

DARIUSZ KOZŁOWSKI*

CONCRETE AND THE MASTERS OF THE TRANSMUTATION OF MATTER

BETON I MISTRZOWIE TRANSMUTACJI MATERII

Abstract

Concrete is used in architecture for the construction of buildings with rationalistic motives and for aesthetic reasons. The most significant accomplishments could not occur without the participation of the master of transmutation. Time has verified positively such cases marked by the greatness of architecture. Today there are still works of architecture in which concrete plays an essential role.

Keywords: fair-faced concrete

Streszczenie

Beton w architekturze jest stosowany w konstrukcji budynków w wyniku motywacji racjonalistycznych i z powodów estetycznych. Najbardziej znaczące dokonania odbywały się nie bez udziału mistrza transmutacji. Takich przypadków naznaczonych wielkością architektury czas zweryfikował pozytywnie. Dziś wciąż powstają dzieła architektury, w których beton gra rolę zasadniczą.

Słowa kluczowe: beton architektoniczny

1. *Béton brut*. What we have in mind when talking about “concrete architecture” is such a use of reinforced concrete in façade technology and interiors which leaves the nature of this building material visible. This way of using concrete – which is obvious in engineering constructions, was seen as the originality of architecture. Today, concrete in architecture is a normal thing – it constitutes the basis of modern building technology. For those who wish it – it combines the features of modern building technology with the features of traditional building material. Its application depends solely on the creator’s attitude or spiritual state. One also needs to remember that for some reason the social reception of concrete architecture is not enthusiastic, and that of the architects – ambivalent. And yet, concrete has all the qualities found in the excellence of stone, the building material accepted by everyone; it is the stone of the present. Properly prepared, it is durable – and remains resistant to time. It is also a “stone” that can be cast in moulds. It then reveals the nobility of the formwork – the smoothness of steel, the nature of wood – concrete castings can take the form of both support for a high-rise block and a fluted classical column.

* Prof. D.Sc. Ph.D. Arch. Dariusz Kozłowski, Institute of Architectural Design, Faculty of Architecture, Cracow University of Technology.

Looking at the past of concrete architecture, a classic comes to mind first: the architecture of Le Corbusier and his *béton brut*. The surfaces of this concrete reveal the nature of the wooden formwork in which an architectural thing was cast on the site. Thus, one should mention here the Unité d'Habitation in Marseille (1947–52), and other housing units in Berlin, Nantes, Briey, Firminy, the chapel in Ronchamp (1950–1955) and the buildings in Chandigar (1955) and La Tourette (1957–1960). The construction of Le Corbusier's last concrete work – the church in Firminy (designed in 1967) – was completed in 2007, with the use of new technologies.

Béton brut of the great Frenchman blurs for a moment the memory of earlier applications of raw concrete in architecture, not only in the case of engineering structures. The renovation of the Wrocław's Centennial Hall from 1912 was completed in 2010. The building designed by Max Berg, which at the time of its construction had the record-setting roof span, was restored to its original appearance, thus reminding of the significance and beauty of raw concrete. One cannot forget about Goetheanum – the building in Dornach (near Basel), the first large-scale concrete building that was strictly architectural rather than engineering; concrete is the material which implements the ideals of organic architecture according to Rudolf Steiner's vision.

2. Expressionist concrete in Neviges. The Pilgrimage Church of *Mary, Queen of Peace* (1962) designed by Gottfried Böhm, in Neviges (near Cologne) built on the basis of the competition design is another building of the German architect where concrete constitutes the basic matter. At that time the construction of another great concrete building began – the town hall in Bensberg – which was completed only nine years later. The shape of the town hall tower and the church in Neviges seem to be a distant echo of the trend in the drawn architecture rather than the constructed one, associated with Hans Poelzig and Bruno Taut – with crystal architecture.¹ In fact, the roof covering of the large body of the church is reminiscent of a crystal that reminds one of nature's true creation – a huge mountain crystal not touched by man's hand. The concrete of the temple's façade shows traces of time, which today coincides with the aesthetics of a certain kind of ordinariness of the contemporary technology that did not try to astonish with extraordinariness. Likewise, a natural rock, whose form is merely the result of the passing of time.

Neviges is a small village with traditional architecture scattered across the undulating terrain. The building occupies a position at the top; it is dominant in the landscape of the village due to its location and the extent of the design. However, the form of the crystal's coping, its decomposed regularity and the crown-like covering perfectly fits and completes the free urban layout.

The way to the church leads through a kind of an open concrete courtyard along other concrete storied buildings, which is a resting place for pilgrims approaching the *sacrum*. The dark single-space interior of the building reduplicates the form visible from the outside – the shape and material. Everywhere there is concrete, darkness and delicate play of streaks of light coming through the gallery and window openings with stained glass in the balconies obscured by constructions.

¹ W. Pehnt, *Vom Kristaltempel zum Signature Building – Ekspressionistische Architektur: Die Fortsetzung einer Geschichte*, Baumeister, May 2001.

3. Concrete “machine” according to Testa. Far apart in distance from the concrete buildings of Le Corbusier, but not far apart in time, the London Bank of Buenos Aires (1959–66) was designed by Clorindo Testa. Built in dense urban development of a multi-story neighbourhood in the historic city, in the corner of the street, the structure used concrete material with all the grammar of Corbusieran ideas and *béton brut*, generating personal forms.²

The building occupies the entire corner plot at the crossroads, adjusting itself with the height to the compact, historical neighbourhood. The entrance to the bank is indicated by a “torn out” corner, covered with a “remnant” of the roof structure with wall sections suspended from the cornice. Visible from the inside of the building, the surfaces of the suspended “fragments” of the walls were reinforced with a distinct ribbing, embedding a new structure in a rather small scale of heavily articulated pilasters, columns and cornices of the neighbouring architecture; the building offers a novelty of form embedded in historical background. Especially the exterior walls of the bank take part in this game: reinforced concrete structure that creates a deeply relieved form. The intention was to separate the load-bearing structure of the building from the filling, also with the curtain wall. This was done in an uncompromising way, without any predecessors or successors.

The interior of the building reveals the significance of the extraordinary external structure. The aim was to obtain a single-space interior that was susceptible to any arrangement. Effective structural solutions were applied – the main supporting structure is a hanging construction made in monolithic reinforced concrete casting technology. The purposefulness of the constructional concept combined with the spatial solutions of the building disappeared in the veil of impression with the artistic sculpture of the interior and external relief. From the interior, the architectural thing resembles the concept of the wall in the Corbusieran church in Ronchamp. The view from the outside brings to mind the ideology of “machine”, but not for living in this time. The architectural sculpture, the decomposed “machine” of the Bank of London in Buenos Aires with the autonomous reinforced concrete brutalist elevations at the time of the construction, certainly remained in the aura of a futuristic thing. Today the building retains the mood of the technical creation of some unknown civilization from the past which treated concrete as a holy material. It also preserves the value of a timeless work of art, not only in the series of Clorindo Testa’s accomplishments.

3. Carlo Scarpa’s sophisticated concrete. The continuator of the idea of Le Corbusier’s concrete – developed and used concrete in an unorthodox manner, in raw and refined versions, showing the beauty of the imprinted wooden formwork next to the smoothed surface and the simultaneous application of other materials and textures.

The tomb of the Brion Family in San Vito di Altivole in the Treviso region (1969–1978) is a microcosm, a model of some architecture or even a city. The term tomb is misleading. In fact, it is a small *necropolis*, built in an area of several hundred square meters, in the immediate vicinity of a small provincial cemetery. The area cloistered with concrete walls from everydayness of the surroundings houses the Gate, Chapel, Tombs, Park, Canals, Sunken Buildings... In this artificial world of architecture, concrete is of fundamental importance: concrete for Carlo Scarpa has first the value of the nature of stone, and only then of the

² A. dal Fabbro, *Clorindo Testa l’architettura animata*, Venice 2003.



reinforced concrete structure. The nature of stone is expressed in a kind of dignity which is hidden in the shadowiness and mystery of the colonnade or the impenetrability and gravity of the stone wall. Scarpa transfers these features into a material composed of cement and sand. His concrete has all the qualities of stone, which, while retaining its characteristic individuality, remains concrete; it is also a contemporary stone. Used in this way, it allows one to process itself like – stone. First, the architect gives it the shape of an element, then works on the surface. The material retains the appropriate nobility of the outer structure and reveals the touch of the master’s hand: a craftsman, an artist, an alchemist who performs the transmutation of ordinary things into a work of art. The ancient fluting of stone columns, sculptural breakdown of the surface – is transformed by Scarpa into a game of stepped several centimetre folds of the plane and compositions of thus formed elements. The continuation of such a convention of the construction of form is the submerging of concrete “cornices” under a few centimetres of water. In the *necropolis* of San Vito di Altivole, these cornices, fragments of the building, unknown architectural details sunken deeper in the chapel’s vicinity, rest on the bottom of the water among the seaweed, creating an unfamiliar space of the architecture of nostalgia, once existing here, some excavation of a mythical building or city.

Carlo Scarpa's concretes in San Vito di Altivole do not reveal the soul of the material – when looking at the architectural thing, we commune with its externality; we watch its surface – colour, texture, we touch the roughness or smooth the polished “skin”, coating the mass of things, often “dressed” in decorations of glazed, coloured ceramic tiles, enhancing sensory games (the spectator would like to feel the nature of the smooth surface with their hands, or cannot resist exploring its roughness). Then we see – shape – weight, mass, and at other times lightness. We evaluate the form by trying to discover its purpose or poetics. Then reflection or inquisitiveness orders one to look into the depths. We see the power of the material, but we do not feel the forces running inside the structure.

In the works of the Italian Master, there are no prime and other things, more important or less important ones. The whole is combined with the smallest element, a part is the whole and at the same time only a fragment of the whole, regardless of whether it is a building, bridge or portal in the old palace. The construction of the building reveals the nature of its craftsmanly origin, as do the balustrades, stairs, doors, window frames, lighting and fittings, hinges and locks. In this way, the architecture of Carlo Scarpa became a realization of Richard Wagner's dream of the *Gesamtkunstwerk*, the combination of the works of an architect, an engineer, a sculptor in absolute Unity.³

4. Concrete without a flaw. Aurelio Galfetti presented an elegant version of concrete from smooth formwork enriching the surface with deep, horizontal reliefs in the external walls of tennis courts in Bellinzona, Switzerland (1985) designed with discipline confirming the rationalistic attitude of the creator.

The *tennis club* is the first phase in the implementation of the Bellinzona sports centre, a complex of public swimming pools designed in 1969. In 1983, the first phase of the project was implemented: it consisted of a regular, square and axial area of playing fields designated with trees, and the building with restaurants and club facilities. This “structure-wall” defines the boundary of the sports complex, between the recreation area and the urbanization zone with parking lots and access roads to the motorway. It constitutes a boundary and astonishes one with the plane of the concrete façade. But above all it is – the *Gate* – the transition between the worlds: the outer world of chaos, the everyday busy and noisy world, anonymous place for meetings without consequences – and the order of the interior, courtyard, park, place for showing sympathy and kindness. The “wall” is also a type of a pedestrian bridge, a type bringing to mind trade bridges from Italy, or a kind of castle walls with an internal passage or a road running at the top along a building, here – under a transparent roof. The border structure is, in a way, a protection against noise and wind.

The functional solution is not unusual here, the lapidary composition of the architectural thing in space does not surprise here. What is remarkable in this building of Aurelio Galfetti is – concrete! The outer wall of almost seven meters, with small square windows in the lower part, is a reinforced concrete cast in a steel formwork that leaves deep horizontal “fluting”. The resulting surface demonstrates the nobility of the material and reveals the nature of the form – this time the smoothness of steel. Watching this concrete, we commune with its externality, we want to touch the polished surface; we notice the power of

³ *Architektura betonowa*, D. Kozłowski (ed. and introduction), O. Czerner, A. Kadłuczka, L. Kłosiewicz, K. Kucza Kuczyński, M. Misiągiewicz, E. Niemczyk, J. Roguska; Cement Polski, Kraków 2000.



the material, but the forces running inside the structure remain uninteresting. Precision of the massif cast on the construction site is of the highest quality, which is usually only obtainable at prefabrication plants. The way of erecting things remains a mystery; there are no signs of the touch by the master's hand. There are no signs of construction technology – the outer surface remains smooth, also without any signs of weather or climate. Any steel protections were hidden, retracted deep into the holes, or embedded into the drawing of horizontal grooves.

In another work by Galfetti, in Castelgrande in Bellinzona (1983–1989), the concrete used in the revitalization of the historical structure reveals an explicit reference to the classics of raw concrete. What characterizes this architecture is the radical assurance of the choices, a very determined and uncompromising attitude, which orders a continuation of a kind of modernism, based on the principles of “purism”, as a style once not fulfilled completely. On the other hand, the absolute power of the architectural language allows the architect

from Ticino to continually develop the formal capacity of the language and create novelty. Galfetti's of purist reduction is not in contradiction to the power of expression.⁴

5. Peter Zumthor's *Béton super brut*. A chapel devoted to the Swiss Saint, St. Nicholas von der Flue (1417–1487), known as Father Klaus, was erected among the fields in the vicinity of the village of Wachendorf, in the Eifel region of Germany. The chapel was designed by Peter Zumthor in 2006 who also participated in its construction. The presence of the village is imperceptible, the structure is located near the private fields of the client, Hermann Josef Scheidtweiler. The chapel was erected by simple means with the beneficiary's own resources and with the help of friends. From a distance the structure may resemble a large lonely menhir or a structure from an unknown past. The chapel is an angular concrete block with smooth walls without window openings. At close range, the walls reveal several centimetre-thick layers of semi-dry concrete, with slightly discoloured edges of the compacted material. The small openings resembling tie holes in formwork systems also attract attention; the interior reveals the true nature of the openings. One enters it through the door – the triangular solid metal plate whose clever mechanism allows one to leave it slightly ajar. The light coming through the upper opening brightens the darkness inside. The analogy with the Pantheon comes to mind for a moment! The small holes in the walls, visible from the outside, form a starry composition on the dark, black walls, bringing to perfection the similar idea of the altar, wall in the Le Corbusier's church in Firminy.

The walls were cast by filling the space between the flat outer formwork and the type of internal formwork: a tight vertical stack of 112 slender wooden trunks that left stamped traces in the concrete cast. The internal formwork was removed by burning it slowly. What was left is the original texture of the walls, coaly black colour of the background for the starry ornament of point holes and a beam of unreal light falling from above, whose source and nature can be discovered in the narrow interior by turning the head skywards. The austerity of *béton super brut* is complemented by the floor of the chapel lined with lead poured in situ like concrete.

6. The most durable concrete, or Louis Kahn's found building. There is concrete, which time feels respect for; there is such concrete architecture that once created, remains resistant to time. These are metaphorical statements – time is merely a witness to the transformation of existence: both birth and fading into nothingness. The durability of the building matter, the built structure depends on the destructive factors of the physical environment. Architecture of Louis Kahn's lost work – *Huvra Synagogue* remains unchanged beyond time. The recently discovered matter of the temple is also indestructible – it is the Most Durable Concrete.

Louis Kahn treated the building material and light alike – like an architectural building material. Concrete and light – he used this material like Le Corbusier in Ronchamp and La Tourette. The light that he found in the works of ancient Rome, Greece and Egypt is the same as the glow and darkness of his constructed and intentional works. He kept returning to the light of the Pantheon – where he found “...the light that almost cuts you like a knife”, and

⁴ *Architektura betonowa*, D. Kozłowski (ed. and introduction), A. Baranowski, J. Cybis, J. T. Królikowski, K. Kucza Kuczyński, E. Kuryłowicz, Cement Polski, Kraków 2004.

to light as building matter: *“The light, which I cannot treat as material, begins to become a material when it starts the dance of glow”*.

Louis Kahn left many unrealized works. Between 1959 and 1963, he designed the US Consulate in Luanda in Angola, the *Meeting House* at the Salk Institute, and the *Mikveh Israel Synagogue*. At the end of the 1960s, he created the vision of the *Hurva Synagogue* in Jerusalem, perhaps his greatest work, in three versions. In all of these designs, Kahn created forms based on architectural pretexts derived from antique monuments: configurations of space in the shape of forms derived from elemental solids, celebration of mass and massive structure, play of light and shadow, rawness of materials. The unbuilt *Palazzo dei Congressi* in Venice announced a change of style visible in his last work – *The Yale Center for British Art* in New Haven, Connecticut.

The year 2000 brought a sensation. The drawings of possibly the greatest work of the master of Modernism – the *Hurva Synagogue* – were found in the World Museum of Imagination. This building was not created in an “empty place”. Its idea related to the place where the temple was demolished in 1721; the name *Hurva* – ruins – remained. In the nineteenth century another synagogue was erected here, a large structure in the style of a Turkish mosque, which was destroyed again during the war in 1948. Louis Kahn undertook the design of another temple. The image of the new temple along with the Muslim Rock Temple and the Christian church of the Holy Sepulchre appeared as the third great religious monument of Jerusalem.

Kahn found the beginning of the constructed world of the synagogue’s architecture in another journey in time, where he came across the Temple of Solomon (its western wall was close to the location of the project). In the *History of Architecture* by James Fergusson, he sought out a reconstruction of the temple with a square chamber of the sacred zone. The four massive columns defining the interior space and sequences of small rooms running around the perimeter attracted his attention.

The architect explains the plan of his temple in the following way: *“The new building should itself consist of two buildings, an outer one which would absorb the light and heat of the sun, and an inner one, giving the effect of a separate but related building...”* He did not mention anything about the transmutation of concrete. The plan of the synagogue, a regular square, is designated with sixteen massive pylons built of local stone – four on each side – whose shapes are reminiscent of the monuments of the Egyptian past.

Raw concrete was used inside the sanctuary (outside – raw stone). *“I want to use the same stones as in the Western Wall [of Solomon’s Temple], [...] as big as can be obtained, looking as monolithic as possible. Concrete is beautiful. If it is beautifully made, it is one of the finest materials”*. Enclosed with pylons, the inner courtyard of the *Temple of Hurva* is a shrine of concrete and shadows. The openings cut in concrete planes once again bring to mind some historical past. The altar is placed exactly in the middle of the sanctuary and surrounded by seating for two hundred people.

The four sloping parts of the concrete ceiling do not come in contact with the opposite pylons. *“The space between them will be such as to allow enough light to reach the outer room and completely enclose the inner room with it... The structure of the building is like huge leaves of a tree, allowing the light to sneak in.”* The game of light is continued as the game of shadows. The space between the pylons and the inner room was given the role of dispersing and dyeing of light; the intense sunlight changes its intensity, colour, it diffuses and turns into darkness with different saturation. The light here is as much the light of the Pantheon as of the The Karnak Temple Complex. The Hurva Temple is one of the greatest experiments with

the combination of sunlight and building material – concrete. Kahn worked with the intense desert light that he captured in his sketches from his trip to Egypt.

The concrete of the synagogue is extraordinary. First, it creates a construction – it shows the power, possibly the power of its, and architectural at the same time, structures. It remains sincere, revealing the reason for its existence: technological imprints of the formwork – boards and ties. It shows its nature: it is raw, it does not care about being more elegant than it is dictated by the building custom; its surfaces cast in moulds represent shades of grey and textures created not without a delicate contribution of chance. It does not brag about its tectonics, nor the power hidden inside steel bars. The existing stone of a distinct texture that encroached on the exterior of the building does not oppose the dominance of concrete, but rather emphasizes the distinctness of its nature.

It is the Most Durable Concrete, inviolable, indestructible. To see Louis Kahn's lost structure, one has to go to the Artificial World of images generated by the computer based on analyses of the master's records. And find the *cicerone*, the discoverer of the lost architecture – Kent Larson.

All these types of concrete could not have been created if their creators had not possessed the secret and power of transmutation – turning an ordinary building material into the material for a work of art. Doubts were sometimes raised by: the monumental building with an excessive form, Boston City Hall by Gerhard Kallman and Michael McKinnley (1969) or the thing exhausting opportunity for the creative use of concrete, Fritz Wotruba's sculptural work – Trinity Church, Vienna (1976). Yet, the 1980s and 1990s revealed the creative work of the Ticinian alchemists: Aurelio Galfetti, Livio Vacchini, Luigi Snozzi. Nowadays, concrete (from wooden formwork) still sporadically reveals beauty: Landesgartenschau-Pavillon exhibition in Weil am Rhein by Zaha Hadid (1999), Casa Olajossy in Lublin by Dariusz and Tomasz Kozłowski (2004), while the nonchalant concrete from formwork systems can be seen in the complex structure of the Phæno Science Center in Wolfsburg (2008) by Zaha Hadid.

References

- [1] Pehnt W., *Vom Kristaltempel zum Signature Building – Ekspresjonistischer Architektur: Die Fortsetzung einer Geschichte*, „Baumeister“, May 2001.
- [2] Dal Fabbro A., *Clorindo Testa l'architettura animata*, Venice 2003.
- [3] *Architektura betonowa*, Kozłowski D. (ed. and introduction), Czerner O., Kadłuczka A., Kłosiewicz L., Kucza Kuczyński K., Misiągiewicz M., Niemczyk E., Roguska J.; Cement Polski, Kraków 2000.
- [4] *Architektura betonowa*, Kozłowski D. (ed. and introduction), Baranowski A., Cybis J., Królikowski J. T., Kucza Kuczyński K., Kuryłowicz E., Cement Polski, Kraków 2004.
- [5] Larson K., *Louis I. Kahn – Unbuilt Masterworks*, New York 2000.
- [6] Based on: Kozłowski D., *Beton surowy w architekturze lat 60. i pięćdziesiąt lat później*, Kraków 2011.