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THE CONCRETE ARCHITECTURE OF TADAO ANDO – THE EXPERIENCE OF MATERIALITY IN THE PERCEPTION OF A BUILDING'S ARCHITECTURAL FORM

BETONOWA ARCHITEKTURA TADAO ANDO – DOŚWIADCZENIE MATERIALNOŚCI W POSTRZEGANIU FORMY ARCHITEKTONICZNEJ BUDYNKU

Abstract

Using the work of Tadao Ando as an example, the paper discusses the aspect of the experience of materiality associated with the perception of works of architecture built in concrete. This material becomes the principal means of expression in creating the geometric ideas of buildings conceived in the tradition of Japanese minimalism. The research subject concerns the experience of materiality in the perception of a work of architecture. The aim of the research is to point to the need to realise buildings on the basis of the principle of material honesty, which gives rise to an authentic architecture, free of falsification, in which the detail reflects the technology of erecting monolithic structures. The research focuses on an analysis of selected buildings and of the critical opinions accompanying Ando's work. The conclusions indicate that the materiality of Ando's concrete architecture acquires additional meaning in the presence of the variability of natural elements such as light, water and air, which is used as an element of a creative narrative perceived by a sensitive viewer.

Keywords: *concrete architecture, experience of materiality, idea and matter, Tadao Ando*

Streszczenie

Tekst opisuje na przykładzie twórczości Tadao Ando aspekt doświadczenia materialności związany z postrzeganiem dzieł architektury realizowanych z wykorzystaniem betonu. Materiał ten staje się głównym środkiem wyrazu w tworzeniu geometrycznych idei budynków utrzymanych w konwencji japońskiego minimalizmu. Temat badań dotyczy doświadczenia materialności w postrzeganiu dzieła. Celem badań jest wskazanie potrzeby realizacji budynków w oparciu o zasadę szczerości materiałowej, w wyniku której powstaje architektura autentyczna, pozbawiona zafałszowań, gdzie detal odwzorowuje technologie wznoszenia monolitycznych struktur. Badania koncentrują się na analizie wybranych budynków i opinii towarzyszących twórczości Ando. Wnioski wskazują, że materialność betonowej architektury Ando zyskuje na dodatkowym znaczeniu w obecności zmienności elementów natury jak światło, woda, powietrze, co jest wykorzystywane jako element twórczej narracji, dostrzeganej przez wrażliwego odbiorcę.

Słowa kluczowe: *architektura betonowa, doświadczenie materialności, idea i materia, Tadao Ando*

1. INTRODUCTION

The experience of materiality is the leading sensation defining the aesthetics of concrete architecture. Directly related to one of the components of the Vitruvian triad, namely durability (*firmitas*), materiality becomes the essence of the tangibility of architecture in the viewer's contact with the form of a building. This has specific consequences for the perception of a work, determining the sense of unity between the architectural idea of an object and the matter in which that idea has been embodied. Under certain circumstances, concrete evokes associations with the Platonic "primordial matter" of the dialogue *Timaeus*. The Great Builder of the World – the Demiurge – combining it with the idea of a thing, by harmoniously ordering its amorphous form in order to give it real shape in the act of creation, reproduces in it the image of the temporal and impermanent world of the senses, with all the imperfections and flaws of physical things. The image of the imperfection of this work was in reality created only in the process of striving to achieve the perfection of things modelled on the unattainable, perfect and eternal idea[1]. A tangibly existing thing can never be treated as the idea in itself, but only as a certain representation of it in physical form. Concrete, owing to its susceptibility to being formed, allows one to perceive in it this kind of philosophical "primordial matter" while retaining the features of reconstituted stone, which are designed according to the aesthetic and structural expectations of the designer, making this material a universal medium for transforming architectural thought into the physical form of a building. Here concrete becomes the carrier of the record of an architectural idea which, owing to the neutrality of its fluid mass, acquires the aesthetic expression intended by its creator only in the formwork, once it has reached its hardened state. The experience of the materiality of concrete is accompanied, on the one hand, by a sense of rawness and coldness and, on the other, by a sense of safety and solidity. Frequently remaining in contradiction – being desirable and repellent at the same time, or impersonal and expressive at once – the aesthetics of concrete lays the foundation for the emotional side of the perception of a work. Twentieth-century modern architecture has accustomed us to this aesthetic of neutrality and expressive impressions, which takes on new meanings as soon as the form is exposed to light, coming alive for a moment from its static slumber. Against the background of numerous experiments with concrete architecture, the work of Tadao Ando stands out. Applying the simple rigour of panel formwork, he creates a language of minimalist composition that finds its reflection in the concrete surface, not concealing the building process and at the same time turning it into the art of narrating the technological origin of the detail. In this way an "honest" architecture comes into being – one that does not pretend and is not embellished, and is therefore authentic in its purist and ascetic form. The aesthetic and structural coherence of matter with the form and the architectural idea of a building constitutes the very essence of the principle of material honesty, which Wojciech Niebrzydowski explains as follows:

> The principle of 'material honesty' in architecture consists in revealing the true character, the nature, of a given building material. It states that the architect should use a material in such a way as to display its most important features, drawing from the building material only that

[1] Platon, *Timajos* [in:] Platon, *Dialogi*, trans. W. Witwicki, Unia Wydawnicza "Verum", Warszawa 2007, pp. 297–366.

> which it essentially is. In turn, the observer should not experience any sensations other than those which a given material conveys through its essential properties[2].

The architecture created by Ando responds perfectly to the issue of material honesty, which makes the experience of materiality an important aspect of the perception and of the technological identity of a building's architectural form.

2. THE AESTHETICS OF CONCRETE AS THE ESSENCE OF EXPERIENCING THE MATERIALITY OF TADAO ANDO'S ARCHITECTURE

Tadao Ando is a Japanese architect who has made concrete the principal means of aesthetic expression for the spatial ideas of the buildings he designs. As he states: "I want to create architecture that is the essence of basic materials, techniques and space[3]." Ando achieves the introverted character of his architecture through the aesthetic neutrality of concrete matter, which, by means of monolithic partitions, physically delimits space, sharply drawing its boundaries. The legible division into the interior and exterior of a building creates an architecture of strongly defined form, oriented towards the experience of materiality. This experience does not result solely from the very essence of concrete matter and its physical properties, but is the outcome of external factors, coming directly from nature, acting upon the geometric structure devised by Ando. These are chiefly light, air and water. Miho Iwata points to this significant component of nature's influence on buildings in Ando's work, discerning in this relationship not only the spirit of Japanese minimalism, but also an architecture of ideology and faith:

> Out of simple form, Tadao Ando creates architecture full of drama and emotion. Bringing nature into life and into architecture is an important theme in the artist's work. It is an art that seeks the proper relationship between nature and man. Isolation from the outside world, the reintroduction of nature into the interior of a building, the creation of contemplative spaces – these are the main premises of Ando's work. In order to realise his idea, the artist eliminates all unnecessary elements and constructs each object solely from a specific, selected material, with enormous care, indeed with love, in order to achieve a rich, profound impression. Behind the simplicity of the forms lies immense work on the details. His realisations constitute an attempt to express the maximum of quality through minimal elements[4].

In contrast to designers who exploit the brutalist nature of concrete derived from traditional board formwork, Ando for the most part uses concrete with exceptionally smooth surfaces, cast in plywood formwork, usually measuring 90×180 cm, which, together with the tie-rod holes, produces a delicate drawing of the module. This imprint on the concrete face is at once a detail characteristic of Ando and a trace recording the technological genesis of the building, revealed in its material, "honest" form. This modular dimension of the plywood panel has

[2] W. Niebrzydowski, *Nieszczera szczerość materiału*, "Czasopismo Techniczne. Architektura" 2006, 103(9-A), p. 317.
[3] Cit. in S. Ratajczyk, *Kościół Światła*, "Architektura & Biznes" 2004, no. 3, p. 68.
[4] M. Iwata, *Architektura Tadao Ando*, "Architektura & Biznes" 2004, no. 3, pp. 66–67.

yet another significant aspect, rooted in Japanese culture: it coincides with the tatami, the traditional Japanese straw mat used to cover floors, which became a unit of measurement for interior floor area. The tatami module ultimately imposes a spatial rhythm and scale on buildings, as can be observed in the case of the traditional architecture of the Japanese house[5]. Ando uses concrete to create a void bounded by the geometry of simple, ascetic forms, carved out of a wider space in order to create a separate place that might be called a refuge for the individual in society. Here the power of the materiality of Ando's concrete works reveals itself, consisting in spatial isolation enclosed within strongly defined bounds, which give a sense of the intimacy and safety of the primordial cave. The aesthetic neutrality of the concrete planes intensifies the sense of durability and stability, which gains in significance through the minimalist convention of the means of expression. In his text *On the Nature of Concrete – or Ideas, Metaphors and Abstractions*, Dariusz Kozłowski describes the experience of the material aspect of Ando's architecture as follows:

> The rigour of simple geometric compositions is built by the sensual quality of reinforced concrete structures. As always, Tadao Ando's concrete, cast in smooth-walled forms, does not conceal its technological origin. The formwork leaves on the reinforced concrete a record that makes it possible to discover its size, shape and the arrangement of the holes left by the ties connecting the formwork walls. This relief is imprinted on the surface of the concrete, smooth and delicate at the same time, inviting one to bring one's hand closer and touch it – a touch that does not disappoint: the concrete has the nature of a smooth and delicate fabric, contradicted, however, by the coldness and hardness of the material's other, stony kinship. The traces of the forms, the 'engravings' on the concrete walls, this sole 'ornament' of the architecture, create a delicate drawing, precisely thought out and designed, having nothing in common either with an architectural nonchalance that displays building technology, or with the craftsman-like honesty of castings bearing the marks of board formwork[6].

3. THE EXPERIENCE OF CONCRETE MATERIALITY IN SELECTED WORKS BY TADAO ANDO – HOUSES AND TEMPLES

Among Tadao Ando's numerous realisations, particularly with regard to the experience of concrete materiality, his houses and temples deserve attention on account of the introverted character of their architecture. The architect was entrusted with the design of buildings with interiors of an exceptional character – residential or devoted to religious worship – that is, closely bound up with the intimacy of dwelling and with the spirituality of prayer and meditation. This is an architecture in which the materiality of the idea has been accentuated by the varying participation of natural light. The first significant project by Ando to be noticed by architectural circles is considered to be the *Azuma House* (Row House in Sumiyoshi,

[5] K. Ingarden, Y. Kinoshita Watanabe, *The Japanese Traditional House: Spatial Representation of Dualistic Social Codes*, "Środowisko Mieszkaniowe/Housing Enviroment" 2026, no. 54, pp. 25–37, https://doi.org/10.2478/he-2025-0035 (access: 24.07.2026).

[6] D. Kozłowski, *O naturze betonu – czyli idee, metafory i abstrakcje*, [in:] D. Kozłowski (ed.), *Architektura Betonowa 2001*, Polski Cement, Kraków 2001, p. 11.

Osaka, Japan, 1975–1976), in the form of a rectangular concrete "box" inserted into a narrow plot between the existing terraced houses, with a characteristic internal courtyard open to the sky. The experience of materiality lies in the monolithic character of the spatial layout proposed for this house, access to which is restricted to the mystery of a single entrance opening leading inside. Its introversion and isolation from the outside world create a place of shelter, intensified by the sense of the concrete solidity of the cast spatial structure, like a capsule, concentrating almost entirely on the opening towards the sky. The *Koshino House* in Ashiya (Hyogo, Japan, 1979–1980, extension 1983–1984) is another example exploiting the materiality of the aesthetics of concrete in combination with light, including light from skylights above, in which the isolation of space has been combined with a partial openness of the interiors to nature. The house is firmly embedded in the terrain. Here Ando applies the characteristic imprint of the formwork panels, which at times lends a slightly undulating plane to the smooth concrete, with the characteristic points left by the ties. In turn, the *4x4 House* on the coast of the Seto Inland Sea in Tarumi-ku (Hyogo, Japan, 2001–2003) is an example of a residential tower erected in monolithic concrete, with a characteristic glazed cube penetrating the upper part of the tower's shaft, from which a view over the water unfolds. The experience of the materiality of concrete architecture here correlates with the iconic geometry of the scheme, once again oriented towards the introversion of a fortress, which opens up to its surroundings as it rises to a distance that is safe for the user. Against the background of Ando's other houses, these three distinctive examples show how emphatically and with what technological deliberation the architect uses concrete to express materiality even in his smallest realisations. In Ando's sacred projects, in turn, we observe that the concrete forms acquire a transcendent character filled with the symbolism of meanings derived from the action of natural elements such as light, water and air. In the *Church of the Light* (Ibaraki, Osaka, Japan, 1987–1989) we are dealing with a rectangular form intersected by a wall set at an angle. The key element of the composition here, however, is the cross-shaped slit in the chancel wall, constituting the main element of the interior and of the play of light. Ando later employs a similar motif of a cross-shaped slit in the roof slab of a small chapel forming part of the multifunctional, multi-phase *Awaji-Yumebutai* complex (Tsuna, Hyogo, Japan, 1993–1999). Here the experience of the materiality of the introverted interior with its concrete partitions is illuminated by light falling, this time, from above. The small *Meditation Space* (Paris, France, 1994–1995), built next to the UNESCO headquarters, similarly makes use of modulated light entering around the perimeter of the cylindrical wall, lending a contemplative atmosphere to the interior. Opening to the sky also became an essential element of the *Hill of the Buddha* project (Makomanai Takino Cemetery, Sapporo, Japan, 2015), creating a pavilion inside a lavender-covered hill – the space of a prayer hall with a statue of the Buddha. Here the materiality of concrete, folded in a characteristic manner, creates a solemn atmosphere conducive to quiet and contemplation.

4. CONCLUSIONS

Ando has perfected the art of combining the geometric idea of a building with the method of expressing it in detail, which is reflected in the record of the ordered technology of the building's realisation in the concrete imprint on the façade. This honesty, consistent with the nature of monolithic matter, is all the more valuable today, as original materials – owing to

restrictive legal requirements and the dictates of economics – are increasingly replaced by numerous imitations. Ando uses concrete in accordance with its aesthetic predispositions and its susceptibility to shaping, almost exclusively in the most purist, minimalist form of smooth, grey surfaces. The universality of the materiality thus obtained creates the basic means of expression in which the creator's thought about the shape of space can be recorded. This medium is intended to remain as neutral as possible in its technological rigour, so that it may "come alive" under the influence of external factors. Especially by employing light and shadow, Ando makes concrete into a material stage for a spectacle of sensations that build the emotional appeal of the work in the eyes of a sensitive viewer. The variability of the influence of external factors creates a certain contrast with the durability and neutrality of concrete matter, and it is this field that defines the essence of the aesthetic success of Ando's realisations. The fleeting moments of sunlight acting upon bare concrete surfaces are readily captured in photographs which, published in numerous monographs and albums, create a coherent narrative of Ando's style. In the publication *The Colours of Light,* the photographer Richard Pare assesses the leading role of light and colour in the perception of his work as follows:

> In Ando's architecture, the harmony of form, light and colour is achieved through a synthesis of the contrasting qualities of their natures. Light and colour, unlike the essential elements of architecture, are ephemeral and transient. The modulated path of light is of fundamental importance to Ando's architecture. The sense of calm results from the way in which light and colour, through their presence and absence, lend articulation to form. There is a balance between tension and repose in the buildings that produces both tranquillity and a stimulating effect. Ando's work is imbued with a profound sense of spirituality[7].

The concrete used in Ando's works emanates calm and the neutrality of shades of grey, which allows for the creation of an architecture oriented towards spiritual experience, regardless of whether the building is a house, museum, gallery or temple. The composition of the geometric schemes, combined with the materiality of the aesthetics of concrete, makes these works stand out against the garish and colourful shapes of contemporary architecture, which vies for the viewer's attention, often through exaggerated and overrated aesthetic devices, merely to gain a presence in the media. The aura accompanying Ando's buildings appears restrained and at the same time rich in the field of interpreting the sensations arising from contact with it. Its foundation is the aesthetics of concrete, which defines the essence of the experience of the materiality of an architecture rooted in the spirit of Japanese minimalism.

References

[1] Ando T., *The Colours of Light*, photographs by R. Pare, Phaidon, London 2000.

[2] Ingarden K., Kinoshita Watanabe Y., *The Japanese Traditional House: Spatial Representation of Dualistic Social Codes,* "Środowisko Mieszkaniowe/Housing Enviroment" 2026, no. 54, pp. 25–37, https://doi.org/10.2478/he-2025-0035 (access: 24.07.2026).

[3] Iwata M., *Architektura Tadao Ando*, "Architektura & Biznes", no. 3, pp. 64–67.

[4] Kozłowski D., *O naturze betonu – czyli idee, metafory i abstrakcje*, [in:] D. Kozłowski (ed.), *Architektura Betonowa 2001,* Polski Cement, Kraków 2001.

[7] T. Ando, *The Colours of Light*, photographs by R. Pare, Phaidon, London 2000, p. 222.

[5] Niebrzydowski W., *Nieszczera szczerość materiału*, "Czasopismo Techniczne. Architektura" 2006, 103(9-A), pp. 317–319.
[6] Platon, *Timajos*, [in:] Platon, *Dialogi*, trans. W. Witwicki, Unia Wydawnicza "Verum", Warszawa 2007, pp. 297–366.
[7] Ratajczyk S., *Kościół Światła*, "Architektura & Biznes" 2004, no. 3, p. 68.

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