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JAPANESE CONCRETE / 日本のコンクリート

JAPOŃSKI BETON

Abstract

Why is Japanese concrete architecture so renowned worldwide? Why do Ryue Nishizawa, Tadao Ando, Toyo Ito, Takeshi Hosaka, Kazumi Kudo and Hiroshi Horiba, the world's most innovative and influential architects, use concrete? Why does religion have such a strong influence on Japanese architecture? Can local culture influence concrete transmutation? Beauty is often in the eye of the beholder. To some, massive concrete Japanese architecture may appear brutal, to others it could be a symbol of strength and solidarity.

Keywords: Japan, concrete, transmutation, haiku, religion, light

Streszczenie

Dlaczego japońska architektura betonowa jest międzynarodowo rozpoznawalna? Dlaczego japończycy Ryue Nishizawa, Tadao Ando, Toyo Ito, Takeshi Hosaka, Kazumi Kudo i Hiroshi Horiba, najbardziej innowacyjni i najbardziej wpływowi architekci na świecie, stosują beton? Dlaczego religia ma tak silny wpływ na architekturę japońską? Czy kultura lokalna może wpływać na transmutację betonu? Piękno jest często w oczach widzów. Niektórym masywna, betonowa architektura japońska kojarzyć się może z brutalizmem, dla innych może to być symbol siły i solidarności.

Słowa kluczowe: Japonia, beton, transmutacja, haiku, religia, światło

1. Teshima Art Museum designed by Ryue Nishizawa on Teshima Island, Japan

Before we enter the enigmatic, white concrete shell, we can catch glimpses of the sea and hear the sounds of the waves from the concrete path that loops from the structure and into the trees. Artist Rei Naito and architect Ryue Nishizawa created the Teshima Design Art Museum, under the auspices of the Japanese organisation called Benesse Art Site Naoshima. On the neighbouring island of Teshima, the gleaming, white, concrete grotto harks back to a more primitive way of dwelling. Two oval openings in the ceiling allow the daylight, wind and rain into the building, gently encouraging the visitors to engage directly with the elements of nature. It is unlikely that visitors would come here completely unprepared, without expecting a unique sensory, cultural and artistic experience. The Japanese concrete buildings are one-of-a-kind thanks to the architects who have found ways to surround interior spaces with raw concrete, creating surprising moments of warmth and comfort. The Teshima project refers to a new conception of

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the relationship between nature and man developed by Tadao Ando, who designed a complex of buildings on the island of Naoshima. Nishizawa and Kazuyo Sejima have also gone in this direction, creating a rectangular ferry terminal on the neighbouring island.

Smooth, white concrete is popular among Japanese architects thanks to its light, pure, uniform structure, offering a gentler alternative to the board, raw concrete. It is created by combining materials with lower iron, chromium and manganese. Masquerading as architecture the gigantic sculpture is a meditative poem on light, water and concrete.

The Teshima Art Museum is almost completely empty, devoid of content. Its interior is fluid, and a concrete layer covers the ground and bends from the thin edges to form a uniform dome overhead. Some sit, even lie down and nap on the ground, and others, as if in a trance, pace slowly around the perimeter. Two large openings in the ceiling offer contrasting views – one of the forest and the other of rice fields and the sky. Nishizawa strove for maximal optical lightness and a slim concrete construction of the ceiling, ultimately only 250 millimetres thick. In hiding the construction elements, especially the beams located by the exposed opening, the lightness and subtlety of the form are made evident. On the ground, puddles of water spill over and move in waves in the direction of the voids as part of the project designed by Rei Naito. The slope and heat are responsible for this moment of magic, co-creating a unique installation.

Not only is the final effect amazing, but also the entire construction process of the structure. The steel support bars were stretched on the hill, which was formed earlier on the ground, and finally covered by white concrete. The process of pouring the concrete lasted 22 hours. Next, after 6 weeks, the cavity was hollowed out and heavy equipment was used to remove earth and soil from it. The organic concrete shell is composed of freeform curves which tie in and respond to the surrounding environment. Thanks to the technology used to make the structure, the entirety was created without combining materials. The ribbon hung at the entrance is part of Rei Naito's work of art.

Concrete does not only have to be found in the common sidewalk, curb, or fragment of a highway. The right admixtures (“alloys”) may make it indistinguishable from any other opaque stone found in nature. The visitors' experience is four-dimensional. While in the third-dimension of time it is a reactionary present tense, in the fourth dimension it is a continuous present tense, the here and now. In the fourth dimension, we are constantly moving towards balance. This structure is very open and allows for every possibility. Well-being, success, beauty, an inner smile, an appreciation for what is, and love are options to choose from. On the other hand, fear is a choice that will always bring us back to the third dimension of reaction and limitations. Ryue Nishizawa has brought the material to the inside of the building to create a space of simple, spherical reflection. Additionally, the properties of concrete are very well-suited to the region. Japan experiences a range of different climates around the country and concrete is a versatile material, which holds up under all weather conditions, especially during the hot, humid summers. Nishizawa's building stimulates faith in the ability of architecture to make the world seem somewhat weird, yet simultaneously a little bit better.

2. Church of the Light designed by Tadao Ando in Ibaraki, Osaka, Japan

Concrete and light. Tadao Ando's principal focus is on simplicity and minimalist aesthetics. In the small town of Ibaraki, 25 km from Osaka, Japan, stands one of Tadao Ando's most signature architectural works, the Church of the Light.

The Church of the Light embraces the main philosophical aspects of Ando's work. It is an interplay between nature and architecture which allows light to define and create new spatial perceptions equally, if not more so, than the physical, concrete structures. Tadao Ando takes an ancient approach to this, also comparable to Le Corbusier's idea that a wall would no longer be a structural element but a mere membrane of the outer shell.

- My intention is to create a specific space that does not exist autonomously on its site, using common materials that we can find anywhere in the world, like concrete, which consists of sand, stone, and cement. I believe that the emotional power of architecture comes from how we introduce natural elements into the architectural space. Therefore, rather than making elaborate forms, I choose simple geometries to draw delicate yet dramatic plays of light and shadow in space, says Tadao Ando.

The use of simplistic materials reinforces the duality of the space; the concrete structure removes any distinction between traditional Christian ornamentation and motifs, decoration and splendour. Besides the cross cut into the eastern wall of the church, the entire structure is covered by a concrete shell; the concrete perfectly blends with the darkness of the church and creates a more humble, contemplative and desirable atmosphere for meditation and worship. The precision of this minimalist architecture is accentuated by the opening in the shape of a cross on the eastern wall, which is the only visible religious symbol present in the church, ideally suited to the main concrete construction. The structure consists of three rectangular blocks which are connected at a 15 degree angle by a wall that never touches the remaining six or the ceiling of the chapel. Eliminating non-essential elements from the architect's point of view had to be a true conceptual challenge. This church is very simple in form and can certainly make the case in favour of "less is more."

Ando has developed minimalism for Christianity, a religion that prioritises being over having, at least at the core of this religion's ideology. It is the ability to understand that a person is more for what he/she experiences, sees and explores, than what they own. It is about possessing experiences, not things.

Aesthetics is evolving in a very interesting way itself. It seems that we can never quite conceptualise or appreciate a cultural moment in its midst, or even once it ends and another one begins. But then, after a sufficient length of time has passed, something changes, and what was once ugly or kitsch can seem beautiful and unique. The same can be said for other disciplines, like fashion and graphic design. Concrete can be very beautiful, and brutalism seems to be having its moment. Part of its genius, as Louis Kahn observed, is that materials have their own destiny, and one should think of that when designing.

Ando's church uses the weight, darkness and density of concrete in order to carve the delicate, yet intense, strips of light into the walls of the church, thereby altering the seemingly "ugly" and "dead" elements into something animated, changing in position. This interplay of light and deep shadow creates the feeling of a sacred, inviolable cave. For Ando, the Church of the Light is an architecture of duality, an expression of the dual nature of existence, solidity/emptiness, lightness/darkness, raw industry/domestic cosiness. These co-existing differences leave the church void of any and all ornamentation creating a simple and unadorned space. The interplay between light and solid raises awareness of the timeless, spiritual interior. The concrete simplifies and reinforces the duality of the space and the entire structure is the inverse of traditional Christian motifs and aesthetics.

In all my works, light is an important controlling factor; – says Ando. I create enclosed spaces mainly by means of thick concrete walls. The primary reason is to create a place



for the individual, a zone for oneself within society. When the external factors of a city's environment require the wall to be without openings, the interior must be especially full and satisfying. And further on the subject of walls, Ando writes, At times walls manifest a power that borders on the violent. They have the power to divide space, transfigure place, and create new domains. Walls are the most basic elements of architecture, but they can also be the most enriching.

Japanese religion and culture have great influence on Tadao Ando's creativity, which as part of the "haiku" effect; it beautifies nothingness in order to reveal the uniqueness of "simplicity." His philosophy is that *to change the dwelling is to change the society*. Haiku is a form of Japanese poetry with three lines, which limit writers to five syllables in the first line, seven syllables in the second, and five syllables in the last. George Fairbanks is one who creates "haiku" in architecture, understood as a "one-page, quick-to-build, uber-terse design description." With only one sheet of paper, there is no room for indecision or indirectness. This is the essence of the essence; a conceptual note understood by everyone. There may not even be room for diagrams, which sounds crazy at first, but perhaps this crazy form is actually brilliant.

3. Tama Art University Library designed by Toyo Ito in 2007, Tokyo, Japan

Architect Toyo Ito said: *The new library is a place where everyone can discover their style of "interacting" with books and film media as if they were walking through a forest or in a cave; a new place of arcade-like spaces where soft mutual relations form by simply passing through; a focal centre where a new sense of creativity begins to spread throughout the art university's campus.*

As one of the leading architects in Japan's increasingly well-regarded architectural culture and winner of the Pritzker Prize in 2013, Toyo Ito (born June 1, 1941), has gained international recognition mainly for his perfect minimalism with the use of the latest technology, uniquely combining both traditional and modern elements of Japanese culture.

From the beginning of his career, which now spans four decades, Ito has been experimenting with a variety of architectural forms. He is most well-known for the huge structure of the ribbed dome in Odate and the wavy, white concrete roof of the Meiso No Mori funeral hall (both projects completed in Japan), among others. *I will never fix my architectural style and never be satisfied with my works,* – he said.

The Brutalist architectural movement flourished from the 1950s to the mid-1970s. During this time the characteristically rugged concrete was mainly used for building exteriors, especially for government projects and educational buildings. What is "brutal" about concrete is the scaled, unnatural, intentionally cheap, harsh, raw and dominating surfaces, created by man but derived from nature, which are increasingly surrounded by artificially controlled and simple constructs. Today, concrete construction has become not only pervasive but also

Ill. 1. Teshima Art Museum

http://img.mp.itc.cn/upload/20170421/4c97c7a5927a4b0f927fccabd09482cf_th.jpeg

Ill. 2. Church of the Light

<http://www.artsky.com/r/u/pic/2017/01/1483673877961083524.jpeg>



03 Yasei Art University Library



04 Meiko no Mori Municipal Funeral Hall

extremely versatile. The use of exposed concrete in interiors can now be seen in many different types of buildings.

The authenticity and nobility of concrete can be appreciated already from the outside. The purity and perfection found in the details is astounding. The columns supporting the arches are unconventionally thin. Ito and the structural engineer Mutsuro Sasaki designed the walls only 20 cm thick, simultaneously providing enough support for the heavy load of the building.

Tama Art University Library is a structure thanks to which we can imagine what the future of architecture will look like. It is an architecture of optimism – not only because of the possibilities that come with easily accessible and inexpensive building materials, but also because of the structural freedom that concrete provides. These traits allow for buildings of huge scale and with diverse purposes to be built.

4. Meiso no Mori Municipal Funeral Hall designed by Toyo Ito in 2006, Kakamigahara City, Gifu, Japan

Between a mountain range and a lake in Gifu lies the Meiso no Mori Municipal Funeral Hall. The funeral hall takes its name, Meiso no Mori, from the Japanese words meaning “forest of meditation.”

The curvaceous roof that hovers over this site is reminiscent of slowly drifting clouds, which create a soft, bright area that reflects the surrounding mountains and the billowing clouds above. The roof troughs collect rain water and drain it down the columns. The outer crests create sky-high spatial features of the roof, thus creating differently spaced outer spaces. Reflective and without any structural connection, the white concrete with glass underneath floats freely alongside the lake. The shape of the roof structure has been determined by an algorithm that generates the optimal design solutions. This type of structural analysis resembles plant growth patterns that transform through simple natural processes; this process is called “evolution.” Most of Ito’s works are well known for emphasizing the edges of concrete building structures; in this case, the delicate treatment of the created space inside and outside invites the viewer to participate in the festival of light. Neither the tabernacle nor the human body are exhibited here, only a thin, subtle line between the material object and the spiritual sphere is visible.

5. Shonan Christ Church designed by Takeshi Hosaka, 2014, in Kanagawa Prefecture, Japan

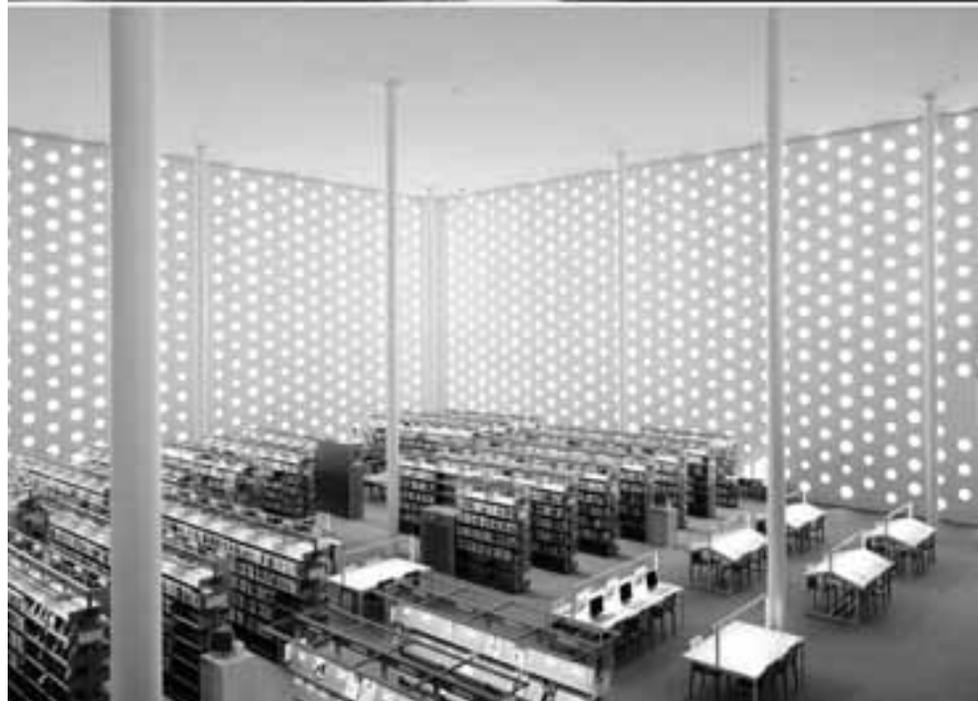
The amount of direct sunlight and indirect light is regulated by the time of the day. Direct sunlight alters the space in the church in different ways creating the perfect environment for prayer and meditation. The “restrained” height of the church, with a sculptured, concrete

Ill. 3. Tama Art University Library

<http://www.maltm.com/wp-content/uploads/2017/06/1712a0f0e31fc6797cab31bd032fab1.jpg>

Ill. 4. Meiso no Mori Municipal Funeral Hall

http://www.dammmagazine.net/wp-content/uploads/2016/03/ti_meiso_03.jpg



roof, is intended to harmonise with the low-rise buildings of the residential area. Glass strips inserted into the gaps between the roof slabs angle slivers of sunlight into the church hall in a controlled manner. The amount of sun rays entering the church changes throughout the day and interplays seamlessly with the progression of the service. *If the service comes close to the finishing time, direct sunlight begins to draw a ray of light on the wall surface.* After mass, the church becomes a place of intimate prayer for a small number of people, accompanied by one, two or three glinting rays of sunlight. At the end of the service, a hymn fills the chapel and only one thin ray shines through.

The characteristic six curved slabs are designed not only for architectural reasons but also they provide structural, acoustic, and lighting benefits, – explained the architect. These six concrete semi-circles symbolize the historic six-day creation of the world referred to in the Bible. The architect calls these tubes “empty pipes”, which look solid and massive from within the interior. The form of the roof was designed to suppress and reflect the sound of the hymns and to help the congregation hear the sermon more clearly. The vertical grooves carved into the concrete walls aim to provide further sound absorption. Strips of dark grey urethane foam inserted into the slits help to avoid undesired echoes. *In the sanctuary, the pastor’s speeches can be heard clearly and easily throughout the space, while the hymns can be heard softly,* – said senior consultant at Nagata Acoustics, Ayako Hakozaki.

This unobtrusive and modest place brings peace and tranquillity. The facade is a dialogue between straight lines and uniform concrete texture. Its introverted style makes the connection between the congregation and religion possible, because the outside world is forgotten, and this space for contemplation is visible only inside the building.

6. Kanazawa Umimirai Library designed by Kazumi Kudo and Hiroshi Horiba, 2011, in Kanazawa City, Japan

We don’t want to create monuments. We want to create architecture that becomes a part of everyday life – architecture that takes into account the sun, wind, urban environment, and other existing elements. Buildings that forge a link between the history of people and places and their future – said Kazumi Kudo and Hiroshi Horiba

Nearly 6000 holes pierce through the concrete exterior of this library designed by Kazumi Kudo and Hiroshi Horiba in Kanazawa, Japan. Translucent glass fills each opening, introducing natural light into the main reading room of the building, which occupies the entire first floor. The mezzanine, where there are informal reading places and work spaces, overlooks this space.

The library of the future. Reading, for the sake of knowledge, enjoyment, or exploration of the world of the human imagination, is one of those experiences that gives one a sense of emotional and spiritual richness quite different from economic and material well-being. In this sense, the creation of a space that surrounds the reader with books is undoubtedly connected to

Ill. 5. Shonan Christ Church
<http://arcdog.com/wp-content/uploads/2016/07/95C9882.jpg>

Ill. 6. Kanazawa Umimirai Library
<http://www.uia-architectes.org/sites/default/files/Kanazawa-Umimirai-Library-photo-1-%40ZOOM-Satoshi-Asakawa.jpg>

the noble ideal of the public good. Libraries in Japan are moving towards a model that encourages readers to stay and linger and actively participate, instead of fulfilling solely their original function as spaces for collecting and lending out books. Taking into consideration the general trend for libraries to facilitate access to books and reading as well as other functions, this library offers automated shelves that operate as a closed stack system. This system is accessible also in the hall and in meeting rooms, which promote social exchange between its users. This huge area serves as a reading space, which is in line with the character and purpose of the library. The building represents a continuous relationship that brings together books and people even as they change and evolve, transcending time and history. The entire concrete structure of the library resembles a three-layered cake in a “cake box”. Incredible in scale and completed with the utmost precision, this “cake box” hopes to become a new symbol of western Kanazawa, a city that is still experiencing a rapidly growing population and urbanization.

7. Conclusion

At one time the concrete structure was associated solely with material used for the structural part of the buildings and possibly the external facades. The use of concrete in interior spaces began a significant transformation in its applications. Contemporary “Japanese concrete” is a combination of “haiku”, light, wind, different shades of grey, spirituality, the motto “less is more”, traditional local art and global minimalism. Concrete interiors in Japanese architecture can be found in the greatest works of the modern masters. The transmutation of concrete is evident in every example discussed above. At present, due to the unique beauty stemming from its simplicity, concrete is also used in Japanese skateparks, furniture and garden lamps, which are always made with great precision.

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