

National Taichung Theater

Urban Magical Ant Nest

Words and Photos by Bo-Yang Lin
Translated by Transglobe Translation Service



National Taichung Theater (NTT) is a major public work in Taichung for the past few years, and is famously known for its architect, a Japanese winner of Pritzker Architecture Prize, Toyo Ito.

The process of constructing NTT is like a living theater; however, unlike a real drama, there is neither leading role nor supporting role on stage, every character in the team fulfills its role in bringing out the perfect show, which lasts a decade due to the complicated architectural construction.

The major phase of construction was completed in 2014. During the construction, numerous skilled workers, from designing to constructing, were brought together to work hand-in-hand. Bringing skillful workmen together into this project was one of the major challenges in the entire construction; however, the success marks an important milestone in the history of Taiwan public works.



Writer Profile

Lin, Bo-Yang

Studied architecture in Taichung and has worked several years in a firm before teaching. Is a fervent architect who loves to break boundaries.

He pays high attention to publicity of architecture, and believes architecture belongs to everyone, not just one. He hopes to create a great public space to enhance citizen's living quality and living aesthetic.

Nominee of ADA Awards for Emerging Architects 2014

He is the current owner of Fieldveo Design Studio and lecturer at Department of Architecture, National Taiwan University of Science and Technology



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The rise of theater can be dated back to religious rituals in ancient Greece. The priest of the ceremony honoring god often wears unique apparel, dances and sings. His standing location in the act and the audiences' location viewing, form a contrasting setting, which later becomes the earliest model of theater.

According to historical documents, theaters built on the slope of an elevated terrace have already existed in the 6th century B.C. Ancient Greek theaters are large, open-air structure, and seats are built with stones. Over time, theaters situated in such natural environment landscapes gradually become more geometrical man-made structures, in order to meet specialization demands of theater and architectural design. Ito has devoted himself in the research of waffle structure, which is a technique that enables a space to break the boundaries of geometrical limitation. He once said that "there are no such straight lines or straight angles in the natural world! I want to build a new geometry, which is imperfect circle, imperfect square." Deep in his heart, he believes architecture should always be based on the environment.

Architecture design: Biomorphism, a concept derived from nature

NTT is located in Taichung Seventh Metropolitan Area, and sits on the axis of New Metropolitan Park. Its unique appearance, very much like a chunk of cheese you see in cartoons or like a giant rock eroded by seawater forming caves in it, attracts people and arouses their curiosity of how it is built. There is no "front side" of this building; every side corresponds to the spacious structural design. Furthermore, the design has no excessive ornamental elements. It is meant to remain simple and neat with solely simple lines that curve and turn which play significant and crucial roles Ito's design.

One of Ito's beliefs is that architecture is a part of nature, and human beings should live peacefully with it; hence, architecture should also obtain vital elements. The design by Ito moves beyond the constraints of traditional theater. His concept is to bring musical sensation to the audience when entering the theater; therefore, the design is an open-spaced, accessible from all direction, cavern-like structure. The architecture is based on curved wall and

tubular structure, which he ultimately aims to go beyond traditional construction method of using slabs, columns, and beams. Instead, the use of free-flowing curved walls creates cleanness and neatness of space.

A major difference between architecture and other forms of designs is architecture cannot place itself away from nature. During the first phase of planning building a theater in the urban redevelopment zone, the prices of surrounding pieces of land skyrockets when the plan is settled. Real estate even names this area as the "front row of opera house" which becomes the high-end residential district. When Ito is asked about how to balance his design and its surrounding rising concrete jungle, his answer is "Biomorphic Architecture". Biomorphism means to explore the structure and dwelling of creatures in the natural habitat, and be inspired to design functional architecture with naturally occurring shapes or patterns.

NTT is like a magnified ant nest dwelling comfortably and naturally within the urban district. The concept is innovative, but it is very challenging to combine the concept and structural design together. Ito, as an architect, has to think outside the box to make everything possible. First of all, he has to discard the traditional designing method of distributing floors and its function ability as priority. Then, he has to thrust aside his technical

knowledge of construction. With further keen observance and analysis of the existing structure in the nature, he can subsequently create a perfect harmony among natural force and space. This knowledge is applied to NTT's three dimensional curved wall that not only creates a fluid spatial effect, but also highly differentiates itself from traditional theater that aims for high function and high effectiveness.

The beautiful yet sensible curve of the wall has been rationally calculated to create the perfect line. Visual and auditory are two essential elements in a theater, and the design is often adjusted to meet these two requirements. The audience has to have full visual of the stage and can perceive consistent sound quality from different seating. The concrete curved walls are designed to have certain thickness in order to absorb the echoes and a 3D software simulation quality check is used to ensure the quality of sound. Combining visual, auditory, and architecture together brings craftsmen expertise to a higher level of aesthetic.

Construction: A challenge of integration

The theater breaks the boundaries of using traditional straight angled columns and beams. Due to its high



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construction difficulties of building three dimensional curved walls, the construction bidding failed five times; however, in the end, Best Giving wins the bid. During the planning of NTT public work, Taichung City Government holds international design competition, which Ito's design comes at first. The architecture construction team initially consists a Japanese design firm and a Taiwanese construction company; however, an eminent English firm called Arup joined the team for the technical engineering structure design support. This international team has a strong ability in communication and its members work along very well with each other, which are two crucial components to completing the theater. Furthermore, the team also faces literal construction technique difficulty, such as installing facilities and pipeline in the right sequences, which are some of the pre-construction major problems to solve.

The architecture is made with reinforced concrete, using the method called jet grouting. Reinforced concrete is filled into the steel framework of the three dimensional curved walls. The team discards the common way of using steel formwork to preserve time and reduce cost. The steel framework of the three dimensional curved walls is a piece of artwork itself. Binding wires are much more difficult than ordinary architecture that requires skilled craftsmen to complete. During the construction, Best Giving builds a 1:1 3D curved wall unitized mockup for precision on structural construction. Generally, a full-scale mockup is a mockup of the most complicated area in the construction for the use of further testing and analyzing the materials. It is also used for the designer to check its design.

The bionic architecture in the concrete jungle

Ito's iconic work, Sendai Mediatheque, is open to public in 2001. Though it appears very solemn, it is a building with practical use of space. It is praised as "a very curious yet dazzling captivating architecture." Remember NTT is located in the park, on the rim of Seventh Metropolitan



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Area. Ito's creation is a fluid spatial effect that seams the theater with the rest of the city, bonding people and the community. He once said about his designing concept, "Comparing the world to a river, a conventional building is like a timber stuck into the bottom of the river. The inner part of the timber has nothing to do with the river. The architecture I want to build is like swirl in the river, where it has its own space but merges with the flow of the river." Hence, NTT can be described as a creature lying dormant on earth, every breath that it takes in and breathe out enables the city's inhabitants to naturally fall into the "swirl" of the urban city, enjoying themselves with the greenness of the park and the surrounding natural environment. NTT can be counted as one of Ito's masterpieces. 🌿

National Taichung Theater

Location: No. 101, Section 2, Huilai Road, Xitun District, Taichung City

Date: Main body completed in November 23rd, 2014

Design: Toyo Ito & Associates, Architects

Constructor: Best Giving

Specialty: Design concept is based on the coexisting of theater and natural habitat. Biomorph architecture acts as the main concept to create "fluidity" and "purity" of three dimensional curves.

Terminology

Biomorphic Architecture: It is a created architectural design of elements inspired by patterns or shapes of nature and living organisms. Studying the nature closely to find a regular pattern and using the result of observations to enhance the perfection of architecture, are main concepts for constructing and functioning a building. (Taken from Professor Ji-Yi, Zhang handouts, NCTU Architecture)