brass plates, punches, patterns, and decorative metal fittings

* Coloring
Polishing and coloring are performed to maintain the appearance of hardware and protect the metal pattern.
Finishing and coloring follow the color of the original product or receive instructions with a sample. There are many finishes such as “Sentoku” color, green-blue color, and sulfurized smoke color. There is also gold plating with electroplating.

*Glass materials
・Molding method & process
Space blowing: Forming method by self-weight of glass, centrifugal force or force of blowing air, taken out without using molds.
Forming with the force of air blown in.
Mold blowing: The shape of the product is made into a mold (casting) and blow the glass into a mold.

Machine for pressing: Molding in which glass is compressed vertically with a mold.
Centrifugation: Molding by rotating the mold and utilizing its centrifugal force.

* Glass material

There are transparent glass, opalescent glass, and colored glass (silica sand, soda ash, calcium carbonate, etc.); colored glass is colored with metal oxides.

Example: Use colorants such as blue glass (cobalt, copper), green glass (chrome, iron, copper), and red glass (gold, copper, selenium).

* Glass processing

Cutting: A method of drawing the basics of the pattern sketch on the glass surface and engraving the pattern with various gliders along with it. With the cut surface erased, the polishing work is made transparent by buffing or chemical treatment to produce the effect of cutting.

Sandblasting: This refers to processing that turns transparent glass into erasing glass. The glass surface is covered with vinyl, gelatin, glue, etc., and the pattern is drafted on it. This is a method of scraping off the pattern to expose the glass surface and spraying an abrasive (such as Kongo sand) with high-pressure compressed air to carve it.

Frost finish: This is a method of processing the surface of glass with chemicals and is also called a mat finish.

9. Rust removal and dirt cleaning

The splendor and decorativeness of lighting equipment depend on the beautiful finish of metals. Many of the metal parts, which can be said to be the skeleton, have been hung on the ceiling without conducting electricity for many years or have been removed and left on the floor or in storage.

Cleaning is performed to remove dirt that has been left unattended for many years and restore the original shine.

The initial product is a high-grade material such as bronze or copper alloy, which turns green-blue or black in response to oxygen and humidity. Basically, dirt is removed to avoid damaging the fabric. First, the socket cord is removed. Caustic soda is then boiled and used for washing (boil-washing) (**photos 42–44**). The rusted part is removed with a brush using acid or the like. After removal, it is finalized through either the coloring method or the plating method, but when following the original product, the coloring method is more often selected.

There are not many initial steel products, and cast iron products are rust-removed by sandblasting and metallikon spraying (**photo 45**).

10. Example of lamp restoration

As an example of the lamp restorations performed in the past, we will discuss the lamp restoration at the Holy Resurrection Cathedral in Tokyo (Nikolai-do). Other cases are listed as an appendix at the end of the chapter.

Holy Resurrection Cathedral in Tokyo (Nikolai-do)
Repair work year: 1990–1998
Location: 4-1-3 Kanda Surugadai, Chiyoda, Tokyo

The original lighting equipment was completely lost in the Great Kanto Earthquake and does not exist anymore. Subsequently, restoration and repair were examined, including the equipment used up to this repair. Three types of restoration have been decided for lighting equipments with their hanging positions, shapes, and forms clearly visible from old photographs and literature. In the original material “Holy Resurrection Cathedral in Tokyo Magazine[東京ハリストス復活本聖堂小誌]”, there was a description of the quantity, number of lights, etc. (**figure 3**). In addition, old photographs of the sanctuary (**photos 46** and **47**) became important reference materials.

* Restoration policy

The design and size are restored as close as possible to the original product based on the materials and literature. The hanging positions of each of the six locations, one in the center of the sanctuary, three in the shrine, and two in the enlightenment hall, will also be determined. The structure will be changed from candlelight to electric light, and safety is also important for the electric structure. Eight arms are radiated from the main body, and two plates (Bobéche) are placed inside and outside each arm. Seven lamps are attached to the plate, making a total of 112 lamps.

photo 34 Welding work

photo 35 Welding work

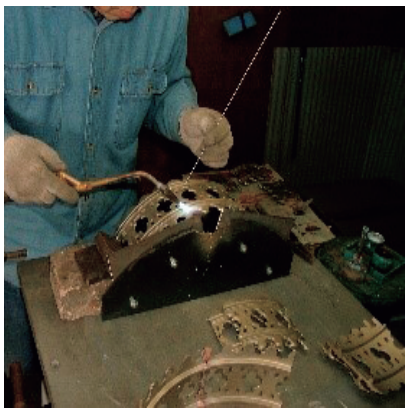


photo 36 Welding work

photo 37 Welding work

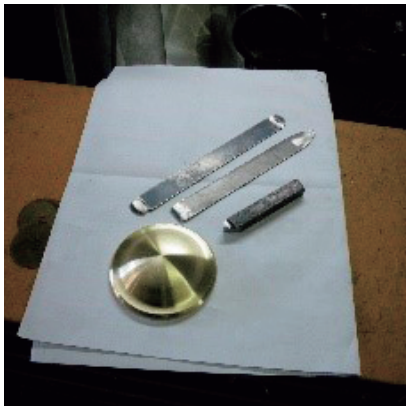


photo 38 Raising

photo 39 Raising

photo 40 Raising

photo 41 Raising

photo 42 Boil-washing

photo 43 Boil-washing

photo 44 Boil-washing

photo 45 Removing rust by sandblasting

* Design drawing

The overall dimensions were determined from the old photographs, and the entire design was analyzed as finely as possible to create a 1/10 design drawing. The dimensions were determined by the proportional relationship between the width of the iconostas and that of the carpet.

* Model making

A model was made as an overall drawing and examined (**photos 48–52**). The height of the individual parts of the luminaire, the shape and size of the arm, and the balance in the center were mocked up in 1/1 and lowered to the actual position. The balance of the entire lighting equipment and its lowered state on the dome were confirmed.

* Detailed design

As each pattern of the main body metal fittings was not clear in the old photographs, we examined it with reference to the lamps from oversea at the time. The arm is made of a solid pipe for the candlelight but a hollow one for the electric lamp because it needs to be connected to a electric wire.

* Wooden pattern

As the prototype of the wooden pattern is accurately expressed as is, the wooden pattern was inspected individually (**photos 53–55**). Notably, the dimensions of the prototype and the finished casting will serve as shrinkage of the prototype by approximately 7/1000. The casting mold factory has a ruler such as a casting scale, which measures it. Depending on the shape of each part, there are those that process a plate-like object and make it into a drawing metal fitting, those that lathing and hammering to add texture, and those that use sand, bow, sandpaper, etc., to make the best use of the surface of the casting.

* Parts manufacturing

The wiring and other wiring parts are prepared in accordance with the electrical appliance regulations. There are no glass ornaments in the restored chandelier, and all the fittings are made of drawn metal fittings (to reduce weight), ground metal fittings, and cast metal molding. There are three types of casting methods, depending on what is being molded. In this case, we decided to use all three methods. However, as there are different factories for different molding methods, we requested a different factory for each part (**photos 56–64**).

1) Raw mold

These are small parts that are easy to remove from the mold and have a small lot. The prototype was made by hardening sand.

2) Gas type

These are used for molding large objects with a high possibility of sand breaking during die-cutting. The form is made durable by blowing carbon dioxide.

3) Wax type method

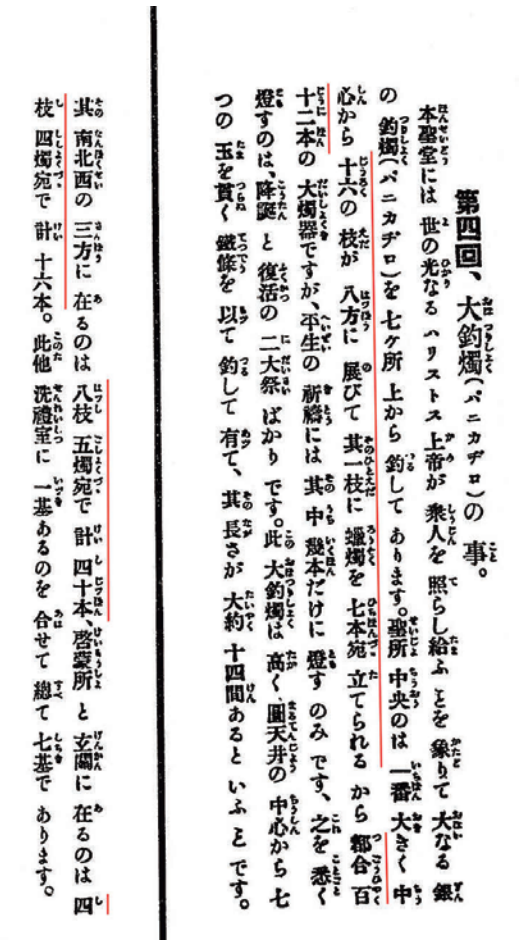
Should the pattern shape of the product have been complicated or the mold difficult to remove, we would use a mold with wax. In the case of arm manufacturing, the inside was emptied for electrical wiring. Therefore, the arm was molded by dividing it in half when viewed from above and welded into one to complete it.

* Design drawing/construction drawing

The design was drawn by reflecting on the examination results as a whole through mocking up old photographs and literature (**figure 4**). The patterns and textures of the individual parts that were constructed were decided based on materials such as gas lamps and oil lamps of the same era, and the size of the actual cost was confirmed by creating a wooden pattern (**photos 65** and **66**).

* Processing

The casting arm divided into two was welded and polished by silver brazing (**photos 67–69**). Polishing is performed with a buff. Patterns were asked to chisel and file artisans. Holes, screw processing, fine patterning, etc., were performed according to the construction drawing.



第四回、大釣燭（パニカヂロ）の事。

本聖堂には 世の光なる ハリストス 上帝が 衆人を 照らし給ふ ことを 象りて 大なる 銀の 釣燭（パニカヂロ）を 七ケ所 上から 釣して あります。聖所 中央のは 一番 大きく 中心から 十六の 枝が 八方に 展びて 其一枝に 燭を 七本宛 立てられる から 都合 百十二本の 大燭器ですが、平生の 祈禱には 其中 幾本だけに 燈す のみ です、之を 悉く 燈すのは、降誕 と 復活の 二大祭 ばかり です。此 大釣燭は 高く 圓天井の 中心から 七つの 玉を貫く 鐵條を 以て 釣して 有て、其 長さが 大約 十四間あると いふ と です。

其 南北西の 三方に 在るのは 八枝 五燭宛で 計 四十本、齋室所 と 玄關に 在るのは 四枝 四燭宛で 計 十六本。此他 洗禮室に 一基あるのを 合せて 總て 七基で あります。

figure 3　Descriptions aout light equipment
(reference：聖ハリストス復活本聖堂小誌)

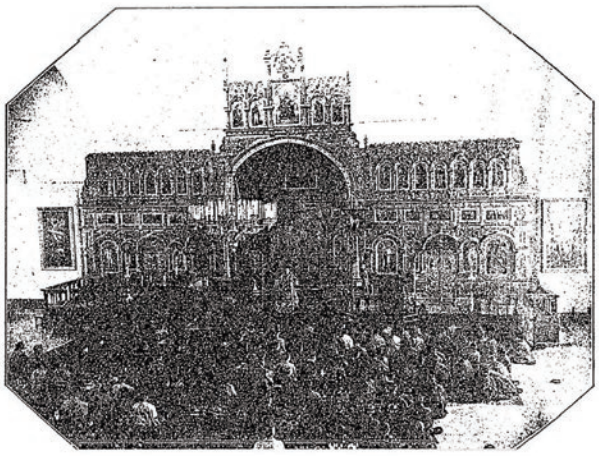


photo 46　Old photo (reference：聖ハリストス復活聖堂画帖)

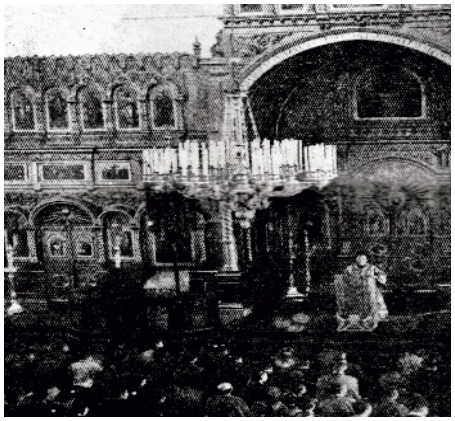


photo 47　Enlarged view of the lamp part

photo 48　Modeling at 1/1

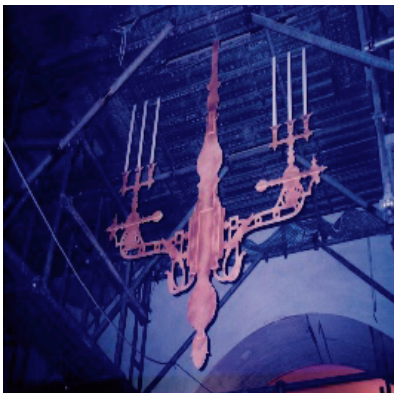


photo 49　Hang on site

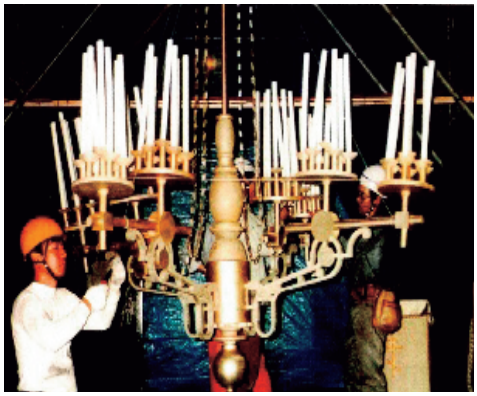


photo 50　Full-scale model (whole)

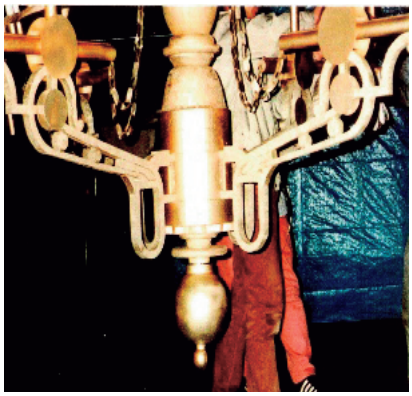


photo 51　Full-scale model (parts)

photo 52　Full-scale model (parts)

photo 53 Ornamental railing top at the bottom of the main body

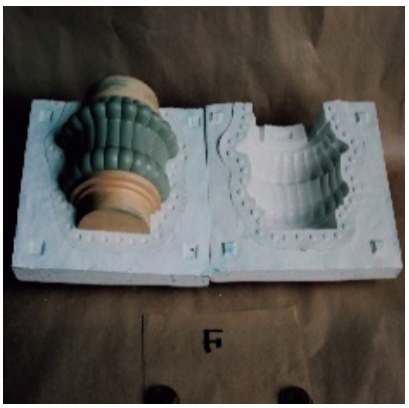


photo 54 Central pipe dressing

photo 55 Central pipe dressing

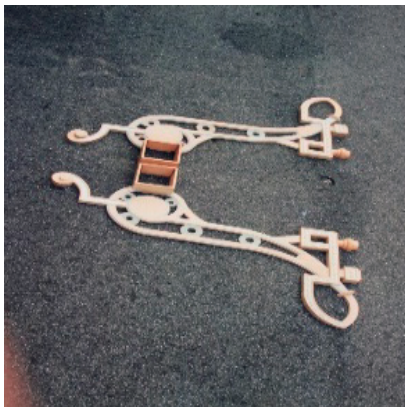


photo 56 Pair of arm wooden patterns

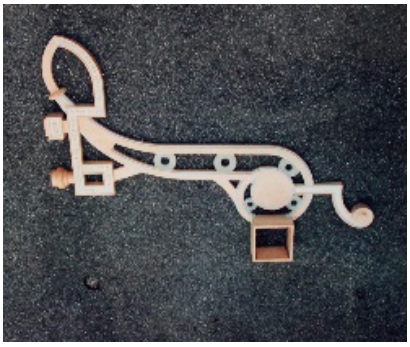


photo 57 Arm sand mold

photo 58 Arm pair sand mold

photo 59 Sand mold

photo 60 Cast pouring

photo 61 Casting

photo 62 Casting

photo 63 Outer mold (wax mold) with plaster

photo 64 Pouring

* Final installation

When the parts were completed, they were temporarily assembled, and if there were no problems, the installation was completed (**photos 70–74**). Auxiliary wire for hanging the chain and anti-shock/ anti-sway wire were installed to prevent it from falling.

11. Summary

The preservation and repair of lighting equipments are supported by various specialized techniques and are made up of a collection of those techniques. As for the work of artisans, the number of sites that

photo 65 Chandelier

photo 66 Wooden pattern

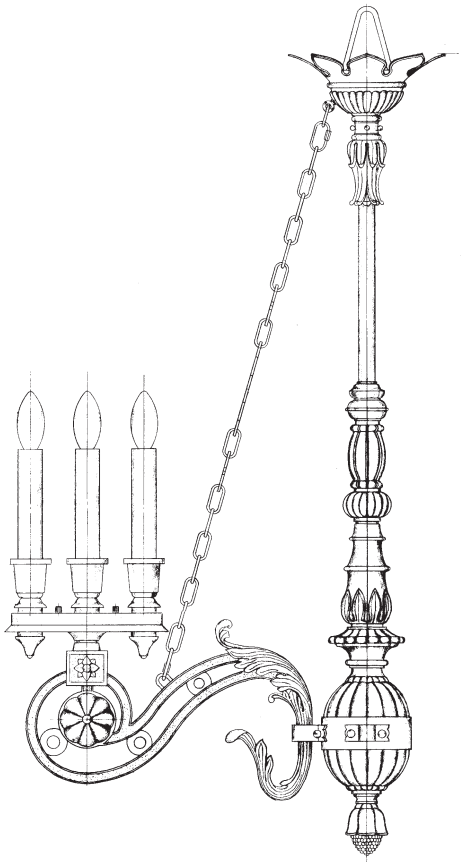


figure 4 Design drawing

photo 67 Welding the arm

photo 68 Polish

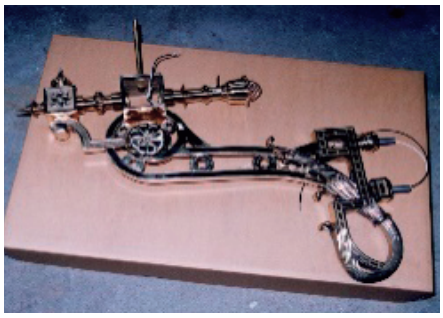


photo 69 Finished product

photo 70 Temporary assembly

photo 71 On-site installation

require such technology is decreasing, and that of new materials and standardized parts and products is increasing. Consequently, it is changing to be efficient and economical. Despite this global trend, we would like to see more workplaces where the next generation of workers can experience the use of technology and pass it on to the next generation who can then inherit the technology.

photo 72　16-lamp chandelier completed

photo 73　40-lamp chandelier completed

photo 74　112-lamp chandelier completed

We hope that, in response to the on-site contractor's claim that the finish is fine if it looks fine from a management perspective, a satisfying repair is made that imagines an appearance that remains for later generations without easily compromising just because it is an interior. When visitors come to the museum, the first thing they see is the interior. The interior of the State Guest House, Akasaka Palace is as impressive as the building.

Experts will understand where the excellent technology is, but the general public will only get the impression that it is a fine building. Of course, it is a magnificent building only with that technology, but the impression of the interior is also important. We think that the construction of buildings in the Showa period will come out from now onward. As the times change, it will be necessary to consider and change restoration and repair methods such as materials and finishes. This is because if the material changes from bronze/brass to aluminum/steel plate, the repair method and finishing/coloring method will naturally change. Even now, there are still issues with changes from incandescent electric bulbs to fluorescent electric bulbs and the processing of light sources.

Old goods are valuable, and if they are removed and taken down, they will be treated as disposable items. We want to treat it carefully and revive it without neglecting it.

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Appendix 1 Restoration and repair

(1) Residence of Mitsui Hachiroemon
- Crystal Chandelier

[Overview]

Installation location: Residence of Mitsui Hachiroemon, 2nd floor Buddhist altar corridor

Location: 3-7-1 Sakuracho, Koganei City, Tokyo
Edo-Tokyo Open Air Architectural Museum

Repaired work year: 1995

Structural type: Electric light (remodeled from the original candle light)

Main composition: Bohemian crystal Bobéche, glass arm, British Swan base socket (arm part), Edison base (bulb part)

[Repair process]

Necessary points for restoration/repair of lighting equipment include the following two points:

1) Return to the original shape

2) Lighting as the role of lighting equipment

The residence's crystal chandelier needed technology to meet these points.

The chandelier was imported from Europe in the completed form as a candlelight chandelier from the Meiji era to the Taisho era, and it is assumed that it was renovated into an electric lantern in Japan.

This is a chandelier for a total of 10 lights with a socket on a glass arm of five lights each with an S-shaped length. The repair was done in a state where the metal fittings to be attached to the main body metal fittings were required at both ends of the glass arm, and the metal fittings to attach the socket were required at the tip of the arm, and all the metal fittings at both ends were loose and not fixed. As the socket remained unstable in the candle cup, the cord was twisted and broken, and the modified socket was broken and was not energized. The socket is a Swan base (European specification B type) with an Edison socket (E type) added and is covered with a white cylindrical cover that looks like a candle. All the wire replacement sockets were repaired, and the metal fittings at both ends of the arm were fixed with plaster by removing all the adhesive from the original parts and setting a new jig. The glass, candle holder, Bobéche, decorative glass, octagonal diamond type parts, and coffin drop trim (rectangular decorative glass) are the original products. All the metal fittings were washed with Bohemian crystal glass, and all the metal fittings were reconnected with copper pins. The missing decorations were manufactured, and all the irregularities were fixed when connecting the copper pins. We installed a fall prevention wire for the entire device and a reinforcement wire for the arm.

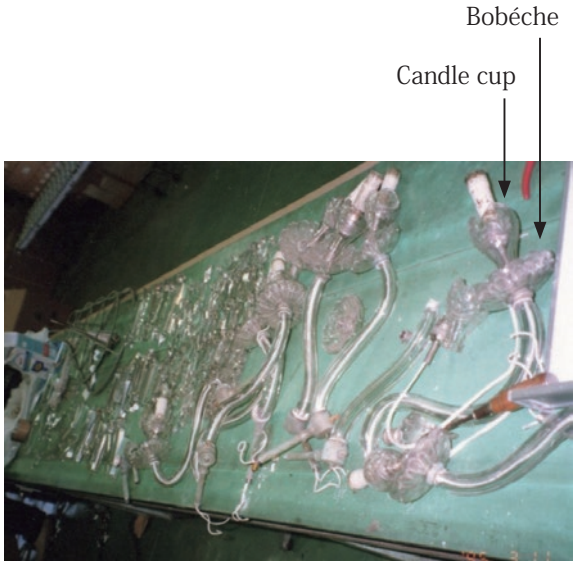


photo app.1-1 Candle cup and Bobéche

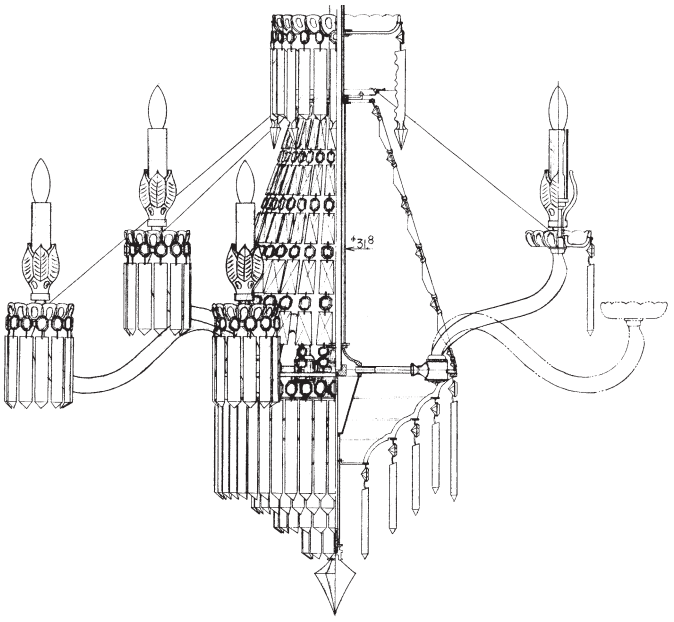


figure app.1-1 Design drawing

photo app.1-2 Wax cylinder

photo app.1-3 Bohemian crystal Bobéche

photo app.1-4 Five large glass arms and five small glass arms

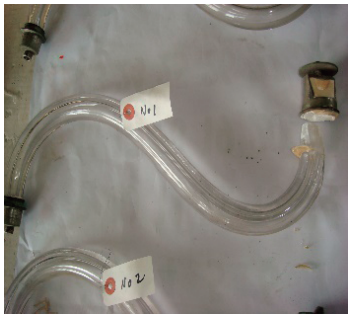


photo app.1-5 Body metal fitting connection and arm adhesion (plaster)

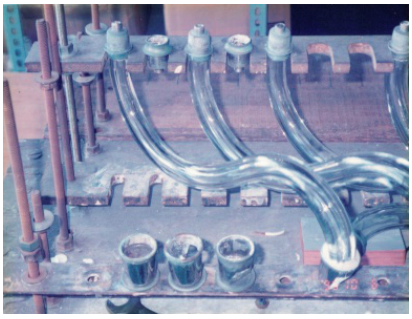


photo app.1-6 Jig for placing gypsum

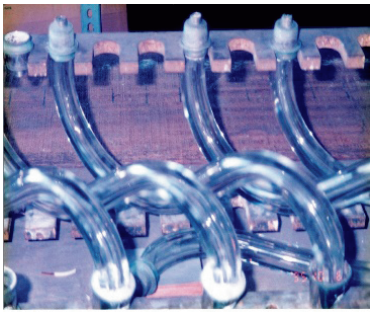


photo app.1-7 Jig for placing gypsum

photo app.1-8 Glass arm metal fittings on both ends

photo app.1-9 Glass arm metal fittings on both ends

photo app.1-10 Electric wire state in socket

photo app.1-11
Electric wire state in socket

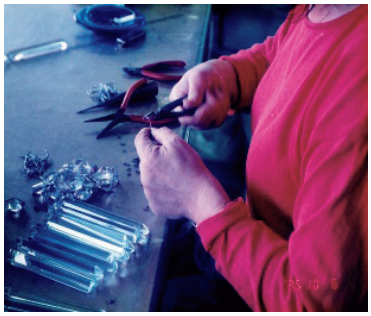


photo app.1-12 Repair/manual repair

photo app.1-13 Repair/manual repair

photo app.1-14 Arm test

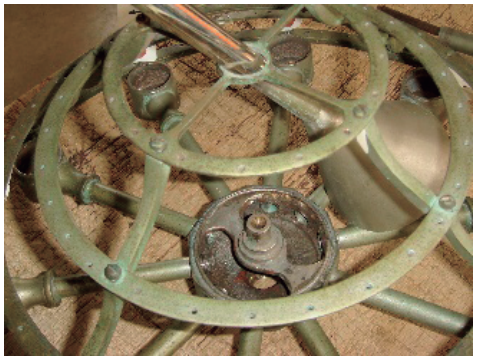


photo app.1-15 Main metal body

photo app.1-16 Main metal body

photo app.1-17 Installing

(2) Bansuisou

[Overview]

Repaired work year: 2007–2008

Location: 3-3-7 Ichibancho, Matsuyama City, Ehime

Bansuisou was built in 1922 as the villa of Count Hisamatsu Sadakoto, a descendant of the Matsuyama feudal lord. Although it was used as an art museum, due to the deterioration of the interior over time from not being used, the lighting equipments were noticeably damaged, falling off, or missing. However, the original product was kept unchanged, and the original condition of the equipment was clear. We had a close discussion about the removal setup, and the fixtures were dismantled carefully for repair, with each part numbered and recorded, and the restoration was completed without incident.

[Repair process]

Before dismantling and after meeting about the setup and checking the condition of the wall-mounted equipment, we removed it from the ceiling hanging source. The condition of damaged parts, such as cracks in some parts, was checked. We also checked for missing parts. After confirming the condition of individual pieces and the shapes of joints, the glass was disassembled.

Restorations and manufacturing were conducted for the uneven glass decorations, the replacement of all bead joints with copper pins, insufficient decorative glass, the production of missing octagonal diamond type parts, and glass globes. The cracked metal pipes, that act as the support of the instrument, were welded and repaired. During the era the original product was manufactured in, the flat plates were still made into pipes and finished by welding (copper, brass plate). For the cast parts that were out of stock, a wooden model was made to simulate the metal parts of the chandelier. In circumstances where molds of these parts need to be made, it is necessary to make them from a wooden mold because they need to be made into a smaller part shrunk from the main body.

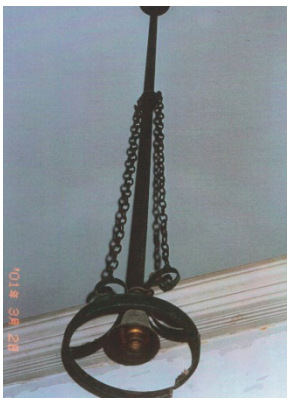
The office lighting equipment fixtures on the first floor have been replaced with fluorescent circular-line lighting equipment fixtures for business purposes, and those in the exhibition room have been restored and replaced accordingly.

photo app.1-18 Bansuisou

photo app.1-19 Chandelier

photo app.1-20 Direct mounting equipment, before and after repair

photo app.1-21 Pipe pendant, before and after repair



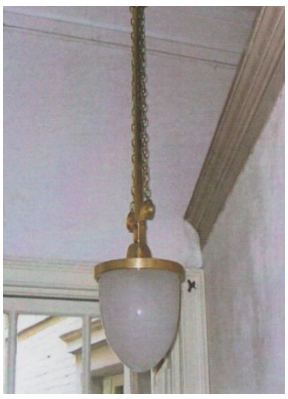


photo app.1-22 Before and after repair

photo app.1-23 Demolition setup meeting

photo app.1-24
Removing the ceiling suspension

photo app.1-25
Before repair

photo app.1-26 Condition of wall fixtures

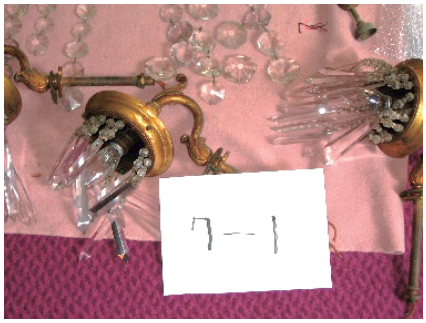


photo app.1-27 Dismantling

photo app.1-28 Dismantling

photo app.1-29 Dismantling

photo app.1-30 Dismantling

photo app.1-31 Dismantling

photo app.1-32 Dismantling

photo app.1-33 Central pipe brass joint damage crack

photo app.1-34 Checking for missing parts

photo app.1-35 Glass condition

photo app.1-36 Glass dismantling

photo app.1-37 Glass dismantling

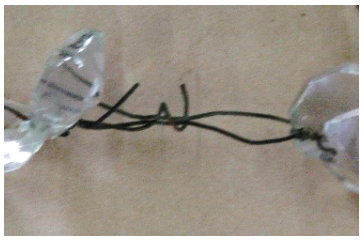


photo app.1-38 Glass connection state

photo app.1-39 Casting molding

photo app.1-40 Wax mold for casting

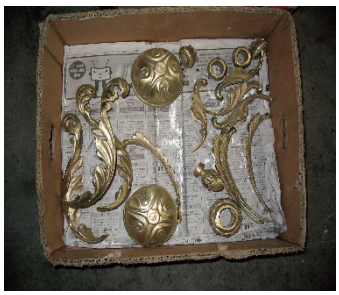


photo app.1-41 Finished casting parts

photo app.1-42 Joinery hardware maintenance

(3) Former Ikeda Family Western-style House

[Overview]

Repaired work year: 2009–2010

Location: 1 Oshima, Takanashi, Daisen City, Akita

Western style house completed in 1922 as a facility library of Ikeda Family, an old landowner in Daisen City (formerly Omagari City), Akita Prefecture.

[Repair process]

There were lighting equipments from when the building was first completed, but they were hanging from the ceiling and have not been maintained or managed.

Some of the fixtures had been removed, and some had missing parts, but they were not irreparable.

The shades had been removed and stored separately, probably due to having been left hanging.

To return them to their original state, we removed and disassembled them, checked their parts, and removed all dirt and rust.

All the metals were made of bronze and brass, and the fabric itself was not damaged. Therefore, after returning the fabric to its original state, its original beauty was retained.

In addition, dormant light plugs (devices that fit into sockets to turn off light bulbs and turn on only one or two lights in case of multiple lights) were used.

* Metal coloring: A dyeing method in which the metal pattern is colored with chemicals on copper or its alloy
* Electroplating method: Electroplating (pure gold plating)
* Black coloring on the surface of pure gold-plated finish
* Shade (glass globe) is made by imitating what remained of the original

These methods, as mentioned above, were used in the reparation process.

photo app.1-43 Reading room on the 2nd floor, before and after repair

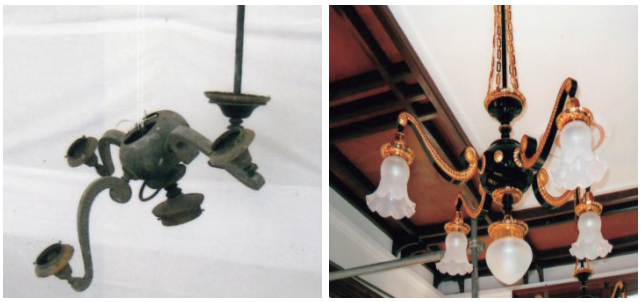


photo app.1-44 2nd floor dining room, before and after repair

photo app.1-45 Reading room on the 1st floor, before and after repair

photo app.1-46 Billiard room on the 1st floor, before and after repair

photo app.1-47 1st floor dining room, before and after repair

photo app.1-48 Demolition record

photo app.1-49 Demolition record

photo app.1-50 Dismantling confirmation

photo app.1-51 Dismantling

photo app.1-52 Reading room arm

photo app.1-53 Reading room arm

photo app.1-54 Dining room arm

photo app.1-55 Dining room arm

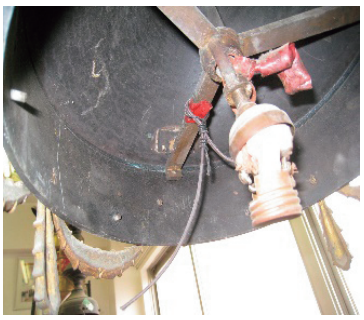


photo app.1-56 Damage to the center of the lamp

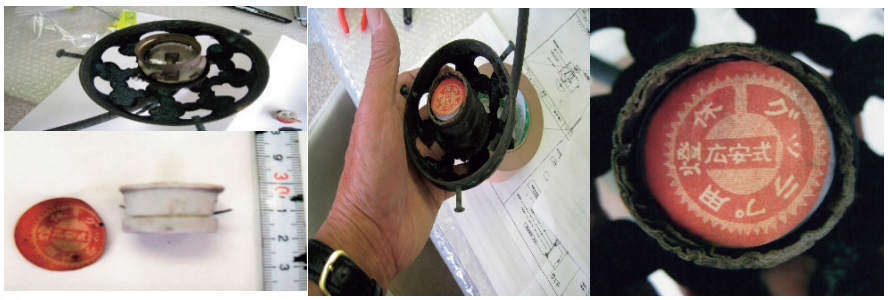


photo app.1-57 Light-blocking plug (with no light bulb fitted in the socket)

photo app.1-58 Corruption

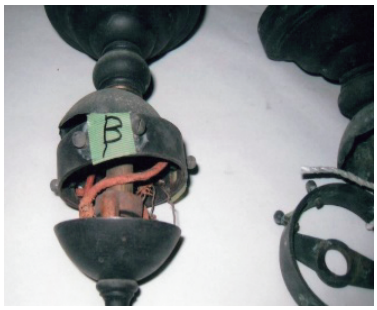


photo app.1-59 Corruption

photo app.1-60 Corruption

photo app.1-61 Glasses

photo app.1-62 Removing rust

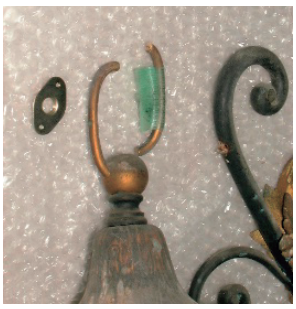


photo app.1-63 Corruption

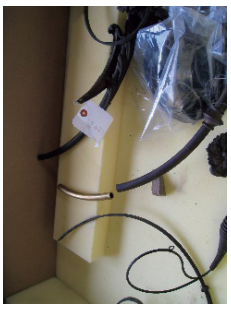


photo app.1-64 Corruption

photo app.1-65 Removing rust

photo app.1-66 Removing rust

photo app.1-67・68 Combination of pure gold-plated parts and colored parts

photo app.1-69 Combination of pure gold-plated parts and colored parts

photo app.1-70 Coloring completed

photo app.1-71 Temporary attachment of equipment and glass

photo app.1-72・73 Temporary assembly of pure gold-plated parts and colored parts

photo app.1-74 Glass molding

photo app.1-75 Glass molding

photo app.1-76 Pattern cut processing

photo app.1-77 Restored glass

Appendix 2: Examples of instrument restoration and repair

(1) Tokyo Metropolitan Teien Art Museum (Former Residence of Prince Asaka)

Location: 5-21-9 Shirokanedai, Minato Ward, Tokyo

[Main entrance cast gate repair]

There was considerable damage to the front gate, which was installed during the construction of the building in 1933. It was made of cast iron. The rails were damaged, and the roller of the gate was found to be rusted when the gate was opened and closed. It was in a state where it could not serve as the sheaves. There was a crack in the pattern and support parts of the main body, so it was removed from the gate pillar and repaired. The cracked part was widened, and the mouth was closed with a stainless steel welding rod. The sheaves was restored in accordance with the design of the original one. A zinc metallikon finish was sprayed over it.

[Repair of radiator cover]

Repairs of the radiator cover, made by the copper electroforming method, were made. The cover was bent and was stored in the warehouse. It was folded in two, and the front surface was damaged. The frame and pattern design were also damaged. Therefore, the bend was restored, and the patterned part was corrected. The damaged frame was fitted with metal fittings and welded. The patterned portions were welded with back-up fittings.

photo app.2-1 Main gate

photo app.2-2 Corrosion of rail

photo app.2-3 Corrosion of rail support

photo app.2-4 Cracks

photo app.2-5 Cracks

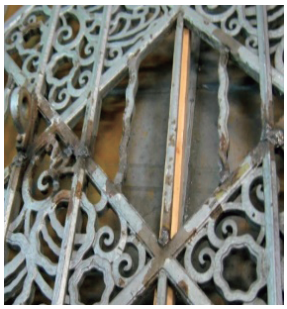


photo app.2-6 Cracks

photo app.2-7 Original color confirmation (rubbing)

photo app.2-8 Repair work

photo app.2-9 Damaged front cover

photo app.2-10 Bent in two

photo app.2-11 Damaged part

photo app.2-12 Damaged pattern

photo app.2-13 Bend returned to original state

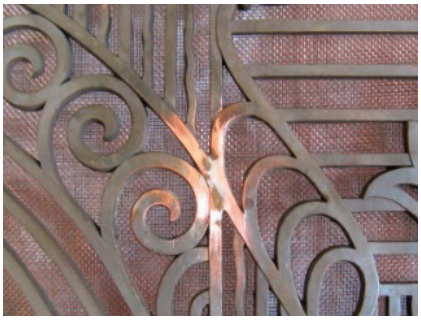


photo app.2-14 Pattern part correction

photo app.2-15 Back refill metal fitting welding

photo app.2-16 Damaged frame attachment

photo app.2-17 Welding of damaged frame

photo app.2-18 Welding of damaged frame

photo app.2-19 Frame welding completed

photo app.2-20 Wire mesh welding

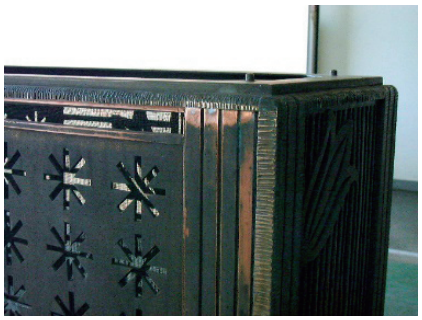


photo app.2-21 Damaged frame casting molding

photo app.2-22 Frame adjustment

photo app.2-23 Finished product

(2) Restoration/repair of lever tumbler lock

The knob and the plate of the lock play a significant role in the design of interior fittings because they are pieces of hardware visible on surfaces. They are also indispensable for safety and comfort.

The knob is a brass or bronze metal handle for opening and closing the door for which casting or hammering is generally used during its manufacturing or restoration process. There are also glass and porcelain products, which were often used in washrooms. They were round, oval, polygonal, etc., and patterns were added to them to match the designs of the plates to which they were attached. The plates were made of brass/bronze and were often plain but had designs on them in some instances.

In earlier times, Japanese houses used either "monkey-type" locks that opened and closed by sliding a key attached to the door horizontally or vertically or T-shaped metal locks often seen in warehouses.

However, with the advent of civilization, modern buildings were built, and locks made in the U.S. that were integrated with the doors were imported. They were finished products that had functionally superior, sophisticated, and refined grips and long-seat designs. The American locks used in modern Japanese architecture are made by manufacturers such as Yale & Town and Sargent & Co. Among them, Yale locks are often used in many buildings constructed in more recent times.

Most of the locks to be repaired are lever tumbler locks. These locks must have strong lock cases as they included the box that holds the key mechanism. Therefore, they are, made of cast iron and hardened. Most of the parts of the locks at that time were made of cast bronze or cast brass. Bar keys are also made of cast iron and restored. As for the wood screws used to fix the long seat and the front of the lock, it is preferable to use flat head screws when reusing the original product.

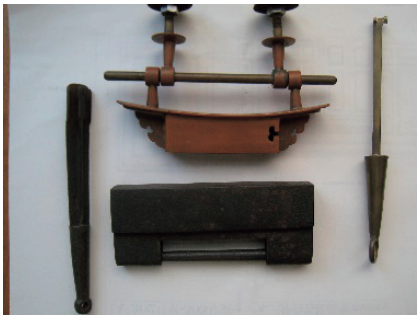


photo app.2-24 Japanese lock (shrimp lock)

photo app.2-25 Monkey-type lock - left: direction of movement, right: when unlocked

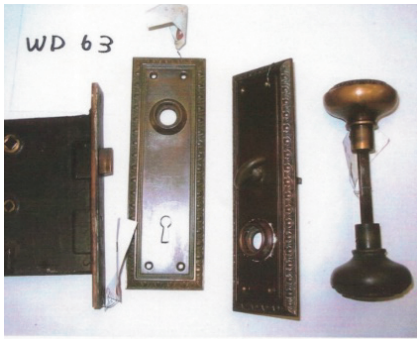
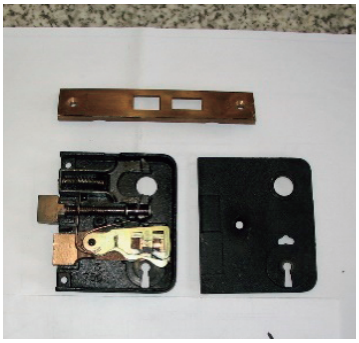


photo app.2-26 Set metal fittings



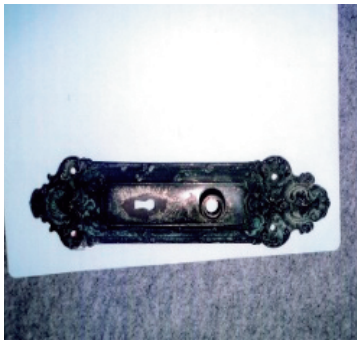


photo app.2-27 Restored product

photo app.2-28 Knob

photo app.2-29 Stick key

photo app.2-30 Box lock adjustment

photo app.2-31 Yale box locks and plates

photo app.2-32 Box lock adjustment

(3) Glass restoration/repair

During repair and restoration work, it is often found that the glass of ordinary lighting equipments is broken or missing. Therefore, one of the main tasks during this process is to produce new glass products for their restoration. For example, if one or two shades of a chandelier for five lights are missing and damaged, the site construction manager will give instructions on which one of the following kinds of repair methods should be issued: 1) restoration to the original design, as much as possible, in accordance with the shape manufacturing method or 2) replacing all five shades with readily available glass (eliminating all technological procedures used in the manufacturing of the original product).

We would like to repair not only chandeliers but also lighting equipments such as pendants and direct-attached lighting equipments through method 1. We believe that taking a high cost of molds and glass for restoring and replenishing the original items will help preserve the artisanship of the time.

If in the future, we can compare the original and restored pieces, we assume it will have been worth the effort. Glass repair is a job that relies on old photographs, documents, and actual objects.

Former Iwasaki Family Western-style House

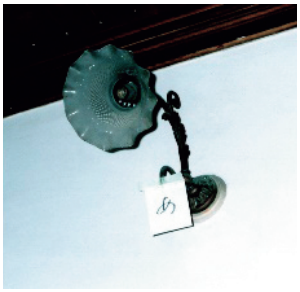


photo app.2-33 West stairs: damaged lamp

photo app.2-34 Mizuya: restored product

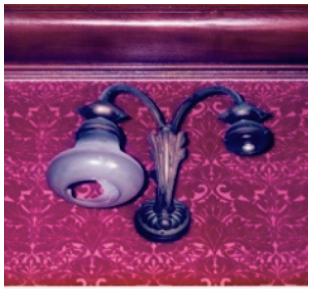


photo app.2-35 Cafeteria: damaged lamp

photo app.2-36 Restored product and original product

Tokyo Metropolitan Teien Art Museum

photo app.2-37 Pendant glass that was stored in the warehouse as a residual material while being damaged

photo app.2-38 Glass shards

photo app.2-39 Immediately after repair

photo app.2-40 Restored product

Former Yamaguchi Prefectural Assembly Building

photo app.2-41 Glass fabric made from mold

photo app.2-42 Cut draft

photo app.2-43 Cut up

photo app.2-44 Restored product

Bansuisou

photo app.2-45 Defective beads

photo app.2-46 Beads damaged/defective connection

photo app.2-47 New beads

photo app.2-48 Restored product

Appendix 3: Restoration design

Materials such as literature and old photographs were analyzed, design drawings were made, and restoration was performed.

When restoring/repairing a lighting equipment of a cultural property building, if a lighting equipment with a completely different design is currently installed, we will explain the restoration process and determine the design of the new lighting equipment.

The general procedure is to first look for the original lamp. Should the original lighting equipment be lost, which is often the case, we look for materials that illustrate or represent the original lamp. If we can find a photo of the original lamp, we can use that photo as a basis to analyze other objects that appear in the photo, such as the ceiling molding, the walls, the furniture and furnishings in the room, and the people. We can reference these objects and people to determine their dimensions, whereby we can determine the dimensions of the lamps in the photo as well. Furthermore, once the general dimensions of the lamps are known, the dimensions of the parts of the lamps used in the same era (such as the sockets of the light bulbs) can be established from the manufacturer's catalogs. Subsequently, we can then take a step toward determining the overall dimensions of the lamps to be restored.

Examples

Former Karatsu Bank Head Office

・1st floor reception room	2-light chandelier
・2nd floor general meeting room	5-light chandelier
・2nd floor reception room	2-light chandelier
・Atrium	7-light chandelier

Bank of Iwate (Former Morioka Bank) Former Main Office Main Building

・1st floor sales room	12-light chandelier

Akasaka Prince Classic House (Former Residence of the Yi Imperial Family)

・1st floor staircase	Chandelier
・1st floorhall	Chandelier

Yachiyoza

・8-light chandelier

photo app.3-1　Old photo

photo app.3-2　Final product

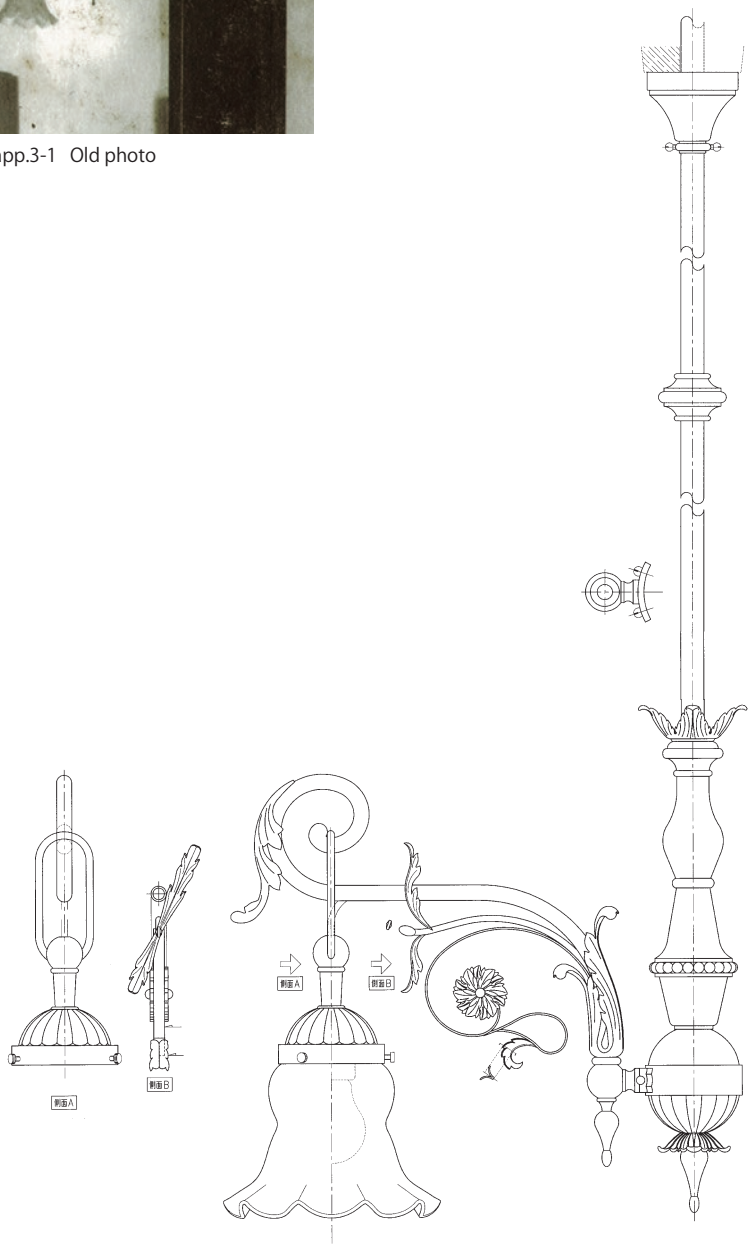


figure app.3-1　Design drawing

Former Karatsu Bank Head Office　2nd floor general meeting room　5-light chandelier

photo app.3-3　Old photo

photo app.3-4　Final product

figure app.3-2　Design drawing

Former Karatsu Bank Head Office　2nd floor reception room　2-light chandelier

photo app.3-5 Old photo

photo app.3-6 Final product

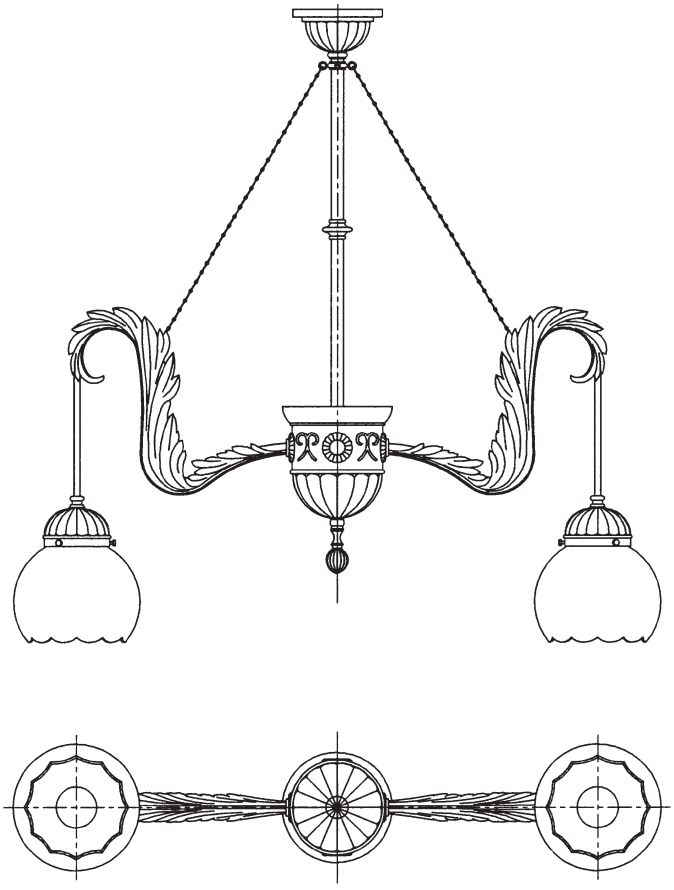


figure app.3-3 Design drawing

Former Karatsu Bank Head Office　Atrium　7-light chandelier

photo app.3-7　Photo when it was diverted to the general meeting room on the 2nd floor (Removed and stored afterward)

photo app.3-8　Final product

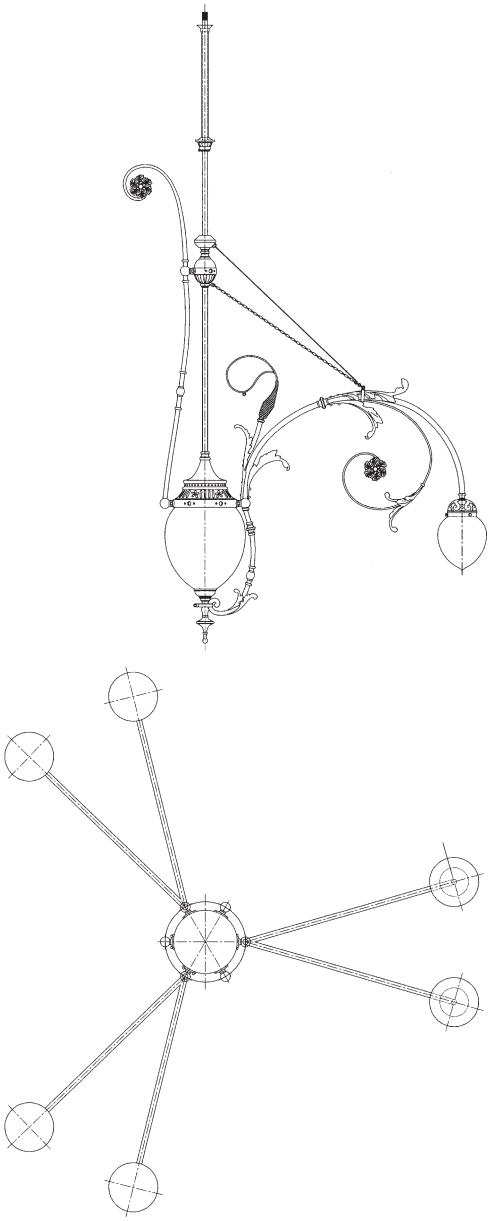


figure app.3-4　Design drawing

Bank of Iwate (Former Morioka Bank) Former Main Office Main Building　1st floor sales room 12-light chandelier

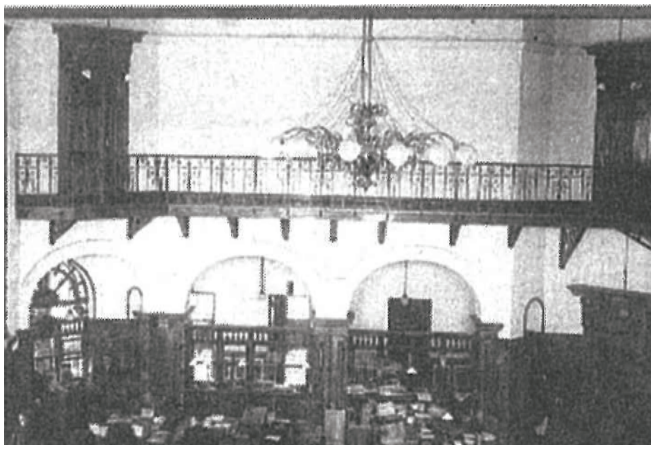


photo app.3-9 Old photo

photo app.3-10 Final product

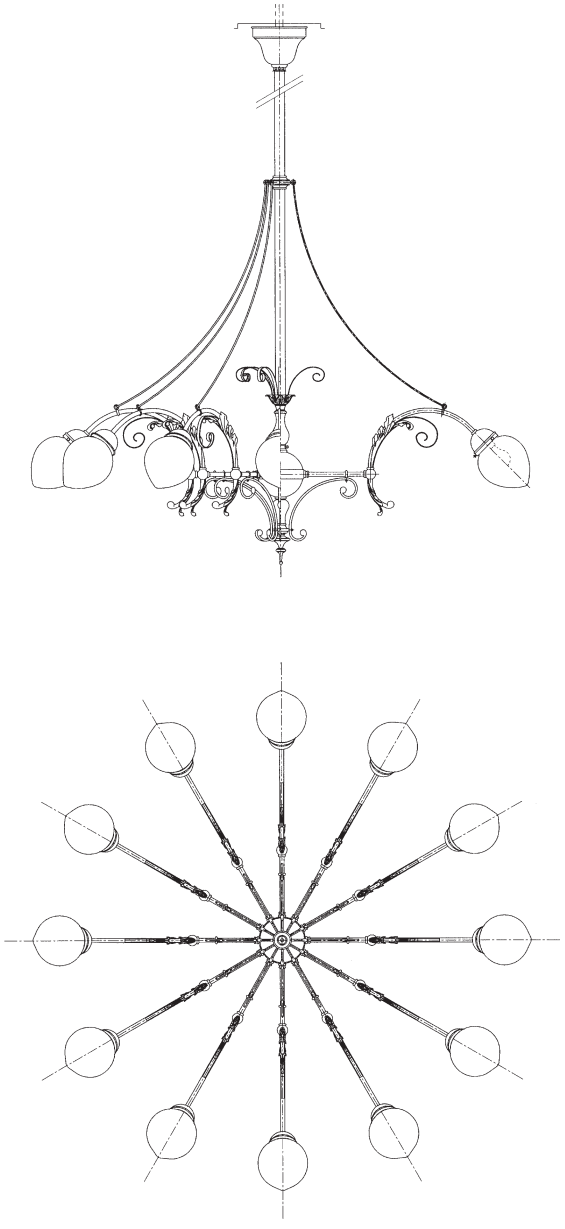


figure app.3-5 Design drawing

Akasaka Prince Classic House (Former Residence of the Yi Imperial Family)　1st floor staircase　chandelier

photo app.3-11　Old photo（collection of The Imperial House Library）

photo app.3-12　Final productphoto taken by：Iwasaki Kazuo）

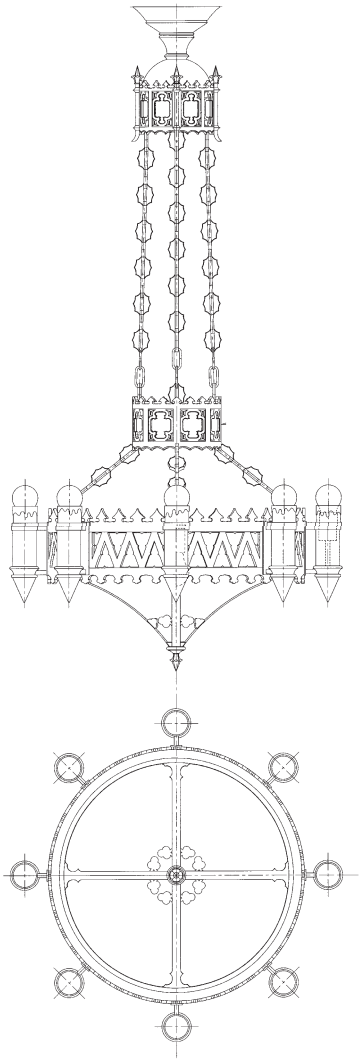


figure app.3-6　Design drawing

Akasaka Prince Classic House (Former Residence of the Yi Imperial Family)　1st floor hall　chandelier

photo app.3-13　Old photo（collection of The Imperial House Library）

photo app.3-14　Final product（photo taken by：Iwasaki Kazuo）

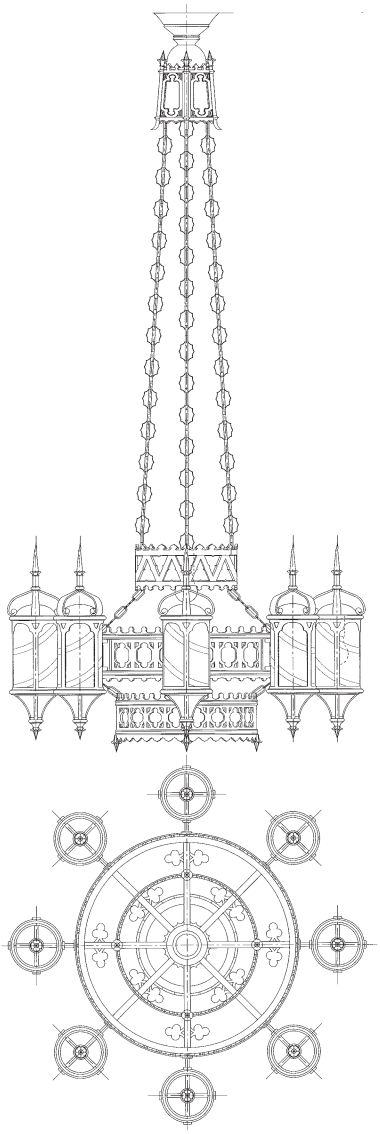


figure app.3-7　Design drawing

Yachiyoza 8-light chandelier

photo app.3-15 Old photo
（photo provided by：Yamaga City Board of Education)

photo app.3-16 Final product
（photo provided by：Yamaga City Board of Education)

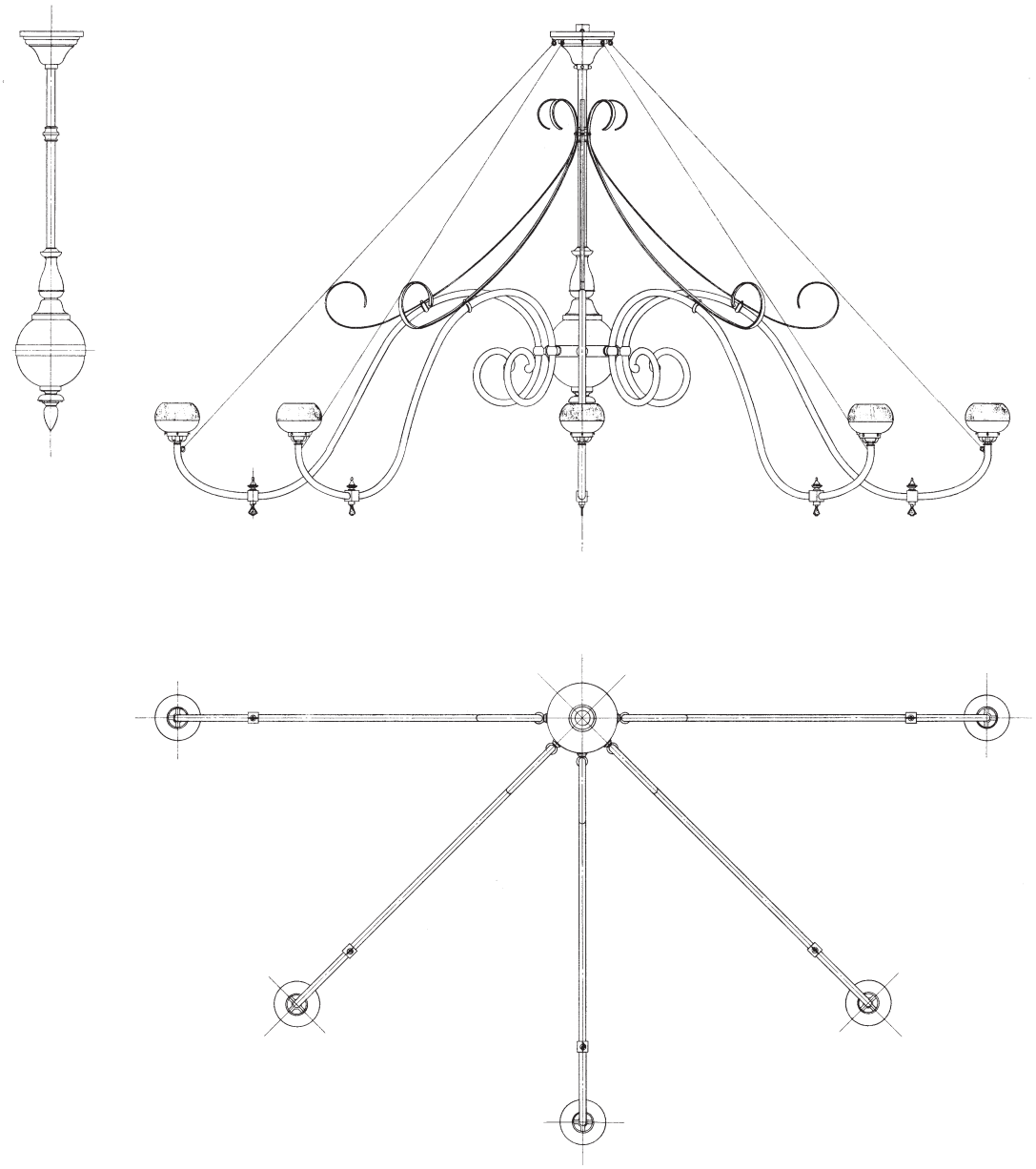


figure app.3-8 Design drawing

Chapter 3

Painting repair of graining in Meiji-mura
- Case study of restoration of No. 25, Nagasaki Foreign Settlement -

Painting repair of graining in Meiji-mura - Case study of restoration of No. 25, Nagasaki Foreign Settlement -

Matsushita Michio
The Museum Meiji-mura

1. Introduction

Wood grain coating (graining) is a painting technique for creating a wood grain pattern consisting of new and old wood. Painting according to this specification has been used in modern Western-style buildings such as cabins, lighthouses, government office buildings, and churches since the early Meiji era[1]. It has been used as a finishing specification for furniture and interiors in Europe and the United States until this day. It is assumed that the purpose of graining is to increase the appearance grade of the base wood by covering its knots or obtain rare granules such as jade granules found in wood from the South Sea and broadleaf trees through coating technology[2].

Of the 64 exhibits that have been relocated to Meiji-mura, four have been restored through graining. In one of them, No. 25, Nagasaki Foreign Settlement, preservation and repair work was conducted from December 2015 to March 2019[3), 4)]. The wood fittings were grained in this repair work. In addition, their surroundings and structures were completely painted. This paper aims to introduce the contents that were repaired through graining in this reparation process and note the problems that have been identified.

2. Outline of the building

Building No. 25 is a wooden Western-style house located at 25 Minamiyamate, the former Nagasaki Foreign Settlement. The building consists of the main building and an annex connected to the rear corner of the main building, both of which are wooden one-story buildings, hipped roofs, and tiled roofs, and the outer walls are clapboard-painted. In the main building, the lean-to veranda rounds the front and both sides of the building, and the eaves girder of the lean-to is supported by an independent pillar. The annex features a high window that opens between the three pillars on the front and a Japanese-style room on the back, with a veranda. The main building was constructed in 1889, and the annex was constructed in 1909. Both these buildings were relocated to Meiji-mura in 1966 (**photo 1**).

The difference in appearance between the main build-

photo 1 Panoramic view of No. 25, Nagasaki Foreign Settlement, after repair completion

ing and the annex mainly appears in the windows. While the sash windows with shutters open on the outer wall of the main building, in the annex, all the windows that open to the outside are sliding windows. Doors and sash windows have basic frames, both inside and outside. Regarding the internal features, besides the Japanese-style room in the annex and the adjacent corridor, in both the main building and the annex, all the rooms have wooden corner beads on the outside corners of the corridor, as well as skirtings or moldings, or both, on the walls. Graining was applied to these fittings and their surroundings, and their internal and external features were painted.

3. Graining repair details

3.1 History until this repair

The entire surface of Building No. 25 was repainted during the relocation and reconstruction process in 1966, and the graining was also newly repainted at this time. No clear survey record has been confirmed regarding the status of the painting during relocation and dismantling [5]. Although the state of the paint at that time is not clear from the old photographs showing the appearance of the place before the relocation (**photo 2**), it seems that some graining remained during dismantling. There is no record of the paint used to reproduce the graining during relocation and reconstruction.

In 1991, the fittings that open to the outside were repainted with wood grain, except for those facing the balcony of the main building. At this time, synthetic resin-blended paint was used for the base, middle, and top coats. The graining method included scraping the paint with a rubber or bamboo spatula after the top coat was painted and before the paint dried.

Before repairing this, the painted wood grain film had peeled off significantly over time, and the exterior graining was noticeably discolored (**photo 8**). The planning of the preservation repairs, including the seismic retrofitting of Building No. 25, as well as the repair of the wooden parts, the roof replacement, and full-scale paint repair, required careful consideration regarding the kind of repairs to be made to the graining part—a major feature of the building.

3.2 Survey

In deciding how to repair the graining part, the following investigation was conducted to understand the residual condition of the coating film in the past.

(1) Peeling survey and rubbing survey

We conducted both a scraping survey and peeling survey on the doors, joinery frames, and baseboards inside and outside the building and confirmed the bottom graining coating film in various places. Various sandpapers were used for the coating film scraping investigation and Neorever, manufactured by Sansaikako Co., Ltd., was used for the chemical peeling investigation. We used both these together to peel off the existing coating film, layer by layer (**photo 3**). However, the investigation was extremely difficult because the coating film surface of each layer was uneven, and the ambient temperature and humidity subtly affected the impact of the release agent. Therefore, we obtained limited information, and the number of finishing layers remaining in various parts of the interior was not uniform. We also found it difficult to accurately calculate the number of times the paint has been repainted.

photo 2 Nagasaki Foreign Settlement before relocation

(2) Microscopic photography of a piece of the paint film

Therefore, we decided to collect a piece of the paint film from the exterior—which is assumed to have been repainted repeatedly—and thereby estimate the maximum number of repaints that could have occurred. A cross-sectional photograph was taken by collecting a piece of the paint film from the siding of the shutter facing the balcony of the main building, which is estimated to have a small degree of damage to the paint film due to scraping during past paint repairs (**photo 4**) [6].

From the cross-sectional photograph of the coating film piece taken from the shutter, it was considered that there were at least five finishing layers below the green-gray coating film during relocation and dismantling. Owing to the number of paint films on the shutters, it was calculated that there should have been a maximum of four paint repairs from the time the main building was built to the time of its relocation and dismantling. However, there is insufficient evidence to apply this calculation to the number of repaints of the interior. Therefore, it was not possible to reference the number of coating layers of grained parts inside the main building to determine when the first layer of graining film was added. Nevertheless, probably, its application dates back to the Meiji period, close to the time of construction.

(3) A presentation of the base graining

The base wood grain finish found during the scraping and peeling process was likened to various coniferous trees, such as cedarwood trees. Various such figured grains were painted in separate locations. In the main building, rare coniferous figured grain, including medium figured grain and bamboo figured grain, were paint-

photo 3 Main building No. 4 room door peeling investigation status

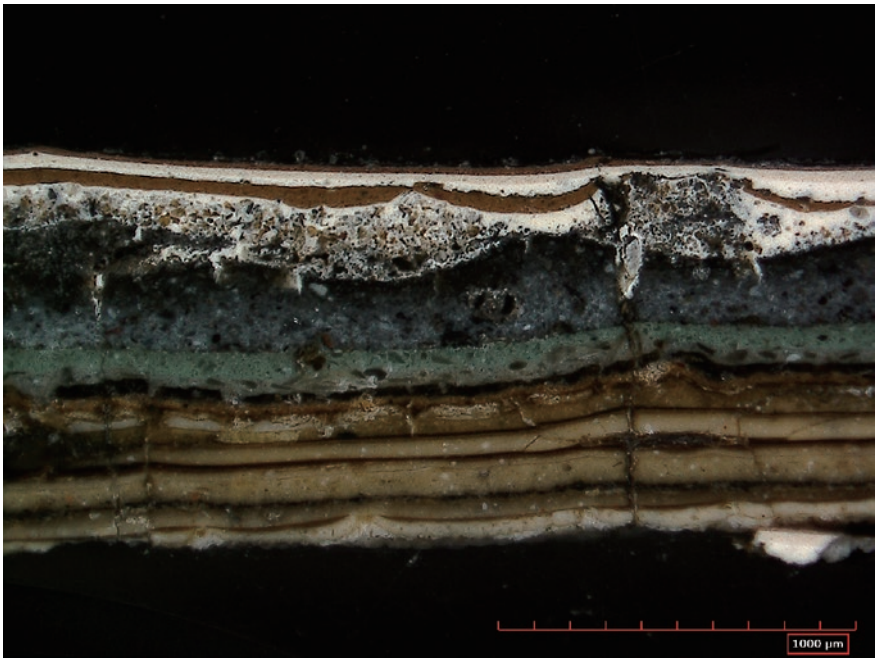


photo 4 Main building veranda shutter paint film cross-section photo (phographed by Tokyo Metropolitan Industrial Technology Research Institute)

ed on the panel board of each door, and eyeball figured grain was used for the figured grain. We can also see the basic regularity of the door stiles, door and window frames, picture frames, skirts, etc., which are coated with fine grain (**photos 5–7**). However, as seen in the annex building, fine, straight lines similar to baseboards were drawn on the panel boards of the doors. Thus, there was a clear difference between the main building and the annex regarding the depiction and classification of the figured grain in the various parts of the doors.

3.3 Repair method

As mentioned above, the depiction of the figured grain on the bottom graining, which was discovered around the door of the main building and is assumed to date back to the Meiji era, was extremely interesting. However, the scraping and peeling investigation process led to the judgment that it would be difficult to make the bottom finish coating film appear to be in good condition even if the peeling range was widened. In addition, some of the fittings were manufactured during relocation and reconstruction.

Considering these circumstances and the fact that the building should function as an exhibition building in a museum, the repair methods for the graining parts were selected as follows. In most cases, where it was difficult to show and preserve the lower coating film, a new coating was applied to mimic the appearance of the lower coating film. Should the lower coating film have been found in good condition during the investigation, it would be preserved and used for the exhibition. Further, to show the history of the paint repairs since the relocation, a part of the room was set up to

photo 5 Bottom graining-eyeball figured grain (Main building No. 4 room door middle stile)

photo 6 Bottom graining-bamboo figured grain (Main building No. 4 room door endplate)

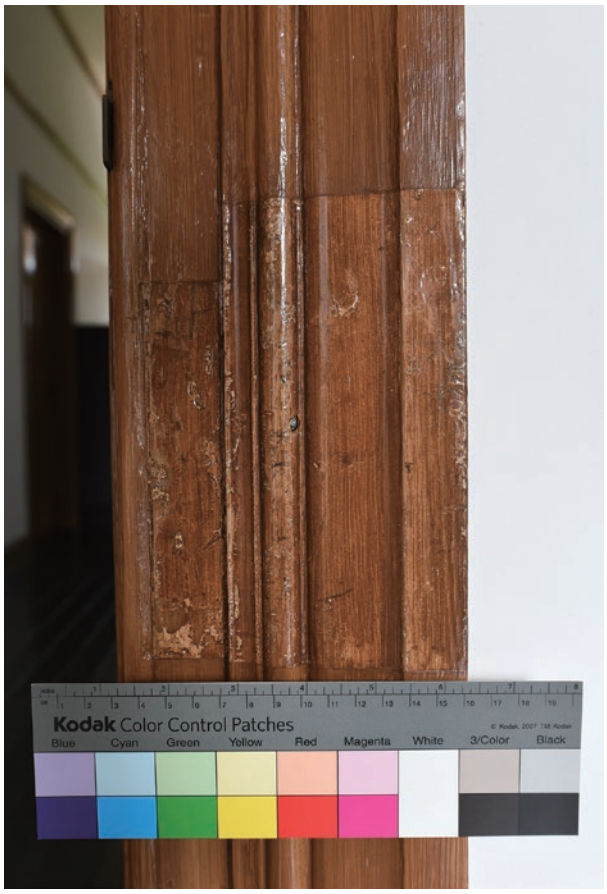


photo 7 Bottom graining-straight grain (Main building No. 4 room door frame)

retain the graining reproduced during relocation and reconstruction, as well as the graining added after the relocation.

Figure 1 shows the specifications of graining on the doors and windows of the main building and annex. The reproduction of the graining was based on the description of the lowest graining found in the main building and the annex. In other words, it was divided into two parts: grain reproduction by stainless steel comb and medium grain reproduction by fine brush, brush, and comb.

Thus, the quality of the interior and exterior space originally composed of woodgrain coating is reproduced with high accuracy (**photos 8–13**).

3.4 Techniques and materials for performing repairs

Table 1 and **photos 14–29** show the materials and processes used in the graining work range in this repair work. The reproduced color tone was determined by making several prototypes based on the discovered woodgrain coating film and adjusting the color tone.

Taking the graining of the main building door where medium figured grain is painted on the panel board as an example, the main points of the painting process are summarized as follows (**photos 14–26**): (1) sander scraping; (2) base material adjustment by keeping put-

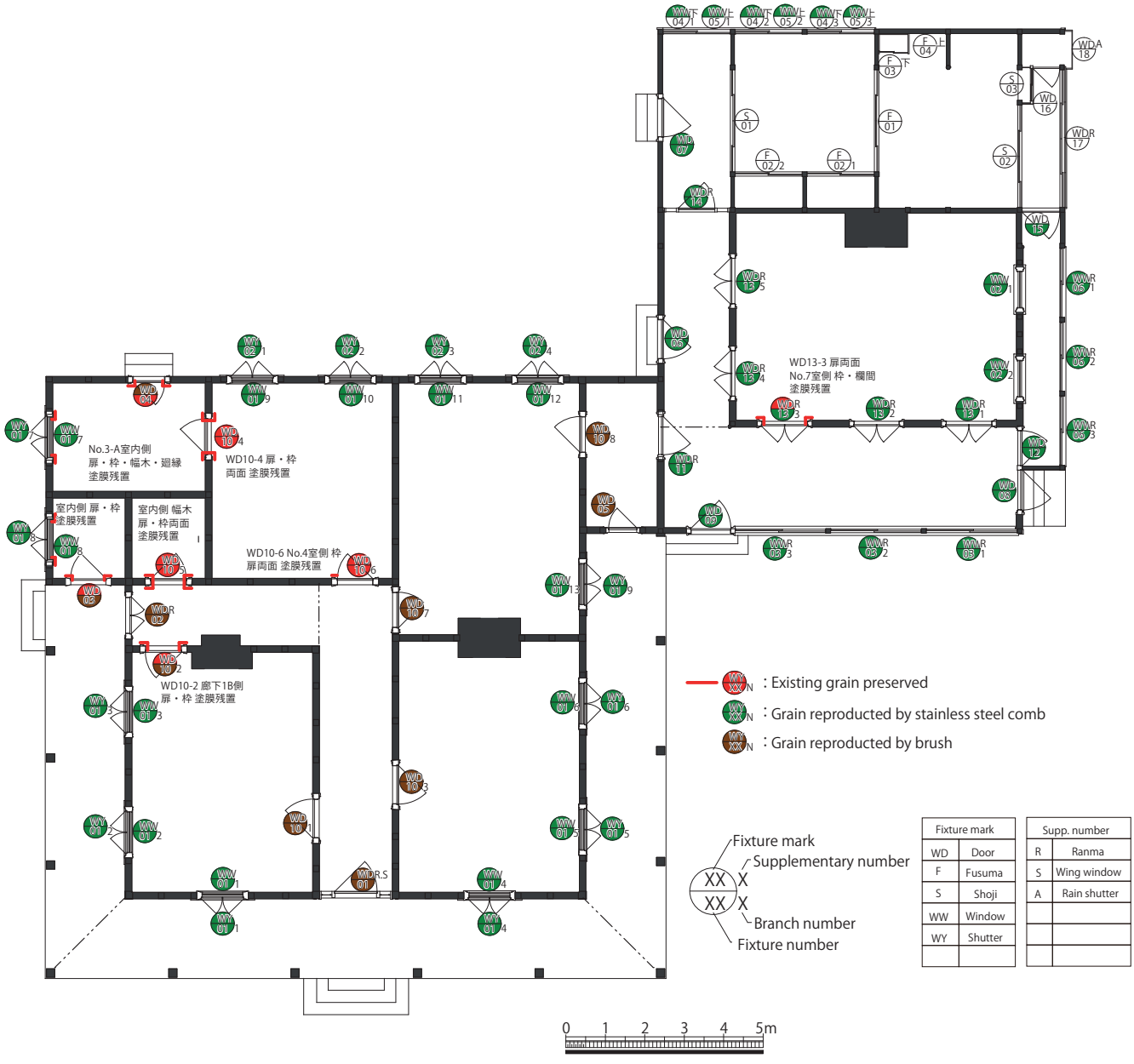


figure 1　Graining implementation specifications

photo 8　Main building front door (before repair)

photo 9　Main building front door (after repair)

photo 10　Annex No. 7 room (after repair)

photo 11　Main building No. 2 room (after repair)

photo 12 Main building corridor 1-A (after repair)

photo 13 Main building shutter (after repair)

photo 14 Graining process ① sander scraping

photo 15 Graining process ②③ sealer coating and undercoating

table 1: Materials and processes used for graining

Process		Name of material used Manufacturer : Nippon Paint Holdings	Thinner Dilution ratio	Standard coating weight (kg /㎡ /cycle)	Interval between coats(23℃)	Number of Coats	Coating method
1	Underground adjustment	Remove fragile paint film with sandpaper, electric sander, etc.					
2	Sealer coating	Fine Penetrating Sealer・Clear	Thinner A 5 ～ 10%	0.16 ～ 0.20	4 hours or more Within 7 days	1	Brush Wool roller
3	Undercoat	Nippe Ken Ace G-II	Paint Thinner A 0 ～ 7%	0.13 ～ 0.15	2 hours or more	1	Brush Wool roller
4	Middle coating (base coating)	Nippe Ken Ace G-II	Paint Thinner A 0 ～ 7%	0.13 ～ 0.15	2 hours or more	1	Brush Wool roller
5	Putty gutter	Polyester Putty	—	—	—	As appropriate	Spatula, etc.
6	Overcoat (wood grain coating)	Water-Based Ken Ace	—	—	2 hours or more	2	Brush, combs, etc.
7	Finishing	Fine Urethane U100 for Wood, Clear	Paint Thinner A 5 ～ 10%	0.09 ～ 0.13	2 hours or more	2	Brush Wool roller

photo 16 Graining process ④ intermediate coating

photo 17 Graining process ⑤ putty application

photo 18 Graining process (medium figured grain) ⑥ -1 panel board medium figured grain marking

photo 20 Graining process (medium figured grain) ⑥ -3 panel board medium figured grain-2

photo 19 Graining process (medium figured grain) ⑥ -2 panel board medium figured grain-1

photo 21 Graining process (medium figured grain) ⑥ -4 panel board medium figured grain-3

photo 22 Graining process (medium figured grain) ⑥ -5 panel board straight grain brush pulling

photo 23　Graining process ⑥ -6 panel board brush blur

photo 24　Graining process ⑦ clear finish

photo 25　Brush for medium figured grain

photo 26　Large brush for blurring

photo 27　Graining process (straight grain) combing

photo 28　Graining process (straight grain) brushing

photo 29　Brush and comb for straight grain

photo 30 Graining completed - door

photo 31 Graining completed (medium figured gain) - panel board

ty; (3) apply sealer and undercoat; (4) apply an intermediate coat of the base color of the wood grain (corresponding to the old wood) with a light gradation from the center to the periphery; (5) for wood grain (corresponding to newer wood material), use an extremely thin brush such as a lacquer brush in the part near the center and paint the wood grain repeatedly, based on the draft drawing that was transferred from the sample board; (6) apply a top coat, scrape off the top coat' s excess paint with a fine-grained comb, and draw the grain; (7) lightly stroke over it with a long-haired brush to give fine brush marks and express the texture of the skin of wood; (8) apply clear paint.

Omit step (5) above for the graining applied to the top and bottom of the door, stile, window sill, fitting frame, skirt, molding, etc. In other words, after drying the intermediate coating film as the foundation, the top coating should be applied, straight lines should be drawn with stainless steel combs, and appropriate undulating expressions are to be added (**Photos 27–29**).

photo 32 Graining completed (straight grain) - center rail

From the above, it can be verified that the restoration of the graining of the plank and the drawing of the grain required more steps than drawing the fine grain. From this perspective, notably, the graining, which depicts the grain of the wood, was not found in the lower layer of the annex, which dates back to the building's foundation, indicating a change in the way of thinking about the depiction classification of graining.

Further, even within the range of grain coating, for example, when components with different directions, such as the door stile and upper and lower stiles, come into contact, one of the woodgrain coatings must be completely dry. It is clearly necessary to consider in the process. We consider it an achievement that incidentally, we could learn about the various elements that

make up this technique by trying to restore the range finished by graining completely.

4. Summary and future issues

The proposition in the repair work of buildings in the Meiji-mura is how to understand and improve the value of buildings, while the definition of "exhibition buildings" is ambiguous. The selection of repair methods for graining in the reparation process of Building No. 25 is intended to answer this proposition. Through this repair work, it was revealed that Building No. 25 was a highly accurate example of woodgrain painting introduced into Western-style architecture in the Meiji era. However, the original graining film, which would normally appear in a wider range, appears only on a considerably small scale due to the limitations of peeling technology.

Therefore, in this repair, we decided to reproduce the woodgrain depiction of each part faithfully and aimed to restore the wood grained parts that would have been applied during the construction of the building. However, the discovered graining did not provide sufficient information about the paint, tools, and techniques used to restore the graining rigorously. At every stage, we considered our construction ability and selected only materials and tools currently available to us. While fully aware of the imperfections of the restoration, we believe that the quality of the space composed of the resulting graining was as close as possible to the space with which this building would have been originally equipped.

When considering the restoration of the graining, the following matters that needed consideration came to light during the repair process:

(1) Determining paints, construction methods, and tools: Regardless of the residual status of graining during construction, which can be used as materials, it is necessary to consider the current availability and actual workability, as well as decide which materials, tools, and construction methods to use.

(2) Guarantee of depiction skill: It is desirable to know about wood when drawing wood grain. Therefore, close communication between the painter and the restoration architect is required for the depiction of wood.

(3) Systems capable of mass production: To restore the high-definition graining found in Building No. 25 to numerous parts as a repair, it is necessary to achieve both the delicacy of the depiction through artisans and mass production.

The restoration architect will have the responsibility to find the optimum solution that can be realized from the above conditions while maintaining a clear idea of what the building should be after being repaired

Notes

1. Regarding examples of graining in cultural properties during the Meiji era, those related to the Ministry of Industry Lighthouse Dormitory, such as Meiji-maru—a lighthouse inspection ship of the Ministry of Industry—Former Tsurushima Lighthouse Keeper's Residence, and Former Kashinosaki Lighthouse Keeper's Residence are well known (Bibliography 2–3, 8).
2. Bibliography 4
3. A nationally registered tangible cultural property (building). Meiji-mura number 25, Nagasaki Foreign Settlement Main Building (1 building), and the Annex Building (one building) are registered as two cases. In this paper, the two cases are collectively referred to as Building No. 25. Regarding the preservation repair conducted this time, the repair work report has already been published (Bibliography 1).
4. Among the other buildings in Meiji-mura, graining was known to have been used in the Official Abode of Sugashima Lighthouse (1873), Mie Prefectural Office (1879), and Higashi-Yamanashi District Office (1885), all of which are designated as national Important Cultural Properties. All paints, including graining, have been repaired when they were relocated to Meiji-mura or after the relocation (Bibliography 5–7, 9).
5. The relocation/sale of Building No. 25 to Meiji-mura was decided in April 1966, and the reconstruction work was completed at Meiji-mura in December of the same year. No report on relocation work has been published.
6. The filming was outsourced to the Tokyo Metropolitan Industrial Technology Research Institute. An optical microscope (KH-8700, a digital microscope manufactured by Hi-Lock Co., Ltd.) was used for photography.

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—展示建造物の塗装復原の現状と課題—、未来につなぐ人類の技 12
近代建築に使用されている油性塗料、東京文化財研究所、2013.3

Chapter 4

Case study on conservation and restoration of internal features

Case study on conservation and restoration of internal features

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1. Introduction

In this study, we mainly surveyed the preservation and restoration of the structure inside the western style house. We investigated the treatment of internal features based on the report of each building. We asked the owner, manager, or person in charge of design supervision to accompany the team and conduct an interview survey on-site regarding cultural properties that have undergone distinctive restorations. We also investigated the kind of circumstances that led to the current reparation and focused on introducing them collectively. For various reasons, this report, however, mainly collects and introduces the descriptions of each property in the report.

2. Restoration of Internal Features

A wide range of internal fixtures and numerous things are in need of restorations, including the following:

Ceiling: Center decoration of celling
Walls: Plastered walls and wallpapers made of various materials
Floor: Wooden floors, such as parquet, carpet, linoleum, tile, etc.
Window elements: Curtains, shutters, etc.
Lighting equipment: Chandeliers, pendants, brackets, etc.
Joinery: Various doors, window frames, etc.
Heating equipment: Fireplace, heater, etc.

In the early Meiji era, many imported products were used, and many of them are closely related to daily life. Therefore, some have been replaced due to dirt or malfuction or have been functionally disabled and removed. The restoration report of the building indicates that each site is struggling to clarify the original specifications while devising their own ideas. Among the items introduced this time, it is difficult to clarify the specifications of wallpaper, floor finishes, curtains, lighting equipment, etc. At many sites, they try to decipher the specifications from the original specifications, design documents or blueprints, old photographs, or delivery records. If the actual item remains, it is normal to restoration and reuse it, but if it does not remain, it is the site's discretion to decide the next course of action, but that is the beginning of the challenges. You read the specifications from old photographs and design documents. However, it is not easy to decide the specifications, such as knowing the pattern but not the color or knowing the design of the lighting equipment but not the specific dimensions. Further, there are many cases in the history of buildings that have been modified from their original use, and there are also cases of what action to take in such cases. In many cases, before restoration work, the conservation and maintenance committee or the conservation and utilization committee should decide the target period to restore. Therefore, at the site, it is necessary to carefully observe each part during dismantling, find traces of the time, and read why this is the case. After such investigation, the target specifications at that time are estimated, and restorations are conducted according to them.

When we heard about the on-site restorations of internal features, the most striking aspect was the shortage of restoration technicians. For example, there were cases as follows:

- As for the ceiling decoration, many restorations are conducted to disassemble it so that it will not be broken when dismantling. This is because there are

insufficient artisans who can reproduce the central decoration of the time with plastering. In reality, the central decoration is also covered with dirt, which causes the edges of the decoration to become dull and the overall impression to be vague. However, there are many cases where the topcoat paint has been carefully removed. Alternatively, it cannot be repaired with plaster, and it is sometimes reproduced with plaster after taking a mold.

- As for lighting equipment, it was difficult to find an artisan who would repair it if there was existing equipment that needed repair.
- Even if the shutter installed on the window is malfunctioning, the contractor is already out of business and cannot handle it; therefore, they ask a person from the ironworks in the city to repair it.

Although we can still repair it now, we are afraid that it will get tougher in the future.

Although we have read many reports this time, we did not consider that the description content was different depending on the site. It is considerably interesting, but it may not have been the main description target as a whole. Of course, there are on-site reports that keep detailed records, but most of them were fairly simple. Further, in the restoration work a while ago, there were many specifications to restore the original shape. However, while most of the restoration work in the past was conducted to restore the original form, in the newer cases, there were instances where the original specifications were slightly altered considering the future use of the property. This is a reminder that the world of repairing cultural properties is changing. As more cultural properties are used in our daily lives, such as Tokyo Station and the Mitsukoshi Nihombashi Department Store, which were designated as important cultural properties, more repairs will likely be conducted in a utilization-oriented manner that considers the customer while protecting the building.

This report mainly introduces the projects that seem to have some characteristics even in the investigation. We would appreciate it if you could refer to these cases when there are similar projects in the future.

1. Former Nippon Yusen Otaru Branch

Name of building：Former Nippon Yusen Otaru Branch
Location：Otaru City, Hokkaido
Owner / Administrator：Otaru City
Date of Designation:：12 March 1969
Designated Category：Important Cultural Property
Era of Construction：Meiji
Classification 1：Structures
Classification 2：commercial and bussiness facility

Case study on conservation and restoration of internal features

① About the wallpaper of the Honored Guest Room and the conference room on the 2nd floor

As a result of a survey conducted before the preservation and restoration work carried out from 1984 to 1987, about half of the wallpaper of the Honored Guest Room on the second floor had been replaced or repaired. As for the conference room, the east side was completely replaced. Regarding the wallpaper, it was confirmed that it was Gold-embossed wallpaper "Kinkara-kawashi" [*1] during the preliminary investigation work, and the manufacturing method is also being investigated. This time, we conducted a paint analysis and confirmed it during the production. Regarding the Honored Guest Room, we created woodblocks based on the current wallpaper, renewed the wallpaper, and partially restored it. In the situation where the water leakage did not stop after that, the deterioration of the wallpaper did not stop even after the previous repair, and the peeling was progressing newly.

Regarding the conference room, the east side that had been replaced was once removed and then reattached.

photo　Inside the Honored Guest Room

photo　Wallpaper that is currently peeling off

② About the ceiling paper

As a result of the investigation of the ceiling paper and the wallpaper, oil-based and water-based paints were applied, and the original colorful color tone was lost. The paper itself was also seen to be stuffy and cracked due to the shrinkage of the paint.

In this construction, the salesroom, branch manager's room, and reception room were restored by removing the auxiliary paint, coloring them with watercolors, taking pictures for printing, and offset printing to create ceiling paper. Currently, the ceiling paper has deteriorated again.

photo　Deteriorated ceiling paper in the sales room

③ About lighting equipment

Of the 25 chandeliers/pipe pendants in total, 13 remained, but most of them were converted to fluorescent lights. The details are as follows.

- 2nd floor Honored Guest Room, three chandeliers (initial product) 2 units
- 2nd floor meeting room, 4-light-chandelier (second-hand goods, Taisho era?)

・Book room on the 2nd floor, 2-light-chandelier in the 2nd reception room (initial product)
・Pipe pendant (initial product)

These are restored after being dismantled and maintained.

The 2nd floor dining room, 1st floor branch manager's room, 1st reception room, salesroom, and other missing parts were estimated and maintained from photographs and traces of the site.

photo　Meeting room Chandelier（initial product）

photo　Honored Guest Room Chandelier (initial product)

photo　Lighting equipments in the branch manager's room (restored based on old photographs; the same applies to the first reception room)

④ Around the window

In this repair, there were almost no curtains left around the windows, but most of the rods and boxes for the curtains remained; therefore, restoration is done based on old photographs. In addition, although a steel shutter was installed, the lower part of the guide rail was corroded due to salt damage, and the operation chain and gears were missing; thus, it did not work. Therefore, it was disassembled and maintained, and the missing parts were replenished. Some shutters are now inoperable again.

photo　2nd floor Honored Guest Room- Restored curtains and wallpaper

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Footnote

1. Varnish coated tin--embossed wall paper

2. Former Ikeda Family Western-style House

Name of building：Former Ikeda Family Western-style house
Location：Daisen City, Akita
Owner / Administrator：Daisen City
Date of Designation:：28 November 2017
Designated Category：Important Cultural Property
Era of Construction：Taisho
Classification 1：Structures
Classification 2：Residence

Case study on conservation and restoration of internal features

① About the old plaster ceiling

The walls and ceiling of the room were all finished with plaster on the concrete base, and the staircase ceiling was painted with plaster on the stucco surface. For the ceiling and bellows plastering, restoration was conducted for damaged parts such as peeling and cracks.

The central decoration of the ceiling was significantly disassembled and restored after the foundation was repaired. The area around the center decoration that connects with the existing plaster (the surrounding flat ceiling) is finished by exposing each layer of the undercoat, middle coat, and top coat to prevent cracks and plastering each layer.

Regarding the bellows, we drew a full-scale drawing based on the existing bellows, created a drawing mold, and restored damaged parts such as debonding and cracks. At that time, the paint applied in the later generations was cleaned, and the paint film was completely removed.

photo Central decoration and ceiling in the billiard room, 1st floor

photo Central decoration in the dining room/ music room, 1st floor

photo Central decoration in the reading room, 1st floor

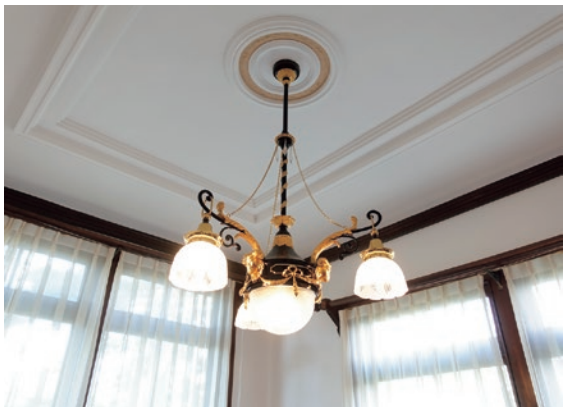

photo Central decoration in the reading room, 2nd floor

② About wallpaper

The wallpaper was applied to the dining room/ music room (wall) on the 1st floor, the reading room (wall), the billiard room (wall), the dining room (wall) on the 2nd floor, and the reading room (wall/ceiling). Both were Gold-embossed wallpaper "Kinkara-kawashi" [*1]. Most of them were exfoliated and faded. In the restoration work completed in 2010, the wallpapers of the dining and music rooms on the 1st floor and the dining room on the 2nd floor were restored.

The Gold-embossed wallpaper "Kinkara-kawashi" [*1], in this case, had spare wallpaper rolls stored in each of the five rooms (six types) used, and it was found in considerably good condition; therefore, it was a good material to know the specifications at that time.

In addition, it was confirmed that the Gold-embossed wallpaper "Kinkara-kawashi" [*1] in the dining and music rooms on the 1st floor was a design registered with the Japan Patent Office and a spare roll, and a woodblock roll could be created based on the design. The dining room on the 2nd floor is used because it was found to be a woodblock roll in the “Paper Museum” (Kita-ku, Tokyo) (same lot number).

photo Restored wallpaper in dining room/music room, 1st floor

photo Printing block of the dining room / music room, 1st floorm, as exhibit

photo Exhibition about wallpaper in the dining room, 2nd floor

③ About carpets and linoleum

Linoleum remained under the carpet in the billiard, and the engraving on the back indicated that a product made by Toyo Linoleum was used. Further, based on the results of a detailed examination of the floorboards of each room, the specifications of each room are determined, and carpets, linoleum floors, or floorboards are determined and constructed.

photo Floorboard in billiard room, 1st floor

④ About lighting equipment in the hall

In the main building, the building itself had been left without modification or diversion; therefore, almost all the rooms were left with the original lighting equipments damaged. Thus, during the restoration work, all the valuable lighting equipments that remained were reused and repaired. As the outdoor light on the 1st-floor entrance and the garden light on the balcony on the 2nd floor were missing, the drawings were created from the original photographs and restored.

For details on lighting equipment, see the previous photo.

⑤ Curtains

For each room in the western style house, the curtain fabric did not exist, and the color and design could not be confirmed. Further, metal fittings to stop the roll blinds were confirmed on the windows of each room. Therefore, roll blinds are installed in the dining room/music room on the 1st floor and the room where the wallpaper of the dining room on the 2nd floor is restored. As for the curtains, the lace curtains have

been renewed in the reading room on the 1st and 2nd floors, the dining room/music room on the 1st floor, the billiard room, and the dining room on the 2nd floor. In addition, thick blackout curtains have been added to the dining room/music room on the 1st floor and the dining room on the 2nd floor to cure the restored wallpaper (Gold-embossed wallpaper "Kinkara-kawashi" [*1]).

photo　Interior, dining room / music room, 1st floor

photo　Interior, dining room, 2nd floor

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Footnote

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3. Yamagata Former Prefectural Office

Name of building：Yamagata Former Prefectural Office and Assembly Building
Location：Yamagata City, Yamagata
Owner / Administrator：Yamagata City
Date of Designation:：28 December 1984
Designated Category：Important Cultural Property
Era of Construction：Taisho
Classification 1：Structures
Classification 2：Public facility

Case study on conservation and restoration of internal features

The contents of the current status change notification related to internal features are as follows.

- The ceilings of the "Central staircase ," the 3rd floor of the South Building and the East Building, have been restored to the stucco ceilings and decorative plaster ceilings. In addition, the interior and lighting equipment were restored and maintained.
- The carpet was restored in the "Interior Minister Room," "Main Hall," "Honored Guest Room," "Governor's Secretariat Office," "County Mayor Waiting Room," and "Police Director Office." "High Government Cafeteria" has been restored to parquet. A patterned vinyl chloride sheet was installed in the corridor on the 3rd floor.
- The missing curtain devices and the curtains in the "Main Hall" and "Police Director Office" were restored, and maintained, and the roller blinds in each room were restored.

Details are described for each below.

① Restoration of plaster ceiling (decorative plaster ceiling)

The ceiling Central staircase of each room on the 3rd floor of the Central staircase, South Building, and East Building were restored as follows.

The Central staircase was board ceiling, partly plastered ceiling, but it will be restored to frame ceiling, each coffer plastered.

Most specifications before the repair of the ceilings of each room in the south and east buildings are mainly "board ceilings," and depending on the room, plywood or cross-covered parts are attached to the four corners of the wall. However, it was revealed by traces left behind the ceiling, plaster fragments found under the floor and in the front yard of the prefectural office, and old photographs such as "Ou Rengo Co-Promotion Society Photobook" and "Yamaguchi Photo Studio Photobook." Therefore, based on them, it was restored to the frame plaster ceiling or decorative ceiling during dismantling and repair that started in 1987. Details are given below.

Restored details (Documents for the basis of restoration)

- "Interior Minister Room"
  Plaster ceiling with center decoration (Initial drawings, old photographs)
- "General Affairs Section"
  Frame ceiling（Traces of nails and nails that remain on the large and surrounding edges）
- "General Affairs Section Manager's Office
  Frame ceiling（same as above）
- "Main Hall"
  3-units Stucco ceiling, with center decoration (Installation marks of the hut beam mask, template remaining on the underside of the land beam, old photographs, etc.）
- "Honored Guest Room"
  Plaster ceiling with center decoration（Traces of nails left on the support material, stucco pieces found under the floor, drawings, old photographs, etc.）
- "Governor's office"
  Plaster ceiling with center decoration（plaster left on the wall, nail marks, old photographs, drawings, etc.）
- "Governor's reception room"
  Plaster mirror ceiling（Part of the plaster pieces that remains behind the ceiling, nail marks, and similar design on the 2nd floor corridor ceiling）
- "High Government Cafeteria"
  Coffered ceiling with plastered between each coffer（Stop nail marks, templates, etc., that remain on large edges）
- "County Mayor Waiting Room"
  Plaster mirror ceiling（plaster molding of wall parting, part of the surrounding edge that remains

behind the ceiling, existing hanging wood, etc.)

・"Police Director Office"

Plaster ceiling with center decoration (Stop nail marks, old photographs, drawings, etc.)

photo P;aster ceiling in the" honored guest room"

photo Plaster ceiling in the "governor's office"

photo Plaster ceiling in the "high government cafeteria"

② Floor finish of each room

There were various specifications before restoration, such as linoleum floor, vinyl sheet floor, carpet floor, and some carpet type P tiles. However, as a result of dismantling, nail holes for carpeting were found in the parquet and floorboards at that time from under the linoleum base plywood. Further, we could confirm the state and pattern of carpeting from old photographs and literature at that time. The floor finishes found are detailed below.

Restored details(Document for the basis of restoration)

・"Interior Minister Room, Main Hall", "Honored Guest Room", "Governor's Secretariat Office", "Police Director Office"

Central carpet, representing parquet around the wall (Original carpet marks, old photographs, literature, etc.)

・"High Government Cafeteria"

Parquet (The original parquet still exists under the linoleum floor)

・"County Mayor Waiting Room"

Carpet (The original carpet nail marks remain on the floorboard)

・"Central staircase"

Stairs, landing, 3rd floor stairs room carpet (same as above) (same as above)

・"3rd floor corridor"

Linoleum line (The original linoleum nail marks remain on the floorboard, and it was found to be bordered by old photographs)

Moreover, regarding the "general affairs section room," "general affairs section manager's room," "governor's reception room," "entrance hall," "corridor on the second floor," and "third reception room," a survey of the current situation at each location was conducted. It revealed that it was linoleum-clad from the nail marks of linoleum-clad, design documents for construction, quotations, and old photographs, so it has been restored to linoleum-clad. At that time, as discussed in the restoration work of the Kenkai Gijido, the linoleum was changed considering how to use it. In addition, regarding the "3rd floor corridor," as many visitors may pass by, considering the ease of walking, a border is printed on a vinyl chloride sheet that does not roll up to make a line. On both sides, the floorboard is originally exposed, but a plain different color sheet is stretched to eliminate the step and restore it.

photo　Central carpet of the main hall

photo　main hall parquet

③ Wallpaper of each room

Each room before the repair was pasted with a cloth or vinyl cloth, but traces indicated that it was pasted with paper at the beginning; therefore, it has been restored as follows.

Restored details (Document for the basis of restoration)

- "Interior Minister Room", "Main Hall, "Honored Guest Room", "Governor's office", "High Government Cafeteria"
  Paper pasting
- "County Mayor Waiting Room"
  Wood slide base, Japanese paper underlay, and top paste（Fragments that remain, literature, old photographs, etc.）
- "Governor's Secretariat Office"
  Wood slide base, Japanese paper underlay, and top paste（references and old photographs）

photo　Restored wallpaper of the governor's office

photo　Exhibition of old wallpapers left in the governor's office

④ Curtain device and curtains in each room

Before the repair, the curtains and curtain devices were lost in many rooms, and only a part of them remained in a few rooms.

This time, the curtain device and curtains have been restored based on old photographs and literature. However, regarding the fissure, there is no specific description in the design documents at that time. Thus, in this repair, the unit price per room is known. Therefore, based on that, we the rooms were ranked considering the character of each room and the hanging form of the curtains and selected the following fissures while referring to the construction examples of the Former Prefectural Assembly Building.

This was divided into the three groups: (1) "Governor's Secretariat Office," "High Government Cafeteria,"

and “County Mayor Waiting Room”; (2) “Main Hall” and “Honored Guest Room”; (3) “Governor’s Office,” “Interior Minister Room,” and “Police Director Office.” The number of warp and weft threads and the amount of driving were then changed. Regarding the color, according to old photographs, the curtains of “Main Hall” and “Governor’s Office” were only found to be dark. Thus, red and green colors were used.

Further, as it is known that roll blinds were attached to each room based on old photographs, documents, installation marks, etc., only the designated room has been restored.

photo　Restored curtains in the “governor’s office”

photo　Restored curtains in the “honored guest room”

⑤ Lighting equipment in each room

Before the repair, most of the rooms were equipped with fluorescent lights, but the lighting equipment has also been restored based on old photographs, literature, installation marks, and wiring marks.

A restoration model was made based on the old photographs, and when it was actually installed in the room, it was compared with the old photographs. When adjusting the details while verifying how it looked, the shape of the lighting equipment to be restored was decided.

photo　Restored chandelier in the “main hall”

photo　Restored chandelier in the “honored guest room”

photo　Restored chandelier in the “police director office”

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1. 重要文化財 山形県旧県庁舎及び県会議事堂保存修理工事報告書２ 旧県庁舎編　平成７年 12 月　山形県

4. Yamagata Former Prefectural Assembly Building

Name of building：Yamagata Former Prefectural Office and Assembly Building
Location：Yamagata City, Yamagata
Owner / Administrator：Yamagata City
Date of Designation:：28 December 1984
Designated Category：Important Cultural Property
Era of Construction：Taisho
Classification 1：Structures
Classification 2：Public facility

Case study on conservation and restoration of internal features

Historical transition of Former Prefectural Assembly Building

The Former Yamagata Prefectural Assembly Building has undergone the following modifications due to changes in usage, and the interior has changed significantly. As it was built in 1916, the assembly hall was remodeled for the office in 1930, and the interior has changed considerably. Subsequently, as a result of examining the use of the former prefectural office site in Yamagata Prefecture, the former prefectural office building and the Former Prefectural Assembly Building will be preserved and utilized to become the "Yamagata Prefectural History Museum." Afterward, it was tentatively used as a joint government building of local organizations such as the Prefectural Southeastern Mountain Village Regional Office. After being designated as a tangible cultural property by the prefecture, it became an Important Cultural Property designated by the country. During that time, the assembly hall was divided into small rooms and became offices, and other major changes were made. After the building was designated as an Important Cultural Property, the prefecture established a restoration review committee for the former prefectural office and began studying how to utilize it. Consequently, the prefecture formulated a concrete plan to preserve and restore the building and utilize it as a future Yamagata Prefectural Folk Museum. Based on it, we conducted semi-demolition survey work from 1986 to 1988 and restoration work from 1988 to 1989.

Cases related to internal features

As mentioned above, the Former Prefectural Assembly Building was extensively modified for the office; therefore, the chamber has been modified as follows.

- Originally, it was a three-corridor flat hall with a vault ceiling in the assembly hall. However, due to remodeling, it was removed along with the podium/side platform, the balcony on the south side, the door, and the pediment on the door. Partitions, reinforcing beams, and ceilings were installed, and the floor, ceiling, and partitions in the western half were covered with new building materials (excerpt from reference materials).

Further, each room other than the assembly hall was also modified for the office.

In response to the above, the contents of the current status change notification related to internal features in this restoration work are as follows:

- Remove the partition, reinforcing beams, ceiling, and floorboards that are built up inside the hall, and set up two columns in the girder row to make the hall a three-corridor flat, and restore the vault ceiling to the nave.
- Restore the front, sides, and ceiling of the podium.
- The ceilings of each room have been modified to board ceilings based on historical photographs, such as plaster ceilings.
- For the walls of the assembly hall and each room, the posterior wall will be removed and restored to paper or plastered walls based on historical photographs.
- The veneer plywood base, linoleum, etc., such as the assembly hall, each room, and the corridor, will be restored to the original specifications from the traces of carpeting and linoleum pasting and the materials at that time.
- The lighting equipment in the assembly hall, each room, and the corridor will be restored and maintained based on old photographs and documents that have been modified for the office.

Details are provided for each.

① Removal of post-installed partitions, reinforcing beams, ceilings, and floorboards inside the assembly hall and restoration to their original appearance

The wooden and plastered walls and ceilings in the assembly hall were removed, and the survey was conducted. The following results were obtained:

- The colonnade remains at the position of 15 shaku (approx. 4.55 m) from the north-south axis of the assembly hall, at intervals of 12 shaku (approx. 3.64 m) in the north-south direction. Each pillar was independent because there was no trace of partition wall attachment. The details of the makeup upholstery were confirmed from the traces of the pillars on the north-south wall side and the makeup edges that were diverted to the small room in the rear.
- The ceiling of the side corridor on the outside of the colonnade remained as original except near the center of the north and south. The inside of the colonnade and the ceiling of the nave were confirmed by the arch-shaped mounting traces remaining on the north and south walls, and the members diverted to the current central corridor. Regarding the ceiling surface finish, the wood-slipped plaster at that time remains on the flat ceilings in the east and west, and the traces left on the original frame also indicate that the vault ceiling is wood-slide plastered. The photographs and the description in the initial design document indicate that the central four sections are skylights for daylighting.

② Restoration of the front, sides, and ceiling of the podium

- From the ground cover remaining near the north side of the assembly hall floor and the ground cover fragments found under the floor, it was considered that there was an overhanging platform with a maximum diameter of 1.5 m and a diameter of about 6.54 m from the north wall of the hall. Further, it was confirmed that the extension on both sides of the hall had an overhang that appeared to be a side platform up to the east and west walls of the hall. The details of the design of the front of the podium and the side platform can be determined from the photographs, and the stairs and handrails can be established from the photographs and the old materials found, and they have been restored.
- Details can be found from the bellows template, wood shavings, bellows plaster, flat ceiling plaster found from the top of the rear ceiling, and the hollow plaster left on the surrounding walls. Therefore, the wooden plaster ceiling and bellows have been restored on the podium.

photo　Inside the restored assembly hall and vault ceiling and floor

photo Restored podium in the assembly hall

③ Restore the board ceilings of each room and corridor on the 2nd floor of the South Building to plastered ceilings

- The ceiling of each room on the 2nd floor of the South Building is a board ceiling, and investigations after removal revealed that each section of the frame ceiling was a wooden ceiling.
- The ceiling of the corridor on the second floor was also a board ceiling. However, in the investigation after the removal, the template and wood slides on the upper part of the bellows remained; a plaster piece of the same type as the bellows in the corridor on the first floor was found in the ground in front of the assembly hall. Therefore, the wooden plastered ceiling around the ceiling bellows is restored following the ceiling of the corridor on the first floor.

④ Restoration of wallpaper in the assembly hall and each room

- Although the walls of the hall were overcoated with plaster, the entire surface of the plaster-finished surface that remains in the lower layer remains with paper pasting marks. Further, this was restored because the continuous small circle print pattern remained on the paper at the waist endplate and the parting part around the window.

⑤ Restore the floor of the assembly hall, all rooms, and the corridor to a carpet or linoleum

- The floor of the hall is made of bare wood, the floor of the aisle is oiled, and the floors of the guest room on the 2nd floor of the South Building and the floor of the main/Vice Chairman's room are linoleum floors with veneer plywood base. However, when it was removed, there were traces of carpet nails, and it was restored to a carpet because it was mentioned as a carpet in the construction documents at that time.
- The current situation is almost the same for other rooms and corridors, but when they were removed, linoleum nail marks remained. Consequently, the corridors and stairs were 0.9 m wide, and each room was solid, so it will be restored. However, as the corridor on the 1st floor of the South Building is frequently used, considering the ease of walking, a border printed on vinyl chloride instead of linoleum is laid out, and it was restored by putting a different color sheet on the floorboards on both sides.
- When restoring the linoleum on the floor, the original method of stretching the floor is rather nailing on the floor. However, there was a concern that if the linoleum was not completely adhered, problems such as the edge rolls up over time might occur. In addition, there is a possibility that accidents such as kicking may occur due to it. Therefore, in this restoration work, it is expected that many people will come and go even if linoleum is used for the floor of the hall, considering how to use it later. Thus, as with the vinyl chloride base, veneer plywood is nailed and then bonded using epoxy resin.

photo Linoleum upholstery in the restored 2nd floor corridor

photo The original linoleum floor that remains in the corridor of the north wing of the chamber

photo Original linoleum

⑥ Lighting equipment in each room

As each room was used as an office, most rooms had fluorescent lights. Therefore, the lighting equipment in each room and corridor was restored and maintained based on the installation marks left on the ceiling and walls, photographs, and construction documents.

Details are as shown below.

South Building 1st floor

- "West Representative Waiting Room" and "East Representative Waiting Room"
  2-light chandelier 2 units
- "Guard room" Cord pendant light 2 units
- "Staircase", "Newspaper press room", kitchenette"
  Cord pendant light 1 unit
- "Corridor" Cord pendant light 3 unit

South Building 2nd floor

- "Secretariat" Code pendant light 1 unit
- "Chairman and Vice Chairman's Office"
  3-light chandelier 1 unit
- "Guest room" 4-light chandelier 1 unit
- "Counselor waiting room"
  Cord pendant light 1 unit
- "Staircase" Ceiling light 1 unit
- "Corridor" Cord pendant light 2 units

Chamber building

- "Vault center" Ceiling light 12 units
- S"mall walls on both sides of the vault ceiling"
  Braket 14 units
- "Flat ceiling on both sides" Ceiling light 14 units
- "Podium wall" Braket 4 units
- "Podium ceiling" Ceiling light 1 unit
- "West Counselor's Office", East Counselor's Office"
  Cord pendant light 2 units

photo Honored Guest Room- Restored Chandelier

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5. Former Iwasaki Family House Western-style House

Name of building：Former Iwasaki Family House Western-style House
Location：Taito ward, Tokyo
Owner / Administrator：Tokyo
Date of Designation:：28 December 1961
Designated Category：Important Cultural Property
Era of Construction：Meiji
Classification 1：Structures
Classification 2：Residence

Case study on conservation and restoration of internal features

The preservation and restoration work of the former Iwasaki family house was started from 1991 and conducted for the necessary parts individually every year until 2004. Items related to internal features include the following:

- In response to damage to the wallpaper in each room due to rain leaks, all rooms were newly replaced except for the rooms where the original wallpaper was left. Two of them have been restored to their original Gold-embossed wallpaper "Kinkara-kawashi" [*1].
- The original lighting equipment was repaired and reused, and the missing lighting equipment was partially restored.

Details are shown below.

① Wallpaper

Among the wallpapers remaining in each room in the western style House, an investigation was held on the paper, pigments, etc., used for the wallpaper that seems to be the original one. As for the ones found, the wallpaper was replaced and the found colors painted. In the southeastern and northeastern rooms on the 2nd floor, Gold-embossed wallpaper "Kinkara-kawashi" [*1], which seems to be the original, was found from the part where the door head was removed at the top of the doorway. Therefore, these two rooms have been restored to Gold-embossed wallpaper "Kinkara-kawashi" [*1].

For Gold-embossed wallpaper "Kinkara-kawashi" [*1], we conducted a survey of the rubbed copies, woodblock rolls, and sample books of the woodblock rolls used to manufacture Gold-embossed wallpaper "Kinkara-kawashi" [*1], which is stored in the “Paper Museum” (Kita-ku, Tokyo), based on the results of the above analysis survey. It showed that for the southeastern room, the same pattern was confirmed in the rubbed copies, but the woodblock roll could not be confirmed. Further, for the northeastern room, rubbing and woodblock rolls have been confirmed.

Therefore, the confirmed woodblock roll is used for the restoration of Gold-embossed wallpaper "Kinkara-kawashi" [*1]. In the southeastern room, the woodblock rolls used for restoration are on display.

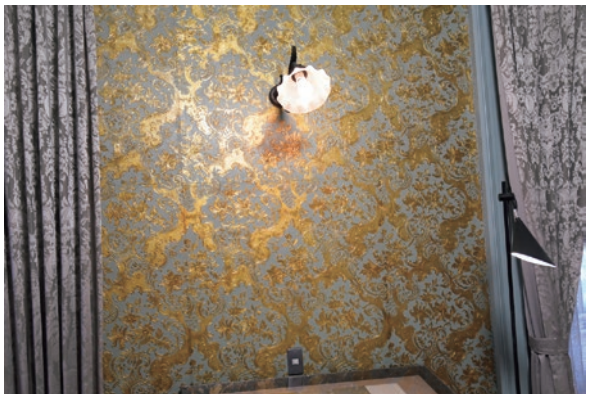

photo Restored wallpaper of the small guest room (southeast room) on the 2nd floor

photo Woodblock rolls exhibited in the small guest room on the 2nd floor

photo Restored Gold-embossed wallpaper "Kinkara-kawashi" *[1] in bedroom 1 (northeast room) on the 2nd floor

photo Gold-embossed wallpaper "Kinkara-kawashi" *1 on display in Bedroom 1 on the 2nd floor

② Lighting equipment in each room

Many of the lighting equipment still exist, and they are removed, cleaned, repaired, and reused.

For the missing ones, we are making a new one, but in that case, we refer to old photographs, documents at the time of construction, and lighting equipment in similar rooms. If unavailable, we refer to the manufacturer's catalog at that time. For reference, we select the one that suits the room's size and atmosphere.

The newly lighting equipment created rooms are as follows:

- 1st floor lady's guest room and study
  Pendant light 1 unit Original
- 1st floor guest room
  Pendant light 1 unit Commercial product
- 1st floor reception room
  Pendant light 1 unit Used product
- 1st floor entrance hall (west)
  Pendant light 1 unit Commercial product
- 2nd floor bedroom
  Braket 1 unit Restored product
- 2nd floor lady's guest room
  Pendant light 1 unit commercial product
- 2nd floor small guest room
  Braket 1 unit Restored product
- 2nd floor large guest room
  Pendant light 1 unit Commercial product

photo Original pendant light in the lady's guest room on the 1st floor

photo Commercial pendant light in the arge guest room on the 2nd floor

photo Original pendant light in the guest room on the 1st floor

Bibliography

1. 重要文化財 旧岩崎家住宅（洋館・撞球室・大広間・附煉瓦塀）保存修理工事報告書 平成 17 年 3 月 文化庁

Footnote

1. Varnish coated tin--embossed wall paper

6. Former Maeda Family House Western-style House

Name of building：Former Maeda Family House Western-style House
Location：Meguro ward, Tokyo
Owner / Administrator：Tokyo
Date of Designation:：7 August 2013
Designated Category：Important Cultural Property
Era of Construction：Showa
Classification 1：Structures
Classification 2：Residence

Case study on conservation and restoration of internal features

Regarding the preservation of Former Maeda Western Style House, repair and restoration were planned based on the following basic policy of preservation management and disclosure/utilization stipulated in the preservation and utilization plan formulated in 2015.

- Aiming to increase the value of cultural properties, reconstruct the Marquis Maeda residence period.
- Publicize and utilize the value of the former Maeda house.

Based on the above, repair intended to restore the study, an adjoining room and a connecting corridor between European-style building and Japanese-style building of the former Maeda house was performed as below.

① Wallpaper

Most of the wallpaper of Maeda's houce period was peeled off during the Allied requisition period. However, some of the wallpaper at the time of construction was found in the Gold-embossed wallpaper "Kinkara-kawashi" [*1] on both sides of the fireplace in the large dining room, the staircase halls on the 1st and 2nd floors, the bedroom, and the anteroom.

1） Study / anteroom

The photographs of the study and the wall surface of the anteroom were enlarged and investigated. These were Gold-embossed wallpaper "Kinkara-kawashi" [*1] with the same pattern as the woodblocks left in the Paper Museum, and they were restored using the woodblocks. Regarding the floor of the anteroom, when the plywood installed on the front of the wallpaper was removed during the restoration work in 1989, it was confirmed that the wallpaper with the same pattern as the old photographs and the photographs before the start of construction in 1989 remains. This was assumed to have been from the Maeda house period according to advertisements for the actual products and products listed in the "Handbook of Building and Civil Engineering Materials" published in 1933 and a historical material survey of the delivery companies listed in the "Money Account Book Special" held by Maeda Ikutokukai. Therefore, the remaining wallpaper is reused from the plywood that was left and removed, and the restored wallpaper is pasted on the surface.

photo Restored wallpaper in the study

2) Bedroom

Regarding the wallpaper used in the bedroom, the wallpaper sample book held by the Cooper Hewitt Smithsonian Design Museum in New York contains a sample of the same pattern as the old photographs and a construction example. Although the design of the entire pattern was revealed, the technique and color information of the striped pattern shown in the old photos were unknown. A piece of paper was found in the bolt hole of the fitting frame in the bedroom during the construction. The details of the pattern (reflective embossing), color, and stripe pattern were confirmed with almost no fading, so it was decided to restore the wallpaper. However, as it was difficult to manufacture a reflective emboss with the same pattern, it was restored by silkscreen.

photo Restored wallpaper in the bedroom

3） Dining Hall

The Gold-embossed wallpaper "Kinkara-kawashi" [*1] of the Marquis Maeda residence period stuck on the side of the fireplace in the large dining room was the only one left unpeeled. However, the pattern of the entire motif was not clear because it was originally a small area. Nevertheless, in the exhibit of “William Morris and the British Wallpaper Exhibition” held during the construction, the same pattern of Gold-embossed wallpaper "Kinkara-kawashi" [*1] made by Sanderson in the United Kingdom was confirmed, and the whole pattern was clarified. In this repair, the existing wallpaper is repaired, and a woodblock is created and restored to make up for the missing part.

photo Original wallpaper beside the fireplace in the large dining room

② Carpet

There are two carpets left in the western style house during the Maeda house period and three in the Seison-kaku in Kanazawa City, Ishikawa Prefecture, where the sencha room was relocated in 1945. In this construction, the study, anteroom, and bedroom were restored to the Maeda house period in accordance with the abovementioned policy. As the interior of the other rooms will be harmonized, we also investigated the carpet and decided the policy and specifications.

1） Study, anteroom, bedroom

After deciding the design and color with reference to the old photographs of Maeda’s house period, it was restored as a hand-prodded cotton rug.

photo Restored carpet in the bedroom

photo Restored carpet in the study

2） Lady's room

The carpet during the construction of the lady’s room stored in the western style house had stains on the whole and defects in various places on the edges. However, after cleaning, the defective part was repaired and reused.

photo Original carpet in the lady's bedroom

③ Curtains

1) The bedroom, study, and the anteroom in the western style house have been restored based on the curtains and tassel that were stored in the building and the public interest incorporated foundation Maeda Ikutokukai. Further, for newly produced items, we refer to the stored items, old photographs, and the results of trace investigations.

photo Curtain in the bedroom

photo Curtain in the study

④ Lighting equipment

As for the lighting equipment of the western style house, many of them were reminedfrom the Maeda house period. Most of them appear to have been specially made for Maeda family. In this preservation and restoration work, as a change of the current situation, 1) the bedroom and 2) the lighting equipment in the western style house passageway were restored to those of the Maeda house period. The shapes and specifications of these are mainly determined from old photographs; however, we also refer to the mounting marks left on the building and similar examples in the western style house.

1） Bedroom

The lighting equipment in the bedroom before the repair had a chandelier in the center, one ceiling near the window, and two brackets. However, as they were all modified from the old photo, the chandelier and bracket were restored based on the old photo. As the one in the next bedroom was diverted, it was returned to its original location, and the pendant reflected in the old photo was restored.

photo Restored chandelier in the bedroom

photo Restored chandelier in the bedroom

photo Restored chandelier in the bedroom

2）Corridor

The lighting equipment in the western style house connecting corridor had three brackets with walls, one ceiling, and a pendant installation mark on the stairs from the Japanese-style building. As the dimensions and specifications of each instrument were confirmed from old photographs and installation marks, they have been restored.

photo　Restored brackets in the corridor

photo　Restored bracket in the corridor

photo　Restored bracket in the corridor

The photo of the lighting equipment was provided by Japan Lampas Co., Ltd.

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Footnote

1. Varnish coated tin--embossed wall paper

7. Former Zentsuji Kaikosya

Name of building：Former Zentsuji Kaikosha
Location：Zentsuji City, Kagawa
Owner / Administrator：Zentsuji City
Date of Designation:：15 June 2001
Designated Category：Important Cultural Property
Era of Construction：Meiji
Classification 1：Structures
Classification 2：Public facility

Case study on conservation and restoration of internal features

① Air-conditioning equipment in the building

Toilet and air-conditioning equipment were pointed out in the building utilization questionnaire distributed prior to the preservation and restoration work that started in 2004. The toilet was installed in the newly constructed annex building right next to Kaikosha. However, regarding the air-conditioning equipment, the investigation and maintenance committee established in advance considered a plan to install floor equipment in the hall and air-conditioning equipment in the annex building and place ducts in the same way as toilets. However, considering convenience and economy when using it, air-conditioning equipment space is created under the floor of the hall; the equipment added is devised so that it is not conspicuous by installing it there and providing an outlet near the wall of the floor.

photo Underfloor space, Air-conditioning facilities and others are concentrated here

② Lighting equipment in the hall

Regarding lighting equipment, according to the investigation and maintenance committee, “Even if the restoration time is not right, the existing lighting equipment will be reused as much as possible. Restoration will be according to the overall policy only for those whose format can be judged from the material. If the illumination is insufficient, install new lighting and adopt a design that is clearly modern.” In response to the policy, restoration work is being conducted as follows:

・The location of the existing medallions was prioritized for the lighting equipments.

・During construction, only 5-watt lighting equipments had been developed, and it is assumed that kerosene lamps were used to supplement the brightness. Therefore, the restoration of lighting equipment was examined based on the time of the end of the war (around 1945). Although there was a plan to restore only the design with the original, it was finally selected from the commercially available products.

・Sufficient illumination cannot be secured with the chandelier alone, depending on the usage conditions (meetings, exhibitions, etc.). Therefore, after discussions with the Agency for Cultural Affairs, a fixed baton was installed on the ceiling near the north and south walls, and a spotlight was placed there. The baton is also equipped with emergency lighting equipment, flame detectors, speakers, and security sensors.

photo Baton installed on both sides of the ceiling wall of the hall, Additional lighting equipment, fire alarms, speakers, etc., are installed on this baton

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8.Tsurushima Lighthouse Old lighthouse building

Name of building：Tsurushima Lightohouse Old lighthouse building
Location：Matsushima City, Ehime
Owner / Administrator：Matsushima City
Date of Designation:：29 June 1995
Designated Category：Matsuyama City Registered Cultural Property
Era of Construction：Meiji
Classification 1：Structures

Case study on conservation and restoration of internal features

① Graining of skirting boards in the former official residence, picture frames around openings such as doors and windows, and decorative wood such as siding

Currently, the original graining is left on the skirting boards of the former official residence, the picture frames around the openings such as doors and windows, and the siding.

This was restored to other parts that had deteriorated, with reference to the graining that was partially left in the room during the dismantling and storage work that began in 1995.

Moreover, for the part where the initial graining was left, the oil of the paint was removed and faded. Thus, the oil of the paint was applied from above to protect the remaining graining.

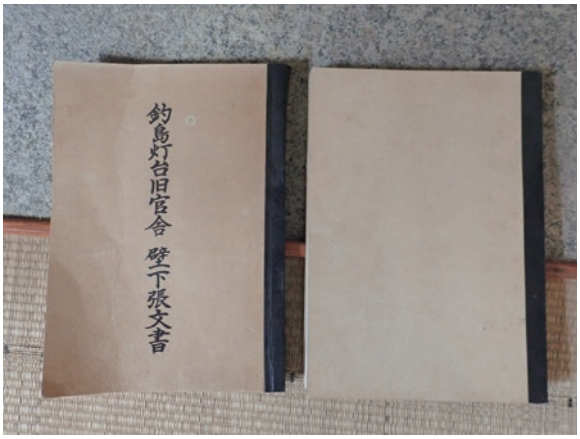
photo Graining that remains on the window frame, probably original

photo Enlargement of the previous photo

② Old documents left in the plastered wall

In the process of dismantling, old documents from the period were discovered on the surface of the plaster walls, which had been covered with bags as a base for painting. As a result of sorting, 200 documents related to the lighthouse business written in ink on 306mm x 217mm Japanese paper were found. The contents of the documents were a logbook and an equipment ledger from that time, and the date of the logbook showed that they were from 1872 to 1876. Therefore, the documents were carefully peeled off and preserved before being stored. Furthermore, regarding the plastered wall of the room where the old document was pasted, the are

photo　Old documents lefft in the plastered wall



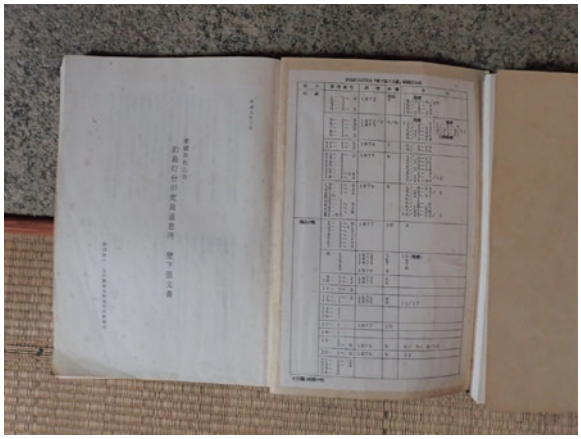


photo Reproduction of old documents left in the plastered wall

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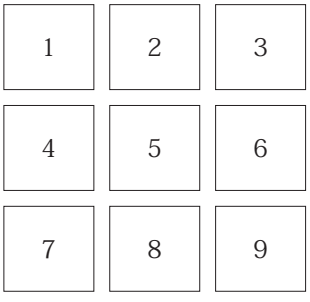
Editor's postscript

We are deeply grateful to all the people who provided support to the investigation and research activities of the Restoration Techniques Section of the Center for Conservation Science at the Tokyo National Research Institute for Cultural Properties. We plan to continue publishing this series of reports focused on conservation of industrial heritage properties into the coming years. Your continued support will be highly appreciated.

Photographs of the cover



1. Iwate Bank (Former Morioka Bank) Main Office Main Building
2. Former Yamagata Prefectural Assembly Building
3. Former Maeda Family House Western-style House
4. Former Yamagata Prefectural Office
5. Former Yamagata Prefectural Office
6. Former Yamagata Prefectural Office
7. Former Nippon Yusen Otaru Branch
8. No. 25, Nagasaki Foreign Settlement, Meiji-mura
9. Former Maeda Family House Western-style House

Conservation and Restoration of Internal Features

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