

# Daimyô yashiki hinagata - 3D Documentation of an architectural model

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The collection of the „Weltmuseum Wien“, the former museum for ethnology in Vienna consists besides of countless artefacts from all over the world on a number of architectural models. One of the most impressive examples is the model of parts of a Japanese Samurai residence, a daimyô yashiki hinagata. It was made for the World Exposition 1873 Vienna and has been forgotten for many decades. In the frame of a research about Japanese wooden buildings it has been rediscovered by Klaus Zwerger in the depot of the museum and is planned to be the centre of the exhibition about Japan in the new exhibition concept currently under construction.

For this reason the model had to be restored which opened the opportunity for a detailed research on the object and furthermore on the architectural typology it is representing and does not exist anymore. In case of extinct architectural typologies research is limited to secondary sources and the existence of an architectural model representing former architectural features brings a great advantage for the research and analysis.

An essential part of the research is the survey and documentation of the model which has been started in the frame of a cooperation between the museum and the Department for History of Architecture and Building Archaeology. Basis was a preliminary project on the recording of models of Indonesian buildings in 2009.

Within the frame of student courses several surveying methods were applied to find the most suitable focussing on a high level of detail not only in texture but also in geometry. One building of the entrance gate was chosen as test object and surveyed on the one hand with a handheld laser scanner and on the other hand with digital camera using photogrammetry to reconstruct three dimensional geometry.

The experience of the survey of the daimyô yashiki hingata proved again that a high precision recording of architectural models is a challenging task. Although the used equipment is state of the art, the poor accessibility to all the parts of the object has to be taken into account. Different approaches showed that the methods applied for the survey are pushed to their limits and arose the need for new innovations. For this particular documentation and survey new devices are needed.

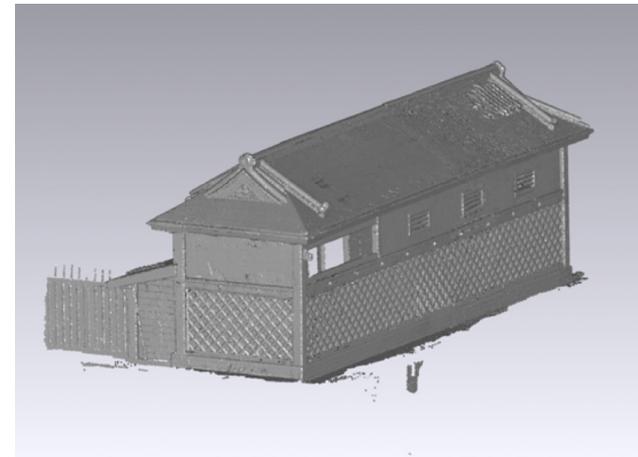
Modern imaging technologies allow the development of devices that can be navigated through the object to cover all parts. With the work on the daimyô yashiki hingata the requirements on the instrument could be defined in detail. As the photogrammetric approach showed results which are more suitable for building archaeological analysis a small imaging device with a high resolution optic is needed. In addition to that the device should be navigable through an architectural model and equipped with a lighting device, to ensure homogenous illumination throughout the interior.

A complete and detailed high resolution recording of the exterior and interior of architectural models, especially of historic can provide a new approach for the research of buildings and construction details. In combination with the comparison of still existing examples and research of material and construction will be the base for a better understanding of architecture.

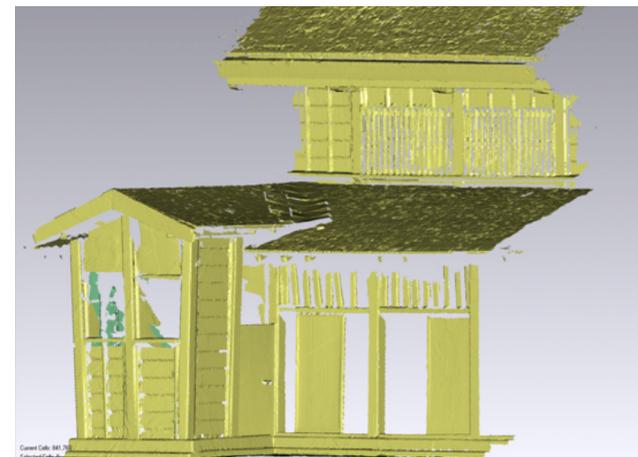
In addition to the advantages in research the recording of the interior of architectural models can be used to generate virtual tours through a world that is not accessible in another way and to share research results with the public. Thus treasures of architectural heritage like the daimyô yashiki can be preserved for the future.



Overview of the entrance hall of the daimyô yashiki hingata (Iris Mach 2012)



3D Point cloud of the left Nagaya (Irmengard Mayer 2015)



First iteration of recording with the scan arm showed obvious problems like the missing eave and small holes (Irmengard Mayer 2014)

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**Forschungs- und Förderungsschwerpunkte:**  
Digitale Technologien in Architektur und Raumplanung

**Kontext | Finanzierung**  
Eigenprojekt

**Projektstatus | geplanter Zeitraum**  
April 2014-laufend



Recording details of the entrance of the daimyô yashiki hingata turned out to be a time consuming and tedious work. (Irmengard Mayer 2014)