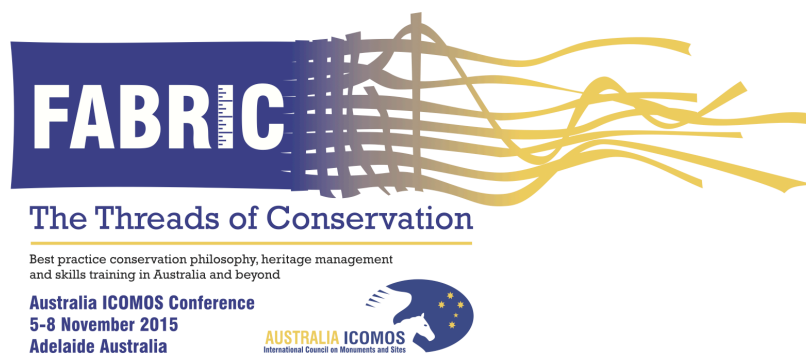


Architectural Wooden Preservation in Japan: Gokoku-ji Temple and Intangible Skills

Dr Tanya Park

Proceedings of:



Introduction

Japan's place in any discussion of historical wooden architecture is clear since it possesses one of the largest collections of enduring historic wooden architecture, from a vast range of historical epochs, originating from 600 AD. In Japan, over 80% of all historic architecture is timber-framed and joined together by intricate bracketing systems which provide great strength and flexibility. This has allowed the timber structures to withstand Japan's incessant earthquakes. Additionally, due to design and materiality preservation and repair is possible with both partial and full dismantlement processes. Throughout this paper we give a brief overview of the actualities of the preservation process in Japan via a recent case study of Gekko-den Pavilion in central Tokyo. In the Gekkoden case study we will view the commonalities of protection in Japan.

Gekko-den Pavilion at Gokoku-ji Temple

Gekkoden pavilion at Gokoku-ji temple, in Bunkyo ward, central Tokyo dates from the Edo period, constructed in the early 1600's. Its original purpose was one of a guest room for Nikko-inn, a subsidiary temple of Onjo-ji in Shiga prefecture. Shiga prefecture is located in the western part of the Honshu Island, close to Kyoto. In 1894 the building was purchased by a wealthy businessman, whose interests lay in the intricate Shoji landscape watercolours, and moved the structure to his private residence in Shinagawa, Goten-yama [present day located in a ward, within Tokyo Metropolis, Tokyo Bay]. In 1928, with the negotiation of a Buddhist Monk at Gekkoden, the building was procured and moved to its concluding location at Gokoku-ji temple and renamed Gekko-den Pavilion meaning Moonlight Pavilion. Research indicated that there are numerous examples where structures have been disassembled and transported to different

locations or significantly remodelled for modification of purpose. Katsura Imperial Villa in Kyoto is an example where traceology of members reveals such modifications. Research pertaining to Norwegian historic vernacular structures also reveals recurrent disassembly of wooden buildings, removal and relocation.

Gekko-den is a single story structure of post and beam construction. The roof style is classified as Irimoya which displays a side of roofing that extends out and up from each side of the rectangular roofing structure. The main structure has a carriage porch with an inner gate. This is reflective of the *Shuden-zukuri* style in Muromachi Period [1338]. The early *Shoin* style is also called *Shuden*. Representative examples of early *shoin* style are the guest halls (*Kyakuden*) of two subtemples of the great Tendai monastery Onjo-ji [*Mii-dera*], the Kojoin. A blueprint for a building very similar to the Kojoin Guest Hall is found in *Shomei*, a collection of secret texts and illustrations belonging to the Heinouchi family, who were carpenters to the Tokugawa Shogunate. An illustration within is labeled “*illustration of an old six-by-seven-bay Shuden*”. The word old suggests that the style was already well-established and perhaps even obsolescent by the time the drawing was completed in 1608.¹



Fig.1.1. Archival photographic illustration prior to preservation commencement [courtesy of Agency for Cultural Affairs ACA] **Fig.1.2** Photographic illustration in the final months of preservation, 30th September 2013 [photograph by author].

Preservation of Gekko-den began in November 2008 and continued until October 2013. The decision for full dismantlement of the structure was based upon an extensive inspection of the structure which revealed numerous members had lost structural integrity. During the 80 years since the move of Gekko-den to its current site structural members have begun to show obvious weakening. Depression of the ground under the flooring system was extensive and deformation and sinking of the structure had become significant.² It was due to these contributing factors, the decision for full dismantlement was made.

Repair with dismantlement is known as *Kitai Shuri* in Japan. Because the principal structural system of Japanese wooden architecture is post and beam without structural walls or bracing and because the jointing system does not employ additional metal pins, preservation by dismantlement is a rational action. Repair with dismantlement is carried out on a case by case basis, two systems are employed, full and partial dismantlement. In essence the building is dismantled from the roof down, examined, the structurally deficient parts are fixed, or replaced, then the building is reassembled. Nobuo Ito³ has commented that the roof and its immediate supporting members are typically dismantled about every 150 years and full dismantlement of the building occurs about every 300 years in the life-span of a structure.

Full dismantlement is seen as an opportunity to learn and acquire knowledge about the structure, frequently it will be the first time a building has undergone full dismantlement. In the case of Gekko-den principal, junior architect and craftsmen examined in detail each individual member looking at materials, building techniques to elucidate the history of the structure. Historically each structure is seen as sitting along a design continuum over the centuries, depicting evolving modifications to design concepts.



Fig 2.1 Photograph depicts original wood spliced with fresh Hinoki wood at post base joint. Traceology reveals traditional hand tools such as the Adze which is used to skim off the outer molecular surface of the wood, thus creating a barrier, providing superior resistance to moisture penetration. [photography by author]. **Fig 2.2** Number plates are attached to each wooden member [photography by author].

An experienced conservation architect is assigned full-time on all preservation sites. Many preservation projects can be between six months to ten years in duration, with up to 80 sites in progress at any one time across Japan.⁴ At Gekkoden pavilion the principal architect, Mr Suzuki-san, as part of the preservation work, researched extensively historical associations of relevance to Gekkoden.⁵ This encompassed travelling to original site in Shiga prefecture visiting Shinagawa, Gotenyama consulting with former proprietors relatives, procuring historical journals, to bring together material pertaining to the history of Gekkoden.

After extensive historical research of Gekko-den by the lead architect an outline for the policy for the preservation process and the changing of the current status of Moonlight hall to an earlier design state was collated and presented to the Agency for Cultural Affairs. The features that were considered to be distinctive about Moonlight Hall, in that they were considered where the value is placed as cultural heritage, were;

- The structure inherited the design features of “Old 6 Ken 7 Ken Main hall” as written in the important Japanese historical resource book of Edo period “Sho-me” [匠明]

- The roofing system is depictive of a different era and is representative of the same design as Sub Hall of Light and Purity [光浄院客殿] and Sub Hall of Study Encouragement [勸学院客殿]
- The structural system has been calculated using the size on one tatami mat as a single unit, except for the broad veranda. It was noted that both Sub Hall of Light and Purity 光浄院客殿 and Sub Hall of Study Encouragement 勸学院客殿 do not use this design layout.

The centre-raised ceiling [oriage-gou-tenjou 折上格天井] of the Audience room was considered of significance and value to the structure, although it was thought to have been introduced at a later date. In Japanese residential architecture, one of the earliest examples of centre-raised ceiling was built in 1614, being the Nagoya Castle Main Residence Ward.

Former interventions were researched thoroughly by site architects and craftsmen through the detailed examination of the structure during disassembly. Decisions were reached concerning the original architectural structural composition and later remodelling. It was deduced that the frame of Moonlight hall had not been fully disassembled during the Edo period. Evidence showed that the posts, decorative rails, decorative roof bows and so forth were all very well preserved when Moonlight Pavilion was initially moved to Gokoku-ji site and reconstructed. There had been a change in roof style in 1892 [Meiji 25] when the structure was moved. In addition, the broad veranda was changed from outdoors to indoors when it was moved and reconstructed again in 1928 [Showa 3]. Modifications included accepting changes of the current status of Moonlight Pavilion to an earlier design stage. These variations included;

- Restore to the original design style as in the last year of Keicho [1614]
- Return the broad veranda back to its original formation
- Return entrance doors and windows to original design concept

- Return the roof design to cypress bark roofing

Material authenticity played a significant role in the research behind the restoration of Gekko-den. Each wooden member was carefully analysed and researched and categorised according to previous research and preservation efforts. An overall plan was enacted depicting the current status of materials remaining within the structure over Showa, Meiji, and Medieval and Edo period. Everything above the main beams was renewed after the moving and reconstruction to Gokoku-ji site. Original materials were preserved as much as possible, but materials which were the cause of structural problems because of serious deterioration or other damage were replaced.

In general, in conservation work on Japanese architectural monuments involving replacement of original members, most of the replaced parts are those around the exposed perimeter of the roof or near the ground surface where moisture damage is most common. It is rare to replace the structural framework members, or other fundamental parts of the building, with the result that most of the important building parts remain as original materials. Through the conservation work on Gekkoden, investigations were carried out not only on the traces remaining on the materials, but also on construction techniques and carpentry techniques. For example, one of the principal tools used by the original carpenters was the yari-ganna [a kind of planing knife shaped in the form of a spear], which produces a finish that cannot be matched by contemporary tools. This tool was selected based on investigations of the surface of the original material. For newly-introduced materials used for the replacement of deteriorated or fire-damaged members, the greatest effort has been made to maintain authenticity of technique by employing such tools. There is a commonality of aging processes that occur to wooden members connected to its organic composition and cellular structure.



Fig 3.1. Wooden members of larger dimensions need minimal replacement. Traditional tools are used to seal the surface of the wood, ensuring resistance to moisture penetration. **Fig 3.2.** Curves are achieved without the bending of wood, figure depicts detail of carpentry.

Even though the main structural components are relatively large, dimensional tolerances are very fine, particularly in the case of surfaces that will remain visible. Allowances are made for wood movement, such as expansions and contractions due to changes in temperature and humidity in Japan's temperate climate, and also gradual deflections under constant loadings.

At Gekikoden there were temporary buildings on site. The principal architect, junior architect, as well as an assigned secretary worked daily on site. Co-joining the office were areas for storage of delicate materials and work areas for intricate splicing of original members to new wood of a similar cell-structure. In another designated room with a smooth floor onto which plywood sheets were adhered, templates were created for curved cutting of members. The craftsmen would lay out elements in pencil and sumi ink, with the help of architectural squares, inking lines and other wooden templates for intricate carpentry joints.

It is imperative that all respective wooden members fit exactly into positions indicated in the drawings, for flush jointing connections. Accordingly it is necessary that ink lines are drawn onto the wood's surface are perfect. *Kikujutsu* (stereometry) enables master carpenters to draw only with the help of an L-shaped square. The inked timbers are all cut and planned

to instructions and then assembled. Kikujutsu is now placed under government protection as one of Japanese Traditional techniques

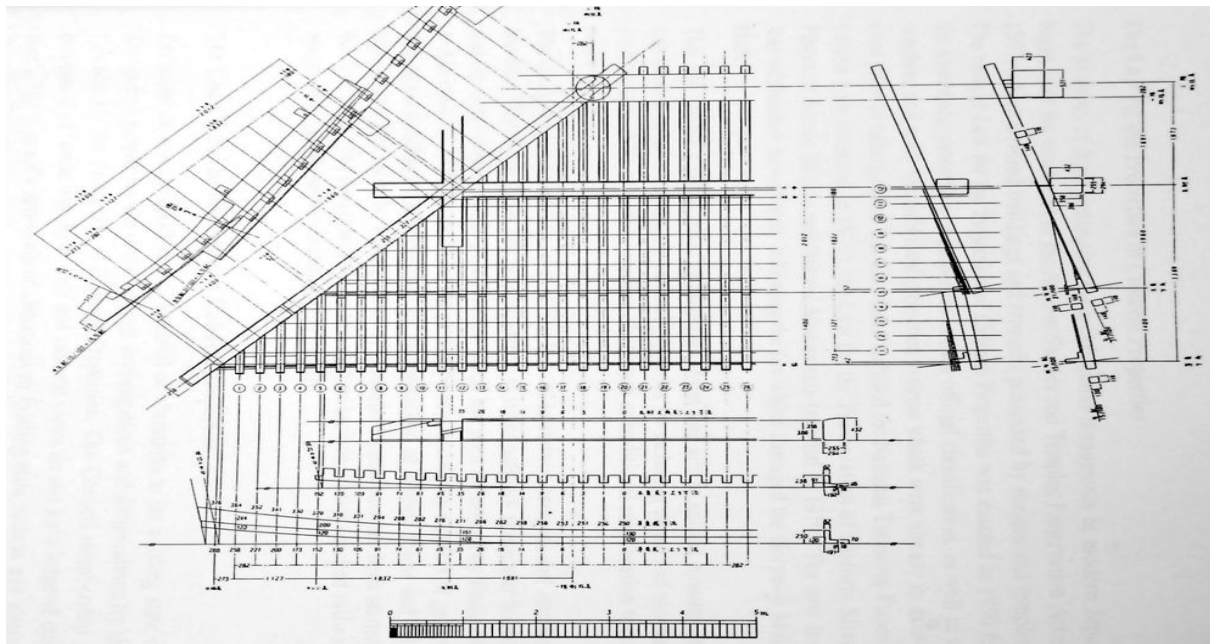


Fig. 4. Kiku is a mathematical/geometrical calculation system highly developed by the latter half of the 18th century [Courtesy of ACA].

Furthermore Shomei is the oldest surviving complete manual on designing using a set of proportions, also known as *kiwarijutsu*. This is the use of pre-determined proportioning system that enabled craftsmen to achieve unity and harmony in design using a set of standards, such as the width of the bays and posts. Such knowledge was protected and remained within families; it is thought that texts were created in the Muromachi period [1392-1573]. By the eighteenth century, printed books containing the modular design standards were widely circulated and obtainable.

International Heritage Discourse:

Through reference to international cultural Heritage policy doctrines, The International Wood Committee Charter (IIWC) has a section entitled Principles for the Preservation of Historic Timber Buildings [1999]. This ICOMOS [*International Committee for Monuments and Sites*] charter⁶ outlines basic principles and practices pertaining to the preservation of historic

timber structures. It is noted in the doctrine the scarcity of historic timber structures and acknowledges their vulnerability to material decay due to organic materials. Some key recommendations advise on inspection, recording and documentation of materials, skills and associated technologies. When interventions are required, it is noted that they should follow traditional means and be reversible and not impede on future preservation. Where possible the replacement materials and associated skills and knowledge should correspond with those used originally. Finally, where society permits, historic forest reserves should be established and education and training are essential for sustainable preservation and development policies. The latter two recommendations pertaining to forest reserves and training outline where Japan is an example of “best practice”. In 2001 a project called “Cultural Heritage Landscape” was initiated, subsequently renamed “Cultural Heritage Landscape System Promotion Program”, this project promotes nurturing, forest management and the raising of public awareness. Additionally, the government has created ‘Forests for Heritage’ for the securing of the necessary organic materials necessary in the preservation of historic wooden structures in Japan, furthermore the crucial Intangible technical skills associated with the preservation. In total, 30 areas, with 19 prefectures, have been designated as Forests for Heritage. Ten material types have been identified necessary of securing for the preservation of Japanese Heritage structures;

1	Cypress
2	Red Pine
3	Cedar
4	Sawara [Cypress]
5	Cypress Bark
6	Thatch

7	Ramie Shell
8	Lacquer
9	Rush Grass
10	Shichito Rush Grass

Protection of skills and Intangible Culture

There is an acknowledgement in the countries who strive to preserve historic wooden structures that the structures are in a precarious position not only due to lack of sufficient materials for maintenance and preservation, but also the intangible skills and preservation techniques associated with the structures. As Larsen⁶ noted in 1995, “The mutually-dependent relationship between the preservation of buildings and the preservation of traditional



techniques are extremely important and

represent the crux of contemporary architectural preservation endeavors in Japan”. In 2015 this still remains a significant element of wooden preservation efforts. The system for the protection of conservation techniques was implemented as part of the latest revision to the Law for the Protection of Cultural Properties *[amendment 1975]*.

Fig.5. Craftsmen and junior carpenter on site [Photograph by author]

The protection of conservation techniques is a system under which the national government may designate the traditional techniques or skills which are indispensable for the protection of cultural properties and may officially recognise the possessors or practitioners of those techniques, either individual persons or preservation organizations. The government grants subsidies to those individuals, or organisations, to be used for the conservation-related projects such as the training of successors. The designation techniques related to buildings include those in the following fields;

1	Wood carpentry
2	Architectural painting or coloration
3	Geometric proportioning
4	Cypress bark and wood roof shingling
5	Miscanthus thatching
6	Production of clay roofing tiles

Kyoto and Nara prefectures have established teams of skilled craftsmen who are hired as full-time government employees to protect their status and to improve the efficiency of the succession of techniques.

Conclusion

Through viewing the actualities of the preservation process and procedures at Gekko-den pavilion current issues are highlighted. Capabilities of countries to have, or gain access to funding, for protection and preservation differ considerably, but regardless of levels of resourcing best practice must always be followed wherever possible. Preservation activities within Japan offer perhaps the optimal examples of ‘best practice’ Documentation and dissemination of information within Japan of the process is commonplace, however, increased understanding world-wide is optimal for global understanding and practice.

The mutually-dependent relationship between the preservation of buildings and the preservation of traditional techniques is paramount. The protection of techniques associated with the preservation of wooden cultural properties in Japan is central in acknowledging their unequivocal significance in the preservation of wooden structure.

References

1. **K. Nishi, K. Hozumi**, 1983, *What is Japanese Architecture?* A survey of traditional Japanese architecture, «Kodansha International Ltd», 17-14 Otowa 1-chome, Bunkyo, Tokyo 112-8652.
2. **Park, Tanya L.** 2013. *The Process Surrounding the Preservation of Historical Wooden Architecture in Japan*. Built Heritage 2013 Monitoring Conservation Management, Milano.
3. **Ito Nobuo**. 2007. *Wood as a material for Japanese buildings*, ICOMOS IWC XVI Symposium, Florence, Venice.
4. **Statistical Data, Agency for Cultural Affairs [ACA]**, Tokyo. 2012.
5. **Personal Communication with principal architect, Mr Suzuki-san**, December 2012.
6. **Knut Larsen**: Education and Training in Preservation [Protection of Techniques]