

Case Study

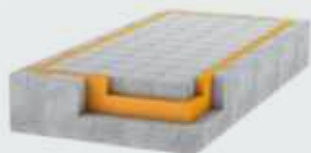
Vibration Isolation for the Kabukiza Theatre in Tokyo, (JP)



» Reconstruction of Tokyo's historic Kabukiza Theatre dating from 1889

» Elastic bedding for Japan's largest revolving stage

» Vibration-isolating foundation bedding for various areas of the historic building



Vibration Isolation for Japan's largest Revolving Theatre Stage

Description of the project

Spring 2013 saw the renovation of Tokyo's Kabukiza Theatre completed. "Kabuki" is the name given to the traditional type of Japanese theatre enjoyed by the middle classes. One of the most famous examples is the Kabukiza Theatre in Tokyo.

During the most recent renovation of the Kabukiza, three height-adjustable stages of varying sizes were constructed, along with a further even larger height-adjustable stage and a new revolving stage. The revolving stage was designed as a circular area in the centre of the stage and makes the process of changing stage sets even faster and easier.

The prototype of today's revolving stage is said to have been used in Osaka's theatres during the Edo period (1603-1868) - long before other countries had discovered the idea.

Nowadays revolving stages are commonplace for operas and musicals throughout the world. With a diameter of approximately 18 metres, the new revolving stage in the Kabukiza Theatre is roughly the same size as its predecessor, but four times deeper and therefore provides more space for all of the required technology. At a height of 16 metres it is as high as a four-storey building and weighs around 360 tonnes. To be able to enjoy performances such as a "Kabuki" in peace and without any disruption, the noises and vibrations caused when operating

the revolving stage had to be kept to a minimum. Other factors that had to be taken into account included the vibrations and noise generated by the neighbouring underground lines, as these could penetrate into the interior of the theatre and reach the stage. The refurbishment of the revolving stage in the Kabukiza Theatre has made it the largest in Japan. Getzner was responsible for the vibration isolation, working with its partner Nittobo Acoustic Engineering. Implementation of the project took place in cooperation with Mitsubishi Jisho Sekkei Inc., one of the largest planning offices in Japan, and Nagata Acoustics Inc., a world-famous acoustics consultant for theatres, opera houses and concert halls.

The Getzner solution

Getzner has created a great impression with this project - not only with the quality of its materials, but also with its skills in being able to predict and calculate the vibration factors in advance.

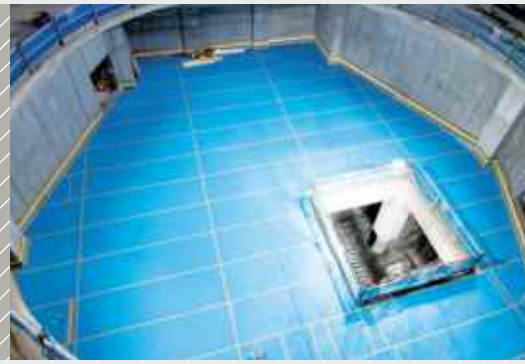
Full-surface foundation bedding on Sylomer® SR 28 was chosen for the Kabukiza revolving stage. For more than 40 years, Getzner has been using this PU elastomer successfully in the rail, construction and industry sectors. Compared to other solutions on the market, full-surface foundation bedding on Sylomer® offers the technical advantage of a consistently high isolation effect. This is required in order to be able to load



Laying the first layer of Sylomer®



After concreting the foundation bedding



Sylomer® for vibration isolation

Feedback

the base area with the concrete stage foundation and the weight of the revolving stage on Sylomer® for the long term. In the case of the Kabukiza Theatre, this equates to a load of several hundred tonnes. To protect the revolving stage from the risk of tilting, Getzner also used high-tech cushioning materials on the side surfaces. This measure ensures that, whatever happens, there will always be a safe distance between the main stage and the revolving stage - even during an earthquake.

Getzner materials were also used for the roof garden, foyers, entrances, machinery rooms and the building's multi-storey car park.

As Getzner used materials that were manufactured directly on site, it took just one week in total to install the vibration solution.

What does Toshiko Fukuchi from Nagata Acoustics have to say about the project?

"When renovating the grand Kabukiza building, which embodies our traditional and fundamentally Japanese dramatic art form, the vibration-isolating polyurethane material Sylomer® from Getzner was used. This material displays outstanding performance and workability. The fusion of tradition and the latest technology

in what was the fourth renovation of the theatre enabled the creation of an even better sound environment."

Toshiko Fukuchi
Director/Project Manager
Nagata Acoustics

Applying the adhesive for the second layer of Sylomer®

The elastic Sylomer® layer is prepared for concreting.





Facts and figures at a glance

Reconstruction of the Kabukiza Theatre

Scope of the reconstruction:	29 floors (use: theatre, offices, roof-top garden, shops, four-story car park in basement)
Client:	Kabuki-za Co., Ltd. & KS Capitol SPC
Master Developer:	Shochiku Co., Ltd.
Execution planning/ construction monitoring:	Mitsubishi Jisho Sekkei Inc./Kengo Kuma and Associates
General contractor:	Shimizu Corp.
Vibration isolation:	Getzner Werkstoffe GmbH & Nihon Getzner K.K.
Cooperation for acoustic design:	Nagata Acoustics Inc.
Acoustic works:	Nittobo Acoustic Engineering Co., Ltd.
Services:	Vibration calculations and forecasts, full-surface foundation bedding for revolving stage, elastic bedding for roof-top garden, foyers, entrances, machinery rooms, car park
Completion:	Spring 2013

Getzner Werkstoffe GmbH

Foundation:	1969 (as a subsidiary of Getzner, Mutter & Cie)
Chief Executive Officer:	Ing. Jürgen Rainalter
Employees:	340
2015 turnover:	EUR 77.9 million
Business areas:	Railway, construction, industry
Headquarter:	Bürs (AT)
Locations:	Berlin (DE), Munich (DE), Stuttgart (DE), Lyon (FR), Amman (JO), Tokyo (JP), Pune (IN), Beijing (CN), Kunshan (CN), Charlotte (US) Headquarter
Ratio of exports:	85 %

Construction references (extract from Japan)

- National Training Centre (sports hall)
- Palace Hotels (swimming pool, chapel)
- Peninsula Hotels (swimming pool, kitchen)
- Tokyo American Club, Sports Centre (swimming pool, fitness studio, kitchen)
- QVC Japan (television studio)
- Toppan Printing Co., Ltd. (rotary printing press)
- Kochi Newspaper (rotary printing press)
- Sumida Aquarium (machinery room)
- Shibuya Hikarie (theatre)
- Loop Road Kanjo No. 2 (four-lane urban motorway, high-rise building)

Credit for the title picture: Shochiku Co., Ltd. and Kabuki-za Co., Ltd.