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THE PHENOMENON OF CONCRETE

FENOMEN BETONU

Abstract

In this essay, the issue of conversion of concrete in architecture will be presented. It will show different methods of treating concrete and determine elements allowing the conversion from a seemingly common material into the perfect thing. The Masters, who have met the challenge of converting concrete, will be presented, along with the characteristic features defining their approach to the subject. The issue of esthetics and utility of the objects of contemporary concrete architecture and its relation to its surroundings as well as its overall reception.

Keywords: conversion, concrete, concrete architecture, enthusiasts and sceptics, creative process, esthetics, texture and color of concrete

Streszczenie

Niniejsza praca przedstawia problematykę transmutacji betonu w architekturze. Ukazane zostaną różne sposoby traktowania betonu, przybliżające do określenia elementów pozwalających na przemianę z pozoru pospolitego materiału, w rzecz doskonałą. Przywołani zostaną Mistrzowie, którzy zdołali stawić czoła niełatwemu wyzwaniu, jakim jest transmutacja betonu i charakterystyczne cechy określające ich podejście do tego tematu. Poruszona zostanie także kwestia estetyki i użyteczności obiektów współczesnej architektury betonowej oraz relacji z otoczeniem, jak również ich ogólnego odbioru.

Słowa kluczowe: transmutacja, beton, architektura betonowa, entuzjaści i sceptycy, proces twórczy, estetyka, faktura i barwa betonu

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Concrete has got its own character: It can – like human beings – be graceful and vicious, faithful and content, friendly and capricious, it can be ill and treated, it can be as stern as a man or alluring like a lady.
We will have to like it – in the new millennium, a “concrete world out the window” will be our companion.
Zygmunt Jamróży

Concrete is seemingly a simple mixture of several ingredients; quite simple in terms of color and texture. Why then is it such a phenomenon and not so rarely called the “stone of our time”?

Digging into the depths of history, the use of concrete is first mentioned around the year 7000 BC; however, it was different than the one used today. There was a different binding factor and thus different durability. The very first mentions of concrete can be found in the “Ten Books on Architecture” – the work of the Master Vitruvius himself. “There is ... a kind of powder, which, from natural causes, produces astonishing results. (...) This substance, when mixed with lime and rubble, not only lends strength to buildings of other kinds, but even when piers of it are constructed in the sea, they set hard under water.” Those qualities, as well as a good accessibility of ingredients, made the technology of the production of concrete well known and commonly used around the 1st century BC. Concrete owes its contemporary form to the development of Portland cement as well as the ability to reach higher temperatures in furnaces. However, it was the turn of the XX and XXI centuries that gave concrete a whole new perspective.

It is phenomenal that a material known thousands of years ago still fascinates people. Once a novelty, used in so many constructions across centuries, it became almost common. The feature, which still makes it so fascinating, is its variability and the process of change. The possibilities it gives are almost endless. The conversion, which allowed for the change of the naturally common material into a remarkable thing, still arouses admiration and pause. The search is the key. There is no ultimate formula for creating a thing so durable, useful and beautiful. One thing is essential, though, a master alchemist able to use science in this inscrutable and for some almost magical process.

Today, concrete gives us great possibilities in the area of creating form. The process of casting allows to create desirable shapes, textures and colors. After the esthetic revolution, concrete was used not only to create the construction, but as a finishing layer inside as well as outside of buildings, and also for creating street furniture and objects of small architecture. It is relevant that there were not many enthusiasts of concrete at first. Decades passed until the usage of bare concrete won the approval of the recipients, especially in the case of representative or sacral buildings. Sometimes, even today, it is seen by society as unattractive, arousing objections and dislike, or just “ugly”. Despite all the adversity, this material plays an important and undeniable role in the shaping of architectural objects, and for nearly a hundred years, it constituted an important tool for creating modern architecture almost as an independent department – Concrete Architecture.

Le Corbusier was without doubt the one who gave concrete a new meaning, taking it out of the frame of a material used only for the function and logic of construction. He used concrete as an important tool in a construct rejecting ornaments in architecture. “I decided

to create beauty by contrast. I will lead a dialogue between the roughness and gentleness, between bland and intense, between precision and chance. I will make people think and reflect”¹

And so it happened. The unité d’habitation became a pretext for a heated discussion concerning the new “colors” of concrete. The rejection of plaster on this building became a sole plate for a new style – brutalism.

The shuttering used to form concrete left marks showing the texture of planks and knots, which fascinated the creator. He himself admitted that there are a lot of faults and flaws on the surface of the concrete used on the building, but that it was not a blemishing defect, rather a factor adding individuality like marks and wrinkles on a human’s body. It is crucial to remember that concrete is not an easy material to shape. Its complicated and peculiar nature makes it highly likely that the mistakes, which occurred in the creation process, will be visible. Le Corbusier, however, tried to teach the recipients that it does not diminish the visual aspects, making them not only accept it esthetically, but also showing that it can itself make for a desirable esthetic outcome, which can draw admiration. Without doubt, the conversion of concrete in this case is one of the most important in history. Unexpectedly, it was discovered that concrete – an artificial material – through its structure and natural roughness, can take a form similar to natural rock. Le Corbusier himself said in his inauguration speech that “It really seems possible to treat concrete as if it was a remade rock worth showing in its natural state”².

Carlo Scarpa continued with the concept after Le Corbusier. His conversion made it very difficult to find concrete in his works as a construction tool only. The creator combined it with other materials in a sublime way, exposing the nobility of the structure and according to it all features of natural rock.

The modern master of concrete architecture is Tadao Ando from Japan. The conversion of concrete – his beloved material – created by him led to the creation of his own unique style combining geometrical modernism with Japanese esthetics. Tadao Ando’s concrete is silky smooth, but not without the marks of construction, the shapes and size of the wooden bonding. The outcome does not pretend to be anything else, it does not hide anything, it emphasizes the absolute simplicity and authenticity of its Master’s works. Ando uses simple form, the principle of reduction and strict geometrical rules. His work can be defined in his words “I want to create architecture as the essence of basic materials, techniques and spaces. Architecture intrigues the human spirit”³

Among others, the Meditation Space at UNESCO headquarters in Paris confirms these words. The space consists of basically a cylindrical space with two entrances illuminated by a slit between the wall and the roof.

„In Tadao Ando’s architecture, everything is transformed into a metamorphosis of silence. Void and silence coexist in the core of his works. The architecture is created from silence. The utility of silence releases the intensity of an inner experience. Tadao Ando returns to the truth many before him committed to – “a metaphoric transfer of void into silence”⁴. The

¹ J. Charles, *Le Corbusier – tragizm współczesnej architektury*, Wydawnictwo Artystyczne i Filmowe, Warszawa, 1982.

² S. Giedion, *Przestrzeń, Czas i Architektura*, Polskie Wydawnictwo Naukowe, Warszawa, 1968.

³ S. Ratajczyk, *Architektura Tadao Ando*, Architektura & Biznes 3/2004, p. 68.

⁴ W. Blaser, *Tadao Ando, Architektur der Stille*, Birkhäuser, Basel-Boston-Berlin 2001, p. 87.



Ill. 1. Church of the light, Tadao Ando, Ibraki Osaka, 1999

key issue for this creator in his projects is also finding the correlation with nature. He takes it up especially in living spaces, aiming to provide the residents with a peaceful atmosphere, absolute safety aiding in contemplation and a life harmonious with nature. These features are easily obtained by the material he uses. Concrete makes objects solid and durable and, at the same time, very close to nature. The 4 x 4 House in Kobe pictures it perfectly. Raw cast uncovered concrete that makes the construction of the building creates an unusually harmonious relation between the body of the building and the surroundings. Concrete softens it, but, at the same time, it prevents the form from losing the toughness. It does not make it dull and boring; on the contrary, it brings out and adds character while letting it become one with the surroundings. Also, this concrete conversion allows a genius play of light and shadow inclining to deeper thought and longer contemplation of this work of contemporary concrete architecture.

A somewhat different approach can be found in Zaha Hadid's works. Her conversions are a great proof that there are no limits in molding concrete. From the very start, she created avant-garde, sophisticated projects with concrete as a perfect tool allowing her to obtain the desired esthetic effect.

She was able to create a seemingly ascetic building in an incredibly refined way, showing her deconstructionist abilities a great example of which is one of her early projects back from 1993. The building of a fire department on the grounds of Vitra factory in Weil am Rhein was built using raw reinforced concrete, which was poured on site into the shuttering. The author's views are best summarized by this citation: "Hadid thinks that reinforced concrete

poured on site is the best material when you want to achieve a sculptural expression in ambitious in terms of construction, huge spans and overhangs.” In the course of time, sharp angles in Hadid’s projects gave place to curved forms and yet they did not lose their dynamism. Such buildings are the Roman art sanctuary – MAXXI National Museum or The Phaeno Science Center in Wolfsburg, which balances nearly on the edges of possibility. When it comes to shaping form, Hadid is as far from conventional as physically possible. The conversion made by Zaha Hadid in this project allows the concrete block to rise into the air. The project was created not only due to the wild and unlimited imagination of the artist, but also thanks to knowledge and strong scientific cooperation with engineers and other architects, the effect of which was the development of self-consolidating concrete with specific qualities.

Among Polish architects, Dariusz Kozłowski deserves a special consideration, as he loved concrete above all other materials. According to Cezary Wąs’ words, “Kozłowski’s approach to architecture, assuming the freedom of creating new shapes and giving them metaphorical meaning, allows to define his architecture as the poetry of concrete.”⁵ The amazing approach of the artist towards concrete is best seen in his own words: “Concrete has a soul. This metaphorical assumption brings at first anthropomorphic correlations – by seeing an architectural object made of concrete, we commune with its exterior, we examine its “skin” in order to assess the form. When the reflection or inquisitiveness dictates to look deeper, we can see the power of the material, the forces running inside the construction – sometimes taking a form of only sensed system of hidden there somewhere steel elements. Sometimes it is possible to see the soul of concrete – when the shape of an object reveals it only from possible connections of beauty, purpose, durability of the product of a human imagination”⁶.

Villa in Fortezza in Lublin is a perfect depiction of such visions. The original look of this detached house makes an impression of an amazing, monumental, abstract sculpture. This conversion of a few simple basic blocks combined together, poured into the traditional wooden shuttering, with imprinted growth rings, refers to the work of Le Corbusier.

Let us not leave aside the leading American architect Frank Lloyd Wright, whose approach differed quite significantly, but who still had his merits in changing the perception of concrete, especially in the context of its constructional qualities and giving it decorative features. The architect had an inner conflict. He experimented with concrete, but some hesitation is visible in his actions – he was not convinced to using “raw concrete” from the very beginning. As Wojciech Nebrzydowski writes in his book, Wright aimed to “break the stereotype of concrete as a material seen as useful but unrefined”⁷. However, the search and creation of his own concrete conversions made him a pioneer in concrete standardization and prefabrication.

Works in the area of concrete conversions are still ongoing, not only by great masters, architects, but also by scientists, and they still stay open to new, spectacular solutions and discoveries. The interest in concrete is so great not only because of its esthetic values, but also structural, constructional and economic conditioning.

⁵ C. Wąs, *Bunt kwiatu przeciw korzeniom. Polska architektura sakralna lat 1980–2005 wobec modernizmu*, Quart. Kwartalnik Instytutu Historii Sztuki Uniwersytetu Wrocławskiego, nr 1/2006.

⁶ D. Kozłowski, *O naturze betonu – czyli idee, metafory i abstrakcje*, Architektura Betonowa, Kraków, 2001.

⁷ W. Niebrzydowski, *Beton i żelbet jako determinanty form architektonicznych*, Kraków, 2002.



Ill. 2. Vitra Fire Station, Zaha Hadid Architects , Weil am Rhein, 1993

Concrete has a great potential; the possibilities of its preparative molding and later processing are incredibly flexible. Due to the technological evolution, it gives the possibility to reach great spans and heights and its amorphous character allows to create complicated casts. It is a mean of expression, which seems to be combining two quite contrary concepts of individualism and universalism because it can be used in any way creating one's own artistic message.

Nowadays, so many different kinds of concrete have developed that its usage is almost inevitable and permanently written into architecture almost as an ideology preached by certain architects. The conversions of concrete allow to strengthen its technical properties, give new looks and also some entirely unexpected features that could seem impossible to achieve. Special consideration goes to self-cleaning concrete, which is not affected by time or nature; transparent concrete; and also photo concrete, which is gaining more and more popularity. One of the novelties in converting concrete is also the façade of Celosia Building created by MVRDV covered in a polyurethane layer. Such treatment of cast on site, smooth shuttering allowed to achieve the effect of fluidity and glimmering of the elevation of the building, which reflects rays of light regulating their access to the building.

The skill of molding concrete is not easy; however, each architect should undertake this hard, burthened with failure trial because, as a peculiar sculptor, he must convince himself of how special a material concrete is. Unpredictability of the outcome should be seen not as a defect, but as an advantage.

The dream of transmutation, a conversion of a seemingly common material into a perfect one may only come true for a master alchemist. Who is this master, though? Examples quoted above allowed to form an answer for this question – he is an artist and a scientist

who relies without doubt on imagination as well as knowledge and on practical skills. "(...) prominent creators have always had the greatest poignancy, set the track of thought about architecture. Discovering then and now the unknown territories of sensitivity they inspire the continuators"⁸.

In creating concrete conversions, it is crucial to remember that the decisions made must not only be well thought through, but also bold. Le Corbusier – the great master of concrete proved that something that seems blemishing often becomes an asset. "uncovered concrete reveals the smallest imperfections, plank bindings, the fibers and growth marks of a tree etc. (...) Are there no wrinkles and birthmarks on men and women, hooked noses and countless distinguishing marks? (...) Mistakes lie in the nature of humanity; our daily life"⁹. To continue this thought, we can compare a reinforced construction to a living organism in which the skeleton is covered in muscles.

The starkness and plainness of concrete and its elegance at the same time is an amazing and unquestionable asset. Concrete allows to a much easier reception of an architectural work inclining to reflection and creating a perfect background for the play of light and shadow. Seemingly artificial, made by men, seems to have features of a natural material. Very coarse, cold and rigid, in many ways resembles natural rock. However, it creates a much wider range of possibilities being so easy to mold and letting the creators convert itself over and over again and the results are hard to predict.

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