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CONCRETE TATAMI – TRADITION AND MODERNITY IN TADAO ANDO’S DESIGNS

BETONOWE TATAMI – TRADYCJA I NOWOCZESNOŚĆ W PROJEKTACH TADAO ANDO

Abstract

The article presents research on the relationship between the traditional principles of Japanese architecture and their contemporary reflection in Tadao Ando’s projects. By analysing selected works of Ando, it demonstrates how the concrete formwork technique merges modernity with traditional Japanese spatial concepts. The hypothesis suggests that Ando’s contemporary architecture continues the Japanese tradition through a modern interpretation of tatami mat modularity in the formwork divisions within concrete technology.

Keywords: contemporary architecture, theory, perception, Tadao Ando, tatami

Streszczenie

W artykule przedstawiono badania dotyczące relacji między tradycyjnymi zasadami architektury japońskiej a ich współczesnym odzwierciedleniem w projektach Tadao Ando. Analizując wybrane realizacje Ando, ukazano, jak technika szalunku betonowego łączy nowoczesność z tradycyjnymi japońskimi koncepcjami przestrzeni. Hipoteza zakłada, że współczesna architektura Ando stanowi kontynuację tradycji japońskiej poprzez nowoczesną interpretację modułowości mat tatami w podziałach szalunkowych w technologii betonu.

Słowa kluczowe: architektura współczesna, teoria, postrzeganie, Tadao Ando, tatami

1. INTRODUCTION

Contemporary Japanese architecture represents a fascinating field of study that combines modern technology with deeply rooted cultural traditions¹. Japan, a country with a long architectural history, has for centuries created spaces that are inextricably linked to nature, aesthetics, and spirituality. Traditional Japanese architecture, characterized by lightweight materials, spatial flexibility, and a subtle approach to the relationship between interior and exterior, has long been a subject of interest and inspiration for contemporary architecture

¹ Cf. B. Taut, *Fundamentals of Japan architecture*, Tokyo 1937.

worldwide. However, the dynamic economic and technological development that took place in Japan after World War II² posed new challenges for Japanese architects – how to combine modern technologies and the demands of contemporary society with the centuries-old traditions that are an essential part of the culture of the Land of the Rising Sun?

One of the most influential architects who successfully combined these two spheres is Tadao Ando. A self-taught architect who gained international recognition, Ando continually balances between tradition and modernity in his work, seeking harmony between the rawness of modern materials like concrete and the spirituality of traditional Japanese space. His projects, found worldwide, are considered some of the most aesthetically refined examples of contemporary Japanese architecture.

Tadao Ando draws on traditional Japanese spatial concepts deeply rooted in Zen philosophy and the *wabi-sabi* aesthetic – an appreciation of beauty in simplicity, impermanence, and imperfection. In traditional Japanese houses, the modularity of space, defined by tatami mats – rectangular textile floor modules – not only served a functional role but also structured the space, giving it rhythm and harmony. The arrangement of tatami determined the proportions of the interior, allowing for flexible organization of space. It was an adaptable space, with functions that could change depending on the residents' needs, while at the same time being harmoniously integrated with nature through openings to the garden and light.

Ando, although using modern technologies and materials in his work, retains the spirit of this tradition. His projects are characterized by a rawness of form, often made of concrete, yet they refer to the Japanese aesthetic of space. Concrete, which at first glance seems cold and heavy, in Ando's hands gains delicacy and spirituality, becoming a vehicle for emotion and harmony. In his designs, Ando frequently uses the formwork technique, whose modularity can be interpreted as a modern reference to the tatami layout – the traditional unit of measurement and spatial organization in Japanese homes.

The aim of this article is to examine how Tadao Ando uses concrete as a modern building material to recreate the principles of spatial modularity known from traditional tatami mats. The analysis of selected works of the architect helps to understand how the concrete formwork technique merges modernity with traditional Japanese spatial concepts. The hypothesis suggests that Ando's contemporary architecture continues the Japanese tradition, and concrete – a material that dominated 20th-century architecture – can be a tool for expressing ideas rooted in Japanese aesthetics and philosophy. In his projects, Ando adapts historical patterns to contemporary needs, creating modern "concrete tatami" that organize space in his buildings while retaining the spiritual dimension of traditional Japanese architecture.

2. MODULARITY OF TRADITION – TATAMI, FUSUMA AND SHOJI

As Tadao Ando once said: "Japanese architecture is primarily horizontal and lacks geometry; it is characterized by spatial irregularity. It is integrated with nature, and its space is devoid of order. In contrast, the Pantheon and Piranesi's interiors represent the Western vision of

² Cf. e.g. M. Skaza, *Tokyo. One city. Ten cases of architecture = Tokio. Jedno miasto. Dziesięć przypadków architektury*, "Technical Transactions. Architecture" 2015, no. 2-A, pp. 173–190; K. Pawłowska, *Krajobraz – architektura – ludzie. Japońsko-polskie studia porównawcze*, "Czasopismo Techniczne. Architektura" 2010, no. 4-A, pp. 7–52.

space. For some time now, my goal has been to integrate these two concepts of space."³ When looking at traditional Japanese architecture, one cannot overlook the geometry based on right angles and the recurring grid of pillars and wooden structural divisions. At the same time, as Ching-Yu Chang points out, "Attachment to horizontality is rooted in the Japanese pursuit of harmonious coexistence with nature. Nature is not an opponent, and the environment is not an object of conquest."⁴

Modularity is one of the most characteristic elements of traditional Japanese architecture. The foundation of this concept is, among other things, the system of tatami mats, which, having evolved over the centuries, defined the rhythm and proportions of living spaces. Tatami, with standard dimensions of about 0.9 x 1.8 meters, were not only a practical element of flooring but, above all, a unit of measurement that organized the entire interior space.⁵ In traditional Japanese homes, the arrangement of tatami, called *tatami-ma*, determined the layout of rooms, giving them a harmonious rhythm. Linked to this is the principle of spatial flexibility – rooms could change their functions depending on needs, and the space itself was designed with the idea of harmony with nature.

Although the modularity of tatami was a practical solution, it had deeply rooted cultural and spiritual significance⁶. In Japanese aesthetic philosophy, rhythm and spatial order were inseparably linked to life harmony. Tatami not only physically organized the interior but also influenced the way residents interacted with the space. Every movement and activity in the tatami space had its place and rhythm, fostering contemplation and balance between body and mind.⁷

A similar function was fulfilled by sliding panels – *fusuma* and *shoji* – which also had a significant impact on the flexibility and fluidity of space in traditional Japanese homes. *Fusuma*, covered with opaque paper or fabric, were used to divide space between rooms, allowing quick adjustments to the interior layout as needed. *Shoji*, made from thin paper placed on wooden frames, controlled the light and created a subtle boundary between the interior and the outside environment. Both elements played a crucial role in shaping spaces that were simultaneously closed, protecting the residents' privacy, and open to nature and light.

Tadao Ando, although designing modern architecture, does not abandon these traditional principles.⁸ In his projects, he consciously refers to the modularity and flexibility of space, which were characteristic of traditional Japanese houses. The divisions of concrete walls, which are a key element defining the character of Ando's architecture, serve a function similar to tatami. Through the repetition of formwork imprints on the walls, Tadao Ando creates

³ T. Ando, *Materials, Geometry and Nature* [in:] F. Dal Co, *Tadao Ando. Complete Works*, Phaidon, London 1995, p. 456.

⁴ C.Y. Chang, *Japońskie pojęcie przestrzeni* [in:] K. Wilkoszewska (ed.), *Estetyka japońska. Antologia*, Universitas, Kraków 2008, p. 208.

⁵ Cf. H. Engel, *Measure and Construction of the Japanese House*, Tuttle Publishing, Tokyo 2020, pp. 44–57.

⁶ Fundamental cultural differences should be taken into account – cf. e.g. A. Wosińska (ed.), *Spojrzenia. Japonia według Zachodu. Zachód według Japonii*, Wydawnictwo Kirin, Bydgoszcz 2013.

⁷ It is generally accepted that the "ideal" quality of Japanese space (not only residential) was achieved in *Katsura Imperial Villa (Katsura Detached Palace)* – the imperial residence in the suburbs of Kyoto, cf. Isozaki A. (ed.), *Katsura Imperial Villa*, Electa, Milano 2015.

⁸ Cf. e.g. T. Takahide et al. (ed.), *Japan in Architecture. Genealogies of its Transformation*, Shimoda Yasunari, Tokio 2018, p. 80.

a contemporary version of *tatami-ma* – a rhythmic layout that organizes space, giving it harmony and regularity. Concrete walls, which at first glance appear rough and unfriendly, in Ando's hands become a tool for creating modular, flexible spaces that retain the subtlety and elegance characteristic of Japanese tradition.

It is worth noting that modularity in Ando's projects, as in traditional Japanese homes, does not only concern the physical space but also the relationship between humans and their surroundings. In traditional Japanese architecture, the key element was the harmony between the interior and the exterior, and the boundary between these two spaces was fluid. Through elements like *shoji*, which let in light and visually connected the interior with the garden, residents were constantly in contact with nature. In his projects, Ando also seeks to blur the boundaries between interior and exterior. His buildings, although made of heavy concrete, open up to nature through the thoughtful placement of windows, openings, and architectural elements, allowing the flow of light and shadow – an homage to traditional Japanese design principles. In traditional architecture, light seems to be incidental, whereas in Ando's contemporary works, it is a deliberate and carefully considered element.

Tadao Ando, like architects of the Edo period, pays particular attention to how light affects space. In traditional Japanese homes, light was subtly filtered through *shoji*, creating gentle transitions between brightness and darkness. This contrast of light and shadow, known as *komorebi*, was a key element of Japanese aesthetics.⁹ In Ando's designs, concrete walls become a backdrop for the play of light, which flows through openings and windows, creating dynamic changes in the space depending on the time of day and weather conditions. Thanks to this, Ando's architecture, like traditional Japanese houses, becomes a meditative space where every element has its place and function.

One example where Ando applied a contemporary version of modularity and spatial flexibility is his famous Church of Light in Ibaraki. The concrete walls forming the raw structure of the church are intersected by two slits – one vertical and one horizontal – through which light enters the interior. This simple gesture creates a space that is both monumental and intimate, where light becomes a key element defining the rhythm and atmosphere of the interior. Like traditional Japanese architects, Ando uses light as a tool to shape space and imbue it with spiritual significance.

Modularity in Tadao Ando's architecture, much like in traditional Japanese homes, is not merely a technical solution. It is a philosophical approach to space, addressing the relationship between humans, nature, and architecture. *Tatami*, *fusuma*, and *shoji* in traditional Japanese architecture served the function of organizing space and harmonizing it with its surroundings. In Ando's designs, these same principles are realized through the use of modern materials and technologies.

3. CONCRETE MINIMALISM OF ANDO – SPIRITUAL SPACE AND SILENCE

Ando's architecture, at first glance, seems to be based on a limited number of elements – rectangles, squares, lines, and arches, sometimes circles, and rarely triangles. However, the Japanese architect creates new configurations of these forms each time, giving his projects

⁹ Cf. J. Tanizaki, *Pochwała cienia*, Wydawnictwo Karakter, Kraków 2016.

a unique character. In Ando's works, proportions play a key role, as do the relationships between individual architectural elements. In addition to shapes, Ando places enormous emphasis on light, shadow, and the connection between interior and exterior.

Ando's minimalist approach is also deeply rooted in Zen philosophy. The austerity of his buildings, devoid of unnecessary adornment, reflects the idea of simplicity and humility, as well as the spiritual significance of silence (*ma*) – the concept of emptiness, which holds immense aesthetic and philosophical value in the Japanese tradition.¹⁰ For Ando, silence is a crucial element because it allows focus on the essence of space – the relationship between architecture, nature, light, and shadow.

In Zen philosophy, the emphasis is also placed on experiencing the present moment and being fully aware of it. Ando's architecture reflects this approach, allowing users of his buildings to fully experience the space – both physically and emotionally. The light that penetrates through the concrete walls creates changing effects depending on the time of day and weather. Shadow, in contrast to light, introduces depth and contrast, giving the space an almost theatrical character. Ando masterfully balances these elements, creating spaces that constantly evolve with external conditions. In a series of his houses, he introduces the outside environment, creating patios as external rooms, thus blending the interior with nature in a thoughtful way.

One of the most important aspects of Ando's work is his ability to create meditative spaces. Concrete walls, although massive, do not close off the interior but create a space for contemplation and reflection. In the Church of Light, daylight, penetrating through a simple cross cut into the concrete, creates a mystical atmosphere conducive to inner silence. The play of light and shadow makes the church's interior take on a symbolic dimension – it becomes a spiritual space where the external material, concrete, gives way to spiritual experiences. Ando employs similar solutions in the Meditation Space in Paris, where in a specific place – defined by circular concrete walls – two axes meet: the horizontal line of human life and the vertical line between the earth and the sky, thus creating a place for focus and serenity.

By creating spaces where people can immerse themselves in silence, Ando refers to the Japanese tradition, where architecture served not only daily activities but also spiritual contemplation. Ando's concrete minimalism is not just an aesthetic manifesto – it is a profound reference to the spiritual values rooted in Japanese culture and philosophy. In this way, Ando reminds us that architecture has the power to influence not only the senses but also the mind and soul, offering a space for reflection and harmony.

4. CONCRETE FORMWORK AS MODERN TATAMI

The modularity of Tadao Ando's architecture is undeniable. It is evident even in his early projects, in numerous sketches where he searches for shapes and proportions. Despite the imprecision of hand-drawn sketches, Ando sometimes records proportions in numbers (dimensions).¹¹ In many projects, modularity applies to the entire building's proportions or its division into smaller parts. Although no sketches have been found where Ando explicitly noted the proportions of concrete wall divisions or formwork dimensions, in the majority of

¹⁰ Cf. J. Petri, *Estetyczne aspekty japońskiej przestrzeni miejskiej*, Universitas, Kraków 2011, p. 73.

¹¹ T. Ando, *Tadao Ando 0. Process and Idea*, Toto, Tokyo 2021, pp. 25, 29, 31 and next.

his projects, he uses concrete walls cast on-site with watchmaker-like precision, divided into a horizontal modular layout.

The principle is best demonstrated in the table below,¹² which lists 20 projects from different periods of Tadao Ando's career. It also shows the main concrete formwork divisions used in these buildings.

No.	Project	Date*	Localization	Formwork divisions
1.	Row House	1975–1976	Osaka, Japan	180x90
2.	Wall House	1976–1977	Ashiya, Japan	b.d.
3.	Glass Block House	1977–1978	Osaka, Japan	b.d.
4.	Rokko Housing I	1978–1983	Kobe, Japan	b.d.
5.	Koshino House	1979–1981	Ashiya, Japan	180x90
6.	Festival	1980–1984	Naha, Japan	b.d.
7.	BIGI Atelier	1980–1983	Tokyo, Japan	180x90
8.	Townhouse in Kujo	1981–1982	Osaka, Japan	b.d.
9.	Iwasa House	1982–1984	Ashiya, Japan	b.d.
10.	Kidosaki House	1982–1986	Tokyo, Japan	180x90
11.	TIME'S I/II	1983–1984	Kyoto, Japan	n.d.**
12.	JUN Port Island Building	1983–1985	Kobe, Japan	b.d.
13.	Chapel on Mount Rokko	1985–1986	Hyogo, Japan	180x90
14.	Church on the Water	1985–1988	Tomamu, Japan	187,5x100
15.	Church with the Light	1987–1989	Osaka, Japan	180x90
16.	House in Shiga	2004–2006	Shiga, Japan	180x90
17.	Toyasaka City Library	1997–2000	Toyasaka, Japan	166x90
18.	Armani / Teatro	2000–2001	Mediolan, Italy	180x90
19.	Chichu Art. Museum	2000–2004	Naoshima, Japan	250x90
20.	Longen Foudation	1994–2004	Neuss, Germany	180x90

* The comparison includes the dates of the first construction; in several cases, the presented buildings were expanded or renovated, and some were demolished.¹³

** This building was constructed primarily from small concrete blocks.

In the list, it is clear that the 180x90 division frequently recurs, which corresponds to the dimensions of tatami mats. If the term "b.d." appears in the column "formwork division", it means that no exact dimensions of the divisions were provided in the available sources. However, this does not mean that such a division does not exist, but only that it was not explicitly

¹² The series of books *Tadao Ando. Details*, volumes 1-4, was used as the basis for presenting the comparison. These books contain detailed drawings showing not only the dimensions of the buildings but also the arrangement and measured sizes of the concrete formwork divisions.

¹³ Cf. among others *Tomishima House* (1971–1973), later adopted into *Atelier in Oyodo* (1980–1981), expanded (rebuilt) three times, then demolished and replaced by *Atelier in Oyodo II* (1989–1991), which was further expanded in 1994–1995, in: T. Ando, *Tadao Ando I. Houses & Housing*, Toto, Tokyo 2019, pp. 110–143.

measured. It should also be noted that in his projects, Tadao Ando uses materials other than concrete, such as glass and wood.

Tadao Ando's building technique, particularly associated with concrete, draws attention not only for its austerity but also for how formwork creates repetitive geometric divisions on the surface of the walls. In traditional architecture, tatami were not only flooring but also units of measurement that organized the interior space. In Ando's work, the repetition of concrete panels can be seen as a modern interpretation of this very concept of spatial organization.

The juxtaposition of traditional tatami mats with modern concrete in Ando's work reveals a fascinating relationship between the past and the present. Tatami in traditional Japanese homes organized space, set boundaries, and defined the layout of interior use. Similarly, concrete walls in Ando's projects, through their modularity and repetition, serve to organize space.

Concrete in Ando's hands becomes a modern tool for shaping space – it not only references tradition but also redefines it. In this way, Ando proves that modernity and tradition need not be in opposition but can coexist and complement each other. C. Jencks points to the modernist nature of traditional Japanese architecture, claiming that “the entire International Style had existed there for four hundred years, including standardization, variability, modular coordination, grid planning, and the valued notion of anonymity.”¹⁴

5. CONCLUSION

The technological advancements of the 20th century brought revolutionary changes, not only in social and cultural spheres but also in the way we design and build. Tadao Ando, one of Japan's most renowned contemporary architects, skillfully combines modernity with tradition in his projects. Through the conscious use of concrete, Ando references traditional Japanese spatial concepts, such as the modularity of tatami, adapting them to contemporary architectural needs.

Although his projects are characterized by austerity and minimalism, they are deeply rooted in Japanese aesthetics and tradition. The concrete walls Ando creates become modern equivalents of tatami – organizing space while offering spiritual experiences. Just as tatami defined the rhythm and proportions of interiors in traditional Japanese homes, the formwork divisions in Ando's projects define space within his buildings. In Ando's hands, concrete gains new meaning – it becomes a tool for expressing spirituality, harmony, and a profound connection with nature.

In Ando's works, modernity and tradition coexist, creating architecture that not only fulfills practical functions but also becomes a space for reflection, contemplation, and spiritual experience. Through the precise use of modular concrete divisions and the subtle manipulation of light and shadow, Ando creates spaces that reference tradition while meeting contemporary needs.

In this way, Tadao Ando shows that even in the 21st century, full of technology and innovation, tradition can be not only an inspiration but also a tool for creating modern architecture. His projects are proof that architecture can transcend the boundaries of time and space,

¹⁴ C. Jencks, *Architektura późnego modernizmu*, Arkady, Warszawa 1989, p. 98.

combining spiritual, aesthetic, and functional values. This is precisely why Ando's work is so highly regarded – both in Japan and around the world – because it serves as a bridge between the past and the future, offering spaces that are simultaneously modern and deeply rooted in tradition. They are a testament to the harmony between the old and the new, while also embodying a sense of *Japan-ness* in architecture¹⁵ that transcends the borders of the Land of the Rising Sun.

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¹⁵ Cf. A. Isozaki, *Japan-ness in Architecture*, MIT, Cambridge 2011.