The Imperial Theatre and the Nanki Auditorium. Two early concert venues in Tokyo

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Introduction

During the Meiji era (1868–1912), Japan started to introduce western classical music as a part of a modernization of the country through *westernization*. At first, concerts took place in the hall of the newly founded Music Academy or in buildings not primarily intended as performance spaces. In the Taisho era (1912–1926), however, the first halls were built, genuinely designed for the new art forms. In this investigation, the architectural and acoustical characteristics of the first multi-purpose theatre, modelled after famous European opera houses of the time and the first private concert hall, will be studied.

History

The Imperial Theatre, a four-story building in Neo-Renaissance style, was designed by Yokogawa Tamisuke (1864–1945). After having travelled to the US and a number of European countries to study theatre design [1], he intended to build a theatre modeled entirely after the famous opera houses he found at this time in Europe. At the same time, he was expected to realize a multi-purpose theatre that also allowed the performance of Japanese theatre, especially Kabuki plays. Therefore, the Imperial Theatre featured both a *hanamichi*, an important acting area for Kabuki plays in form of a passageway that connects the stage with the back of the theatre on the stage right [2], and an orchestra pit. The size of the latter (see Figure 1) had to be significantly reduced, when it was actually constructed compared to Yokogawa's original design, in order to incorporate the *hamamichi*. The theatre opened on 4 March 1911, and the first orchestral concert was held by the Tokyo Philharmonic Society on 6 November of the same year. The horseshoe-shaped theatre was made of a mixture of masonry and reinforced concrete with plaster finishing.

Figure 1: View to the stage inside the Imperial theatre.

The project to build the Nanki Auditorium, Japan's first private concert hall for western classical music, was initiated by Yorisada Tokugawa (1892–1954). While studying music in Cambridge for three years, he convinced the the British architect Sir Alfred Brumwell Thomas to provide the design of the building, based on the model of the chapel of the King's College at the University of Cambridge [3]. The building plan was then revised by William Merrell Vories, an American architect living in Japan. The construction was completed on the 30 July 1918. The opening took place on 27 October of the same year with a performance of Beethoven's Symphony No. 1. The rectangular hall was made of a mixture of masonry and reinforced concrete with plaster finishing [4]. The interior sidewalls where covered with oak wood. The vaulted ceiling was covered with filt. The floor and the stage were also made of wood. The auditorium provided 275 slightly upholstered wooden seats in the basement and another 35 seats on the balcony located at the rear end of the hall. The auditorium was mainly used for concerts of symphonic music, but also for music recitals, lectures and speeches.

Figure 2: View to the stage inside the Nanki auditorium.

Both the Nanki auditorium and the Imperial Theatre were severely damaged in the great Kanto Earthquake in 1923. The Imperial Theatre was rebuilt with a different interior and subsequently used as a movie theatre; the Nanki Auditorium was completely pulled down and not restored in 1931.

Table 1: Parameters describing the architectural features of the studied halls, including the volume V (excluding the stage-house), the capacity N, and the area occupied by the audience S_A.

Name	V [m³]	N -	S_A [m²]	V/S_A [m]	V/N [m³]
Imperial Theater	5480*	1700	750	7,3	3,2
Nanki Auditorium	2157*	310	122	17,7	7,0

*derived from the geometrical models (see Figure 3)

Simulation

A set of room acoustical parameters was calculated, using virtual reconstructions of the halls, similar to the approach in [5]. The geometric models were created using a 3D modelling software (SketchUp) based on the existing architectural drawings, photos and written descriptions. The Simulation was conducted with ODEON 12.00. For the model of the Imperial theatre, the stagehouse has been ignored. The uncertainties that arise from this approach, especially concerning the estimation of the surface materials have been described in [6].

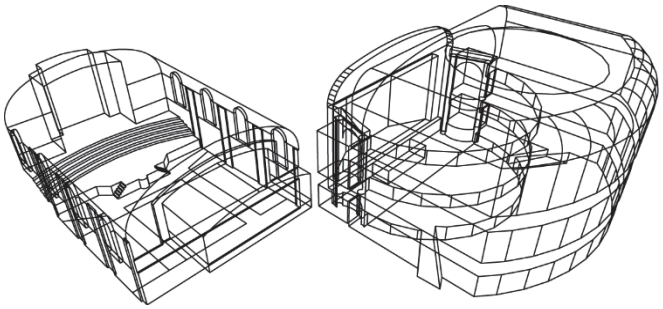

Figure 3: Geometrical model of the Nanki Auditorium (left) and the Imperial Theatre (right).

Results

The simulated reverberation times for the unoccupied (u) and the occupied (o) case of the two halls are shown in Figure 4. For the occupied case of the Nanki auditorium, the stage was assumed to be occupied by a small symphonic orchestra.

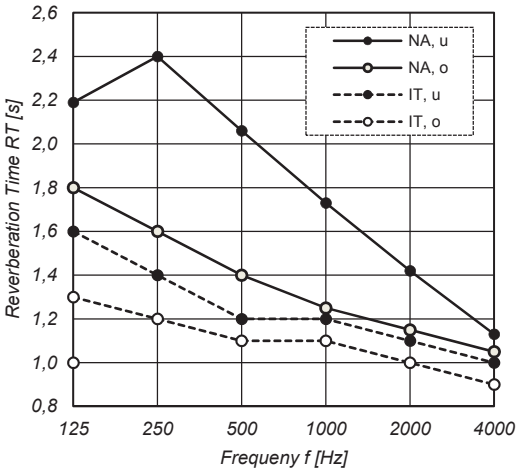

Figure 4: Reverberation Times for the Nanki Auditorium (straight line) and the Imperial Theatre (dotted line).

Further parameters derived from the simulated impulse responses are given in Table 2.

Table 2: Room acoustical parameters calculated for the two halls, averaged over all listening positions.

Name	Case	G_m [dB]	EDT_m [s]	$C_{80,m}$ [dB]	J_{LF} -	L_J [dB]
Imperial Theatre	u	6	1,1	3,8	0,26	-0,8
	o	5	0,9	5,3	0,25	-1,0
Nanki Auditorium	u	13	1,9	0,6	0,24	-0,4
	o	11	1,3	3,2	0,25	-0,6

From a room acoustic point of view, the size of the Nanki Auditorium, as well as the calculated parameters, are in the range of traditional chamber music halls, comparable to those that have been studied in [7]. The size of the Imperial theatre is small, when compared to the most prominent examples of European theatres that existed at the time (e.g. the Opera Garnier, see [8]), resulting in a high strength factor G_m. Theatres of similar acoustic conditions in the history of European opera houses exist, such as the second version of the Lindenoper (1788) [9].

Conclusion

Based on reconstructions of the Imperial Theatre and the Nanki Auditorium, the architectural and acoustical characteristics of the first hall for orchestral music and the first multi-purpose theatre in Japan have been studied. The architectural and room acoustical conditions are comparable to early venues for symphonic music (such as the first Gewandhaus in Leipzig [10]) and opera houses [9] that were built about 100 years earlier in Europe. Both examples investigated demonstrate that concert life and concert venues in Japan, starting about 1868, developed under similar acoustical conditions compared to major cities in Europe, but with a delay of about on century and with a much faster pace.

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