

ANNA RYŚ*

TRANSMUTATIONS OF CONCRETE AS THE ARTISTIC ELEMENT OF CONTEMPORARY UTILITY ARCHITECTURE

TRANSMUTACJE BETONU PIERWIASTKIEM ARTYSTYCZNYM WSPÓŁCZESNEJ ARCHITEKTURY UŻYTKOWEJ

Abstract

Le Corbusier instilled in designers the desire to search for system solutions that work in a wide range of applications. An ideology that did not relate to obtaining a particular substance was born, but it gave rise to a variety of meanings. Its base is a concrete structure. Time and money often have a decisive influence on the quality of the objects being constructed. Contemporary architectural works aim for minimalism, functionality and economy of realization. Once again, beauty in the skeleton of the building is seen, which is both useful and durable. Aesthetics is focused on the precision of workmanship as well as material optimization. Any deviation from the flagship assumption leads to an investment in uncertain land. However, it is the transmutation that seems to be the stimulus for the artistic element of the city's integrated works, such as the expansion of the *Tate Modern Museum of Art* in London.

Keywords: concrete, museum, Tate Modern Gallery, Switch House, Londyn, Jacques Herzog & Pierre de Meuron

Streszczenie

Le Corbusier zaszczepił w projektantach chęć poszukiwań systemowych rozwiązań sprawdzających się w szeregu zastosowaniach. Narodziła się ideologia nie odnosząca się do otrzymania konkretnej substancji, natomiast dająca podstawę dla różnorodnych znaczeń. Jej bazę stanowi betonowa konstrukcja. Czas i pieniąż mają często decydujący wpływ na jakość wznoszonych obiektów. Współczesne dzieła architektury dążą do minimalizmu, funkcjonalności i ekonomii realizacji. Coraz częściej dostrzega się piękno w szkieletcie budowli, który jest jednocześnie użyteczny i trwały. Estetyka skupiona jest zarówno na precyzji wykonania, jak i optymalizacji materiału. Wszelkie odstępstwo od sztandarowych założeń prowadzi inwestycję na niepewne grunty. Jednak to właśnie transmutacje wydają się być czynnikiem pobudzającym pierwiastek artystyczny dzieł wkomponowanych w tkankę miasta, takich jak rozbudowa muzeum sztuki *Tate Modern* w Londynie.

Słowa kluczowe: beton, muzeum, Tate Modern Gallery, Switch House, Londyn, Jacques Herzog & Pierre de Meuron

* M. Sc. Arch. Anna Ryś, assistant designer at the *Kahl-Gaczorek Office*.

1. Introduction

Concrete as a material has been widely known and used throughout the world for thousands of years. From a chemical point of view, it is a mixture of water, aggregate and cement as well as additives that give the desired characteristics of resistance to external factors: water resistance, frost resistance, acid resistance, thermal insulation, etc. As a substance also referred to as liquid crushed stone in combination with flexible A steel tensile-resistant mesh opens up tremendous possibilities for experimenting and exploring new applications in the broadly understood art of our time. Despite the small limitations, concrete as a building material offers extremely flexible and flexible possibilities in shaping the frame, finishing the façade or interior elements. Thanks to its flexibility in production and design, it can take the desired form, and sometimes even the modified texture, to become durable and resistant to climatic conditions. Reinforced concrete solved the problem of fire as well as corrosion protection of lonely steel structures. In addition to today's technology, it is fast in the implementation of large cubicles, resulting in time savings and greater accuracy. Architects do not fully affect the final cross-section and span of the building elements, follow some schemes and simplified rules for the design of concrete structures. However, the final reinforcement system and the selection of the appropriate mixture of components are always given on the basis of the calculations and tests conducted by structural engineers. Non-standard building solutions can carry behind the mistakes and fixes on the building, which raise the price of the facility and exacerbating the pressure of professional responsibility. Professional engineering programs can facilitate human work, but also raise investment costs. However, the soft form of architecture, which takes on once more bold and surprising spans, arouses worldwide delight. Soft and more liquid forms carry more costs. Therefore, if possible, the simplest and most intuitive architectural solutions should be sought in the first place so that the minimal artistic means of achieving the intended effect at the appointed time. Aesthetics is focused on the precision of workmanship as well as material optimization. Because it is time and money that often have a decisive influence on the end result of objects being erected.

1.1. Concrete masters

*The Unité d'Habitation*¹, designed by Le Corbusier, has become the prototype for subsequent experiments with repetitive structural segments. The building was then compared to the Egyptian pyramid, impressive and monumental, but it had the character of a gloomy tomb. He aroused much controversy, admiring both the geometric facade and the raw basic material. This pioneering *blast* gave rise to brutality, forcing viewers to associate with a cool and imperfect texture. Initially, the project envisaged construction of smooth, precision steel components, but the economic situation after the war forced the cheaper material. The designer rejected the idea of uniform plastering of the façade in favor of bright single spots. "I decided to create beauty by contrast. I will lead the dialogue between strictness and delicacy, between colorless and intense, between precision and coincidence. I will force

¹ „It turned out that just concrete made possible the realization of structural, structural and economic assumptions of mass residential construction.”, Gössel P., Leuthäuser G., *Architektura XX wieku*, Wyd. TASCHEN/TMC Art, 2006, p. 382 (own translation).

people to think and reflect”². – defended his innovative work, Le Corbusier, who instilled in designers the will to search for system solutions that work in a variety of applications and sculpture for a more individual architectural nature. An ideology that did not relate to obtaining a particular substance was born, but it gave rise to a variety of meanings. Its base is a concrete structure.

Also known for his numerous accomplishments in concrete, Luis Kahn worked closely with engineers and construction work. As a consequence of receiving innovative architectural solutions and sophisticated details. “Clearly referring to Le Corbusier, Kahn talked about the plan as the harmony of the rooms ... and I consistently oppose the independence of the various elements”³. This architect worked his way into the cellular experience in the field of reproducibility in infinity and Reflecting the shape of the interior – construction grid of columns, beams and ceilings.

The name of the Japanese architect Tadao Ando should also be mentioned, who referring to the western concept of concrete, extracted the beauty of buildings with respect to tradition and simple minimalist forms. In one of the talks, he said “I think that concrete is one of the most important materials of the twentieth century, because it is a combination of freedom – of which everyone’s dream – expression and universality. Concrete is readily available; You can form virtually everything from it. But it is also a demanding material. Easily dirty and difficult to maintain. If an architect uses it without taking these factors into account, it may fail. But when he knows how to work with him, skilfully composing him with glass and steel makes him undoubtedly the best material in modern architecture”⁴.

Other masters find themselves in concrete colour. “(Álvaro) Siza always emphasizes that, in addition to the context, the project’s origin is the local light itself and the characteristics of the region and its capabilities – also in the field of building materials”⁵. The architect often uses raw concrete in his projects, Colouring it on a white shade of gray, with pigments easily available in the Mediterranean area.

We also have projects in Poland that use concrete as the main material for the artistic transfer. Robert Konieczny, the owner of the KWK Promes office, built his house outside the town in a small mountain village called Brenna. Situated on the northern slope with a fantastic view of the valley, it originally was supposed to take the form of a one-story cubicle. However, as the author explains, the climatic conditions and the necessary concentrations of almost point-based foundations hovering over the landslide forced the final cross-section of the hexagon. It was difficult to prove local traditions to local residents. The designer explained that concrete has long existed in the material of fences, telegraph poles, on the roads, is common on public streets, so it should not give the impression of something stranger. The house, almost flowing through the meadow, was baptized *Arka Koniecznego*. It stresses that it gives him a sense of security, and pure raw concrete form fits into a contrasting natural landscape. We can be proud of architecture that changes the aesthetics of countryside into original

² U. Eco, *Historia piękna*, Poznań 2005, p. 402 (own translation).

³ P. Gössel, G. Leuthäuser, *Architektura XX wieku*, Wyd. TASCHEN/TMC Art, 2006, p. 381 (own translation).

⁴ E. Hayakawa, A. Kowalczyk, *Obraz ciszy – rozmowa z... Tadao Ando*, Architektura&Biznes, Kraków 04/2009, p. 78, (own translation).

⁵ M. Adamczak, *Jestem funkcjonalistą*, Architektura&Biznes, Kraków 12/2007, p. 67, (own translation).

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and unique. The inspiration for the project was the concrete *House 128* in Leymen, designed by the architectural firm Herzog & de Meuron, famous for its controversial construction solutions. The building was built on the borderline of the child's drawing and the prototype of the new technology – a concrete block levitating over the unspoilt terrain. The final effect was also supported by earlier experiences of the KWK Promes office. The used solutions applied in with completely new technologies resulted in numerous awards and distinctions.

2. Herzog & de Meuron

A group of Swiss architects Jacques Herzog and Pierre de Meuron, Pritzker Prize laureates in 2001, is known in the world for their unconventional approach to the materials used. He owns an innovative public space – Olympic Stadium in Beijing. An object called *Bird Nest* is based on a very simple idea. "Its façade and structure are identical"⁶. The labyrinth encloses spectacular chaotic steel beams not hidden behind any coating. The shell acts as a boundary between the interior of the stadium and the Olympic zone. The effect taken from nature is at the same time a decoration inscribed in the surrounding zen environment. Stadium with a total area of 258 thousand m² was completed within five years, and the construction cost was enormous.

Architects have extensive experience in designing museum spaces previously developed in Munich, Barcelona and Basel. Their designs usually relate to architectural archetypes and take the form of monumental solids, while also taking care of the smallest details of the building so that they correspond to the leading concept. "Architecture of great dimensions and a small number of details requires a particularly precise design"⁷.

3. Tate modern gallery

When Tate Foundation decided in 1994 to set up an independent gallery in London inside an abandoned power plant built between 1947 and 1963 and designed by Sir Giles Gilbert Scott on the banks of the river Thames, the architects of Herzog & de Meuron were selected for the adaptation. The building remembered the times when it was trying to give up completely of stone in erected buildings for steel, glass and brick. All vintage machines were removed from the halls, and the walls exposed to the structural elements giving the industrial character of the dark interior. The spectacular *Turbine Room*, 152 meters in length and 35

⁶ T. Fiszer, *Londyn 2012*, Architektura&Biznes, Kraków 12/2007, p. 43, (own translation).

⁷ P. Gössel, G. Leuthäuser, *Architektura...op.cit.*, p. 181, (own translation).

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- III. 1. Photo by Wonders of London
 - III. 2. <https://scontent.xx.fbcdn.net>
 - III. 3. <https://babyccinokids.com>
 - III. 4. www.inexhibit.com
 - III. 5. Photo by Jennie Shue
 - III. 6. Photo by Numéro, <http://www.numero.com>
 - III. 7. Photo by Jim Stephenson

meters in height, has been transformed into a gallery entrance hall and an undisturbed exhibition space.

The subject of *Tate Modern* was a challenge for architects who were much satisfied with its implementation, which had to report to the constraints resulting from existing structures. They describe the theme as a hybrid of tradition, Art Deco and Super Modernism. “It is a contemporary building, a building for everybody, a building of the 21st century”⁸. The gallery is considered one of the three most visited tourist attractions in the UK. Although the admission is free (as in other museums in the city), as the designers say, London has changed for the benefit of the city’s economy. Since the year 2000, the museum has enjoyed enormous popularity, which has given the excuse to renew the cooperation with architects in 2009 to expand the facility by an additional 22,492 m² made available to visitors on 17 June 2016.

4. The switch house

Tate Modern Gallery of Contemporary Art is located in the London Borough of Southwark, just off the Thames, where Sir Norman Foster’s *Millenium Bridge* connects to the centrally located the *City of London*. The layout of London is extremely dense and low. Different styles of building are interwoven here, different materials and buildings from different periods. It does it all, that the city center is not uniform. London is geared towards the use of post-industrial sites by protecting biologically active areas willingly by diminishing less valuable regions and by expanding central city centers. Respects the tradition and past of the place while walking firmly forward.

The expansion of *Tate Modern* was intended not only for new exhibition spaces, but also for additional social and tourist functions. *The Switch House* was supposed to also attract visitors to London from around the world. The new wing of the museum, or the twisted tower, is attached directly to an old post-industrial building with a compact horizontal body. The lying cuboid is divided by vertical lizens in the recesses of rectangular windows that stretch almost the entire height of the brick facade. The simplicity of the building gives an elegant monumental effect. Exactly on the central axis of the elevation on the Thames side, there is a strong vertical accent – the former chimney of the boiler room, also with vertical slim divisions. It is an excellent reference point in London’s relatively low profile. From its rear side, it is adjacent to the glazed residential buildings erected in the spirit of Hi-Tech. The new part refers to the height of these buildings, measuring about 65 m. As a result, the wing is visible from the footbridge on the Thames and as it approaches, it disappears behind the still dominant chimney of the former power stadion (ill. 1).

4.1. Foundations as base point

The base for the expansion of the museum’s surface was the old underground fuel oil tanks, which descended to 9 m below ground level, resembling a three-leaf clover. They were

⁸ www.herzogdemeuron.com/index/projects/complete-works/126-150/126-tate-modern.

partly used as the foundations of a new wing of 10 storeys of varying heights and surfaces. The old power station had already built up cafes and museum facilities with a magnificent panoramic view of the opposite bank of the river Thames. In addition, the observation deck on the last floor is also more integrated with the body of the building. Particularly feared was the settlement of the building on coastal land in the post-industrial area of the city. The foundations were strengthened by piling and the structure of the tanks was uncovered for safety reasons. At the same time, it was decided to gain weight of the new structure, which would be able to reach the existing basements using a blend of 40% slag. An additional difficulty was the concrete structure that collapsed the façade at five different angles. Another weight included perforated brickwork facade panels.

4.2. Construction system

The supporting structure of the new wing is a pillar-plate construction system with dense beams for which the windows and panels with brick weave are then assembled (ill. 4). Thanks to the special slag mixes, not only did the concrete become lighter, but it also gained a perfect finish with sharp edges and a perfectly smooth surface. Such concrete is more environmentally friendly, reducing the production of carbon dioxide by-products into the ozone zone. “The large span of the reinforced concrete beam above the main entrance, the one-story steel truss, and the 1.8-meter-high crossbars are elements that have been used at places of unusual stresses from the facade to be transferred to shaft constructions. Lifters gradually lowered after the construction of higher floors, so that the deflections did not exceed 2 mm. In many places, the deflection was limited to 1 mm, due to the need for precise glazing and brick facade assembly”⁹. The planes avoided straight angles. This treatment built an interior full of folds and recesses. The space creates new opportunities for presenting works of art. In spite of the transfiguration of the elevation planes, the structure is composed of beams and slabs with similar rectangular cross sections along with the external walls (ill. 7). The difference between the old and the new element is subtle, but it is clearer from the design side of the interior. This concrete construction serves as a time delimitation.

4.3. Elevation

Initially, the extension was to have a full glass facade. An unusual body would refer to the archetypal glass pyramid at the entrance to the Paris *Louvre*. Finally, a completely innovative structure was changed to change the wall into a façade based on the structure. The reason could be the cost of refractory glazing under differently defined shell planes. This solution could also interfere with the requirements of presenting collections. The final effect is more unusual because less obvious is the external delimitation of added value (ill. 6). Elevations were built on prefabricated panels. That system panels were connected to the construction in suitable shapes that fit into the structure cast on a large part monolithically on site and

⁹ M. Lewandowski, A. Żmijewska, *Rozbudowa TATE MODERN w Londynie*, Architektura-murator, Warszawa, 09/2016, p. 102, (own translation).

partly made of prefabricated prefabricated elements. Clinker bricks have been attached to the façade panels in openwork patterns fastened with metal pins and resin. The whole solution is reminiscent of the *Lego* blocks, which improved the work on the site by 18 months, where the whole building was six years old. For the sake of location in the center of a large city, it was important to the locals, but also to the cost of the project, which is estimated at over £ 200 000 000. The designed shutter based on traditional materials allows light to shine in the middle of the day and discreetly illuminate at night, giving the site an unusual openwork effect (Ill. 5). The material refers to the original finish of the former *Bankside Power Station* and local architecture and creates a uniformity of the facility. 35% of the windows were translucent, 65% partially covered with light diffusing bricks in the interior. "High transparency glass and UV absorption have been applied to allow the artwork to be adequately exposed while protecting the sun from harmful effects."¹⁰ Window hinges are a reference to the elevation of an old building with vertical stripes. The fresh wing seems to destroy the harmony of the existing body by introducing contrasting horizontal holes (ill. 1, 2, 6). These divisions are irregular and vary from floor to floor. However, architecture should primarily be derived from the functions and sociological demands that the authors paid particular attention to.

4.4. Bare interiors

The shredded and twisted body makes this treatment a solid reference point. In no way gives the impression of instability. The feeling is also enhanced by small banded windows visible in the façades. But there is more light in the interior than it seems at first impression. The interiors of the post-industrial hall of the main building were rather dark. During the first adaptation, a roof skylight was introduced over the *Turbine Hall* to revitalize it. The combination of the new wing of the museum with the main part was developed, inter alia, by means of a footbridge based on reinforced concrete razors with an impressive span of 25 m suspended under the skylight on the fourth floor. Much of the museum's construction was left in bare concrete. This gives the raw and minimalist character of space, which must be durable and enduring for the receptions of the multitude of visitors. The sculptural form of architecture has been exploited, thus creating a sense of monumentality and object stability. On the ground floor, the unity of the surface of the floor, walls and ceilings with the texture of the worn cement was achieved. Unified artificial illumination in the form of linear fluorescent lamps in suspended ceilings or metal structures underlines the linearity of solids, structures and facades. The only soft form is the self-supporting staircase curved with concrete balustrades (ill. 3), adopted in many other museum exhibits also at the *Hyogo Art Museum* designed by Tadao Ando. Concrete is shown here in a very raw way, finished only with wooden floors and benches. The bunker effect creates a contrasting background for the presented art and a neutral environment for visitors. In most the gallery is based on the construction of a former industrial hall building the darkness of the interior of the pyramid, the new part upholds this climate. Transmutation became a traditional material in a modified spatial form. The typical layout developed by our times, the layout of columns, beams, ceilings and walls in a spatially broken version has adopted a new quality. As a result, we have

¹⁰ M. Lewandowski, A. Żmijewska, *Rozbudowa ...op.cit.*, p. 104, (own translation).

received a unique iconic structure that is adaptable to the pace of its life. The uniqueness of the gallery is due to the transmutation of traditional structural elements, in this case concrete, to the archetypes of the local town buildings. Architects have expanded the entrance zone to the facility. At present, the museum has a passageway on the shorter axis of the object from north to north and the third entrance from the west, inviting interior to continue the tourist route of the city. The expansion will certainly affect the further development of the social, cultural and artistic life of the UK capital. He is in the future with a modern approach to the role of a museum as an educational center and a socializing international medium with the power of diverse forms of communication and spontaneous activities.

5. Conclusion

“Culture, art and museums are crucial for the development of the modern city.”¹¹ (own translation). We could not care about civilization development without the ability to build buildings that had valuable values in their interior. It was difficult to care for the setting of a beautiful city without the unusual engineering and construction solutions. The iconic architecture of our times characterizes each city in its own unique way. Entered into the surrounding environment tells a story that requires reading based on some information and the context of the place. London as a multinational city does not reject surprising solutions. It remains tolerant of modern architectural solutions in the neighborhood of the old buildings. From the concrete all starts, everything is based on it and depends on it in the work of architecture. But building a building is not just a technological process. The entire poetics of architecture is exacerbated by changing the way we think, with a rational and innovative approach. The expansion of the gallery is an exceptionally large investment for London’s development, but was dictated by the needs of the market. Creation in concrete gives infinitely many possibilities. It is important to adapt them to the realities of construction and the anticipated usage program. The art of building takes place if the investment budget allows. Contemporary architectural works aim for minimalism, functionality and economy of realization. Any deviation from the flagship assumption leads to an investment in uncertain land. However, it is the spatial transmutation that seems to be the stimulus to the artistic element of the city’s integrated works, such as the expansion of the *Tate Modern Museum of Art* in London. Concrete-concrete buildings more often erected in countries with warmer climates, thanks to technological solutions already available throughout the world. What once seemed too violent, perhaps too sincere in its pronunciation, starts to speak to the larger audience. Another example is the award in this year’s portal competition *Bryła* of the year 2016 for the *Beyond Information Technology Research Center* in Poznań. The complex surrounded by a high-rise concrete wall integrates with the *Data Center* buildings. The construction is composed of non-vibrating of the concrete prefabricated elements and elevation was surrounded by a Faraday metal grid to take care of the magnetic field in the interior of the server room. The idea of concrete industrial buildings is a maturing thought that is not fashion but a rational and artistic approach to building way in the future, which we should get used to.

¹¹ With such a thesis board member of the famous London Tate Modern gallery – Donald Hysklop – during a conference organized in 2011 in Mazowiecki Center of Culture and Art. [in:] A. Rasmus-Zgorzelska, *Muzeum wchodzi do gry*, Architektura-Murator, Warszawa nr 02.2011.

References

- [1] Adamczak M., *Jestem funkcjonalistą*, Architektura&Biznes, Kraków 12/2007, p. 60–67.
- [2] Bochnak B, Bochnak J., *Miękkość betonu*, Architektura&Biznes, Kraków 7/8 2013, p. 40–57.
- [3] Bulanda-Jansen A., *Szczęśliwa ósemka – Olimpijski Stadion Narodowy i Narodowe Centrum Pływackie w Pekinie; Herzog & de Meuron*; PTW Architects, Architektura&Biznes, Kraków 12/2007, p. 38–47.
- [4] Charciarek M., *Związki idei i materii w architekturze betonowej*, Wydawnictwo PK, Kraków 2015.
- [5] Eco U., *Historia piękna*, Poznań 2005.
- [6] Fiszer T., *Londyn 2012*, Architektura&Biznes, Kraków 12/2007, p. 48–53.
- [7] Gössel P., Leuthäuser G., *Architektura XX wieku*, Wyd. TASCHEN/TMC Art, 2006, p. 145–161, 381–391.
- [8] Hayakawa E., Kowalczyk A., *Obraz ciszy – rozmowa z... Tadao Ando*, Architektura&Biznes, Kraków 04/2009, p. 74–79.
- [9] Jodidio P., *100 Contemporary Concrete Buildings*, Taschen GmbH, 2015.
- [10] Le Corbusier, *W stronę Architektury*, tłumaczenie Tomasz Swoboda, Fundacja Centrum Architektury, Warszawa 2012.
- [11] Lewandowski M., Żmijewska A., *Rozbudowa TATE MODERN w Londynie*, Architektura-Murator, Warszawa, 09/2016, p. 96–107.
- [12] Pilawska J., Piłśniak M., *Między redukcją a ekstensją*, Architektura&Biznes, Kraków 12/2006, p. 51–52.
- [13] Rasmus-Zgorzelska A., *Muzeum wchodzi do gry*, Architektura-Murator, Warszawa nr 02.2011, p. 30.
- [14] Staisny G., *Biblioteka publiczna w Lublinie*, Architektura, Wyd. Murator S.A. Warszawa 01/2008, p. 52–60.
- [15] Stanek Ł., *Uczciwość architektury? Budowanie wg Hannes Meyer „bauen” 1928*, Architektura&Biznes, Kraków 6/2001, p. 59.
- [16] Węclawowicz-Gyurkovich E., *Architektura najnowsza w historycznym środowisku miast europejskich*, Wydawnictwo Politechniki Krakowskiej, Kraków 2013.
- [17] www.bryla.pl/bryla/1,85298,14647562,Jednostka_Marsylska_Le_Corbusiera__matka_wszystkich
- [18] www.bryla.pl/bryla/56,85301,21762039,serwerownia-beyond-pl-w-poznaniu,,2.html
- [19] www.dezeen.com/2016/06/20/tate-modern-switch-house-herzog-de-meuron-london-opens-to-the-public-jim-stephenson
- [20] www.herzogdemeuron.com/index/projects/complete-works/126-150/126-tate-modern
- [21] www.inexhibit.com/architects-artists/herzog-de-meuron-architecture-projects-and-museums
- [22] www.inexhibit.com/case-studies/tate-modern-expansion-herzog-de-meuron
- [23] www.kwkpromes.pl/arka-koniecznego-2/12122
- [24] www.tate.org.uk/about/who-we-are/history-of-tate