

LESZEK MALUGA\*

## MEXICAN POETS OF CONCRETE

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## MEKSYKAŃSCY POECI BETONY

### Abstract

In the 20<sup>th</sup> century in Mexico, concrete became a very popular material due to many economic, technological, artistic, and aesthetic reasons.

The Mexican architect T. González de León was called a poet of concrete. He himself, or in collaboration with other architects, created numerous monumental buildings. Among the characteristic features of his most famous realizations are minimalist forms made of concrete. Since the 1960s, he experimented with the structure and texture of concrete wall surfaces, looking for the right mixtures of aggregate and subjecting concrete to mechanical or manual treatment. He became an architect whose concrete structures were raised to the rank of a work of art.

Also, other architects, especially in the 1970s, used the visual qualities of concrete in their projects. This method of using concrete became one of the features of modern Mexican architecture.

*Keywords: concrete architecture, modern Mexican architecture, Teodoro González de León*

### Streszczenie

W Meksyku w XX wieku beton stał się bardzo popularnym materiałem z wielu powodów, m.in. ze względów ekonomicznych, technologicznych, plastycznych, estetycznych.

Meksykański architekt T. González de León nazywany był poetą betonu. Sam lub we współpracy z innymi architektami stworzył liczne monumentalne budowle. Cechą charakterystyczną jego najbardziej znanych realizacji są minimalistyczne formy wykonane z betonu. Począwszy od lat sześćdziesiątych eksperymentował ze strukturą i fakturą powierzchni betonowych ścian poszukując odpowiednich mieszanek kruszywa oraz poddając beton mechanicznej lub ręcznej obróbce. Stał się tym, który betonowe struktury podniósł do rangi dzieła sztuki.

Również inni architekci zwłaszcza w latach siedemdziesiątych XX w. wykorzystywali jakość wizualną betonu w swoich realizacjach. Ten sposób zastosowania betonu stał się jedną z cech współczesnej architektury meksykańskiej.

*Słowa kluczowe: architektura betonowa, współczesna architektura meksykańska, Teodoro González de León*

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## 1. Introduction

Teodoro González de León – one of the most remarkable Mexican architects, who died last year, was called a poet of concrete<sup>1</sup>. It may be astonishing to see that this common material in the hands of a Mexican artist became a poetic substance.

Mexico, due to its rich history and culture, is associated primarily with colourful folk art, unusual forms of pre-Columbian temples and pyramids as well as with monumental contemporary murals. In fact, in this large dynamically developing country, the sublimated contemporary culture and the developed economy collide with an enormous amount of social problems and economic inequalities. The cultural landscape reflects these contrasts, i.e. in Mexico, many outstanding architectural works were completed, whereas at the same time hectares of slums were developed around the cities. The element, which, to some extent, matches these two worlds, is the material – concrete.

The political, social, and economic situation of the country after the revolution, which took place at the beginning of the 20<sup>th</sup> century, required radical changes. Ambitious development programs anticipated the implementation of numerous social housing and service investments (including education and health care). These plans resulted in the need to reach for a new building material, which was concrete – an economic, effective, easily accessible material, at the same time susceptible to a variety of shaping.

## 2. From functionalism to organic architecture

young Mexican architects began to create designs in the spirit of functionalism and learned new ideas from Le Corbusier directly on their way to Europe or indirectly from the European architectural press and literature<sup>2</sup>.

One of the ardent supporters of this trend was Juan O’Gorman (1905–1982), an architect and painter who designed and realised many objects in the reinforced concrete technology (mainly school buildings). A home-studio for Diego Rivera and Frida Kahlo became his showcase from this period of creativity (1932). Two three-storey buildings were connected by a footbridge at the highest level (ill. 1). The architectural form represents the trend of functionalism along with the Cubist influences, which can be seen in Le Corbusier’s projects from that period<sup>3</sup>.

Mexican artists when looking for their own artistic paths, however, gradually departed from the harshness of functionalist architecture in order to enrich the artistic effects of

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<sup>1</sup> M. Mota, *El poeta del concreto, Teodoro González de León*, [www.gatopardo.com/portafolio/estructura/teodoro-gonzalez-de-leon-poeta](http://www.gatopardo.com/portafolio/estructura/teodoro-gonzalez-de-leon-poeta) (access: 2017.06.01).

<sup>2</sup> In Mexico in the 1920s Le Corbusier’s work *Vers une architecture* (1923) was propagated, which influenced the dissemination of the idea of functionalism; V. Jiménez, *Juan O’Gorman, vida y obra*, Universidad Nacional Autónoma de México, Facultad de Arquitectura, México 2004, p. 13.

<sup>3</sup> The architectural form of O’Gorman’s work is particularly related to the house designed by Le Corbusier for the painter Ozenfant in Paris in 1922; *ibidem*, p. 22.

a building by means of colours and illuminations, and which at the same time appealed to emotions ('emotional architecture' by Mathias Goeritz<sup>4</sup>).

The space composition of *Torres de Satélite* ('Satélite Towers'), which was designed by architect Luis Barragán, sculptor Mathias Goeritz<sup>5</sup>, and painter Chucho Reyes Ferreira, became one of the emblematic realisations of the new aesthetic ideas (1957). It was situated in a newly developing district of *Ciudad Satélite*. The composition consists of five concrete prisms of different heights painted in pure colours – white, yellow, ochre (later the colours were changed several times). The work, which was located on the axis of the urban arteries, blended in with the landscape of the capital city of Mexico as one of its icons (ill. 2). It also became a symbol of Mexican architecture of concrete, which used simple geometric forms, expressive colour, chiaroscuro, and at the same time appealed to emotions (M. Goeritz) – a Mexican modification of modernism. The most representative authors of this trend were Luis Barragán and his follower Ricardo Legorreta.

Over the last fifty years in Mexico, there have been many architectural objects that were constructed with the use of technologies involving concrete. Whether it was raw concrete, painted concrete, or plastered concrete, the compositional qualities of architecture predominantly depended on spatial structures.

In this world of geometrical forms dominated by octagonal order, we can distinguish two different architectural shapes resulting from two different sources – sophisticated spatial structures made of thin-walled reinforced concrete shells by Felix Candela (shell constructions) and Javier Senosiain (organic architecture). In this case, two poles of poetics of architectural forms can be also distinguished, i.e. the first refers to the world of geometric forms defined mathematically, the second – to free forms inspired by nature.

Félix Candela (1910–1997) – a Spanish emigrant – successfully developed and incorporated theoretical structural layouts, which he learned from Eduardo Torroja in Spain, a precursor of thin-walled reinforced concrete structures. In Mexico, during the post-war period, he began experimenting in designing and implementing spectacular architectural forms – ranging from sacred buildings (*Iglesia de la Medalla Milagrosa*, 1953) to industrial halls (*Embotelladora de Ron Bacardí*, 1959)<sup>6</sup>. One of the first works was the roofing of the small Pavilion of Cosmic Rays in the complex of the University Town UNAM (1951). The shell with a complex curvature of the surface (hyperbolic paraboloid) was 15 mm thick at its highest point<sup>7</sup>.

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<sup>4</sup> M. Goeritz (1915–1990), a German emigrant, from 1949 he worked in Mexico dealing with painting, architecture, poetry, and primarily urban sculpture. In 1953 he published 'Manifiesto of Emotional Architecture' (*Manifiesto de la Arquitectura Emocional*) in which, on the basis of the integration of arts, he proposed the search for an emotional dimension in modern architecture with regard to the prevailing functional aspects; Ch. del Castillo Ch., D. Miranda, *Guía Goeritz*, Arquine, México 2015, p. 8]. He had a tremendous impact on the development of Mexican architecture and art in the second half of the 20<sup>th</sup> century.

<sup>5</sup> M. Goeritz was the author of many other sculptures made of concrete. Among other things, he co-created a spectacular object *Espacio Escultórico* (1979) with six other sculptors – a circle of 64 concrete prisms surrounding the lava field in the territory of the ecological reserve in the south of the city of Mexico; *ibidem*, p. 50.

<sup>6</sup> M. Rodríguez Viqueira, *Introducción a la Arquitectura en México*, Limusa, México 2009, p. 126.

<sup>7</sup> K. Duque, *Clásicos de Arquitectura: Pabellón de Rayos Cósmicos / Félix Candela*, [www.plataformaarquitectura.cl/cl/02-110674/clasicos-de-arquitectura-pabellon-de-rayos-cosmicos-felix-candela](http://www.plataformaarquitectura.cl/cl/02-110674/clasicos-de-arquitectura-pabellon-de-rayos-cosmicos-felix-candela) (access: 2017.06.02).



Both the filigree form of the roofing of a small church in Cuernavaca (a single hyperbolic parabolic) and the wavy form of *Los Manantiales* restaurant in Xochimilco in the city of Mexico (four interlaced hyperbolic parabolas on the octagonal plan), Candela's works show elegance and poetics of forms determined by geometry and at the same time, they have surprisingly light structures (ill. 3). His experimental architectural forms became icons of modern architecture of the 20<sup>th</sup> century.

Buildings designed by another contemporary artist do not have such mathematical perfection. Javier Senosiain (born in 1948) has been creating works that are part of the organic architecture trend. He accomplished many objects, mainly residential buildings, which in their shapes refer to the forms of nature, animals, and plants. An example may be the residential house in Naucalpan – *Casa orgánica* (1984) and its extension called 'Shark' (*Tiburón*, 1990). The first soft-form building was blended in the undulating area of the garden as a cave complex, whereas its extension resembles the animal's body emerging from the terrain<sup>8</sup>.

Senosiain's works are constructed in thin-walled reinforced concrete technology. This technology allowed the architect to flexibly shape any form. Concrete is not exposed in this case as an artistic quality. The particular objects are individually developed each time by using a variety of finishing materials, ceramic details (associated with A. Gaudí's creative activity) as well as land and plants modelling.

### 3. Teodoro González de León's creative activity

The most famous objects, however, are enormous public buildings, which are located in downtowns or in well-exposed landscape areas on the outskirts of metropolises. In this case, Teodoro González de León (1924–2016), who was mentioned in the introduction, stands out as being one of the most famous contemporary Mexican architects whose creative activities are connected with concrete architecture

On his own or in co-operation with other architects, primarily with Abraham Zabludovsky (1924–2003), he created numerous monumental buildings and architectural complexes, which were mainly located in Mexico City. The characteristic features of many of his buildings are minimalist forms based on expressive geometry. The walls of these objects, which were constructed in the concrete technology, were subjected to mechanical (sandblasting) or manual surface treatment (hammering, chiselling) in order to obtain the desired visual effects. This artistic quality also became a recognizable feature of González de León's works.

After studying in Mexico, González de León practised his profession at Le Corbusier's studio working, among other things, during the realisation of the Marseille Unit (1947–49). There he gained some designing experience and the ability to use concrete. After his return to Mexico, he began his professional career by designing primarily residential, office, and

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<sup>8</sup> J. Senosiain J., *Arquitectura orgánica*, AM Editores, México 2008, p. 58, 103.

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Ill. 1. J. O'Gorman, house-studio for Diego Rivera and Frida Kahlo, San Angel, Mexico City (1932)  
Ill. 2. L. Barragán, M. Goeritz, Ch. Reyes Ferreira, *Torres de Satélite*, Ciudad Satélite, Mexico City (1957)  
Ill. 3. F. Candela, restaurant *Los Manantiales*, Xochimilco, Mexico City (1957)



service buildings. Since the beginning of the 1960s, he started about thirty-year collaboration with A. Zabłudovsky. Together they designed many significant objects, including, among other things, apartment buildings in Mexico City (e.g. *Torres de Mixcoac*, 1967, *La Patera*, 1969, *Fuente de la Templanza*, 1971, *Fuente de las Pirámides*, 1974) and public buildings (*El Infonavit* (1973), *El Colegio de México* (1975), *Museo Rufino Tamayo* (1975) or reconstruction of the concert hall *Auditorio Nacional* (1992). T. González de León alone or with other architects also designed a number of tower buildings such as the complex of *Arcos-Bosques* (with architects J.F. Serrano and C. Tejeda, several of the towers were constructed in the years 1996–2009) or *Reforma 222* (2001–2008). The most important achievement in the last period of his creative activity is the *Museo Universitario de Arte Contemporáneo* at the University Cultural Centre UNAM University (2005–2008).

Among T. González de León's works, which were designed in collaboration with A. Zabłudovsky, public utility buildings with a developed form and a spatial structure are worth paying attention to. Their sculptural expression is based on minimalist geometry often departing from simple orthogonality, on chiaroscuro effects in cut out and openwork forms as well as on the rough art of walls<sup>9</sup>.

One of the first layouts of this type is the architectural complex, which is the seat of the administration authorities of one of the districts of the capital city – Delegación Cuauhtémoc (1972–73). The object consists of two parallel blocks connected by a roof-covered patio. At the same time, it is also an entrance hall for individual sections of the complex. The openwork roofing of the courtyard, varied levels of the floor, ramps and stairs created a complex spatial structure, where a dynamic play of lights and shadows takes place. Chiaroscuro contrasts are emphasised by the rough texture of the concrete walls surface – marble aggregate glistens in the sun and the texture of concrete becomes fleshier in the shadow.

The seat of one of the government agencies, which dealt with housing problems – *Infonavit* (1974–75) – was designed on a plot in a compact urban development. It consists of two parts – an office building and a multi-storey garage. A large courtyard treated in a minimalist way between the main building and the multi-storey garage makes an impression in a square in the ceremonial complex. The non-orthogonal geometry of the layout (the office building has a trapezoidal shape in the projection) hinders perception of the system and distorts the perspective of the space. Deep shadows in the entrance niche enhance the impression of the layout's grandeur. The specific theatricality of the project layout results from the fact that the façades were clearly differentiated. The exterior facades of the office building have an openwork structure with windows retracted into the niches, which provide shade. On the other hand, the front wall of the office building and garages – large flat concrete walls – form spatial frames of the above mentioned entrance square which, like the stage, can receive potential actors and become the place of events (ill. 4).

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<sup>9</sup> For this reason, creative activity of T. González de León was associated with the trend of brutalism.

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Ill. 4. T. González de León, A. Zabłudovsky, *Infonavit*, Mexico City (1974–75)

Ill. 5. T. González de León, A. Zabłudovsky, *El Colegio de México*, Mexico City (1974–76)

Ill. 6. T. González de León, A. Zabłudovsky, *Museo Rufino Tamayo*, Mexico City (1975/1981)



El Colegio de México Research Centre (1974–76) is an extremely interesting example in terms of the architectural structure artistic arrangement against the landscape context. The Centre was built in the south of the city in volcanic areas characterised by the under soil and plants structure which is typical of this environment. A strong geometric body with an extended multi-storey courtyard inside the layout is organically related to the volcanic under soil and vegetation (ill. 5). The structure of concrete walls mediates between the abstract world of geometry and the texture as well as the colour of the environment. On the one hand, strong chiaroscuro contrasts merge the exterior expression of the building, on the other hand, they break interior spaces to create the impression of lightness and spaciousness of the work.

Another interesting realisation is *Museo Rufino Tamayo* (1981). The museum was founded to exhibit the artwork and collections of one of the Mexican greatest painters – Rufino Tamayo. The building, which is situated in Chapultepec Park, appears to the observer among trees like a temple of art moved from the Yucatán Peninsula. Massive horizontal concrete blocks superimposed on top of each other like steps resulted in a spatial system that brings to mind monumental pyramid-like palaces and temples from Uxmal or Chichen-Itza embedded in the jungle (ill. 6). In this case, a modern play on forms is determined by a departure from orthogonality by the introduction of planes and diagonal solids. Sequences of rising and refractive forms are combined by an artistic structure of concrete walls – slightly pink concrete of chiselled texture.

One of González de León's and Zabludovsky's last joint realisations is the re-construction of the huge concert hall *Auditorio Nacional* (1989–1991) in Chapultepec Park in the city centre. The object in the form of an oval building was erected according to the design by A. Zabludovsky in 1952. In the late 1980s, González de León and Zabludovsky created a completely new casing of the auditorium by extending the object and giving the front façade an extraordinary monumentality. Huge cantilevers carry a massive beam creating a portico-like composition or a gateway to a megalithic sanctuary. Extensive stairs in front of the building organize the entrance zone on the one side, whereas on the other side they force a distance and separate the observer from the building. The structure of the concrete façade elements additionally reinforces the impression of a stone monument from the past (ill. 7).

The above examples show a variety of formal solutions. Analysing the work of T. González de León, we can see a very differentiated architectural language, i.e. from functionalist and minimalist forms sparingly operating with detail to almost theatrical age design elements, derivatives of postmodernist poetics (here also quotations from architecture and pre-Hispanic art).

When J. M. Larios described creative activity of T. González de León he showed an extremely rich palette of spatial arrangements and formal means, which the architect used in his composition games such as elements of dialogue with the city (porticoes, urban niches, entrance zones), central spaces (courtyards, corridors, and inner pedestrian streets), forms (step-like, triangular, semicircular, cylinder forms, tilted cubes, towers, etc.), basic components (among other things, roofs, windows, stairs) and other elementary structures (columns,

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Ill. 7. T. González de León, A. Zabludovsky, reconstruction of *Auditorio Nacional*, Mexico City (1989–1991)

Ill. 8. T. González de León, A. Zabludovsky, *Oficinas Centrales de Banamex*, Mexico City (1986–89)

Ill. 9. A. Treviño Arizmendi, *Biblioteca-Emeroteca Nacional*, University Cultural Centre (CCU), Mexico City (1978)

ramps, sun protection blinds, cornices, arches, etc.)<sup>10</sup>. This language of architectural poetics was applied and consistently developed throughout the years of the design work.

The basic building material, which was used to accomplish these diverse forms, was usually concrete. That is why creative activities of González de León and Zabłudovsky are strongly connected with the visual quality of concrete walls surfaces. González de León learned about the technology and artistic qualities of concrete in Le Corbusier's studio in France. From the early 1960s in Mexico, he already started his own design business and started to apply concrete in his projects. At first, these were walls with smooth surfaces remaining after the formwork. The unsatisfactory texture effects of wall surfaces forced him to look for methods to improve the visual (artistic) qualities of concrete. That was the reason why he joined Zabłudovsky. In subsequent projects, they experimented with the structure, texture, and colours of concrete surfaces of walls.

In some buildings, especially in office and residential buildings, they used prefabricated elements, in which the relatively smooth surface of panels showed the structure of gravel. In the case of the apartment building *Avenida de las Fuentes* (1975) a belt of dark and purple basalt was additionally added in horizontal wall panels. However, the purpose of the search was to be a less expressive structure of walls, which were cast directly on the construction site.

One of the unsuccessful experiments of this type is the office building *Nuevo León* (1969–70). In this case, concrete surface sandblasting under pressure technology was applied to the production of which white marble crushed stone and black gravel were used. The low readability of the texture and the gray colour of concrete forced the architects to seek further solutions.

Among other things, the work by Paul Rudolph *Yale School of Architecture* in New Haven (1963), where raw concrete walls were hammered to produce a uniform texture, became a reference point. However, this technology was expensive in American conditions<sup>11</sup>, whereas in Mexico, cheap labour power encouraged designers to experiment with the manual treatment of concrete surfaces<sup>12</sup>.

In the laboratory they created, they were looking for new combinations of concrete components trying to replace gray sand and black gravel with pink sand and white marble crushed stone. On the other hand, the surface of concrete was subjected to manual treatment by the use of a chisel<sup>13</sup> which allowed a relatively deep breaking of the wall surface and uncovered and broke pieces of marble. In this technology, the most important architectural projects by González de León and Zabłudovsky were created almost for the next thirty years<sup>14</sup>. T. González de León claimed that for him, chiselled concrete with marble crushed stone is not

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<sup>10</sup> J. M. Larios, *La composición arquitectónica en la obra de Teodoro González de León*, Universidad Autónoma Metropolitana – Unidad Azcapotzalco, México 2009.

<sup>11</sup> P. Heyer, *Mexican Architecture, The Work of Abraham Zabłudovsky and Teodoro González de León*, Walker and Company, New York 1978, p. 26.

<sup>12</sup> One worker was able to treat on average circa 2m<sup>2</sup> with a chisel within one day; *ibidem*.

<sup>13</sup> There is a noticeable difference in the appearance of the surface of the hammered concrete (hammered concrete) and the chiselled one (chiselled concrete); T. González de León in his working sketches uses the term *martelinado* ('hammering'), but in practice he did not use concrete hammering in significant realisations; J. M. Larios, *op.cit.*, p. 239.

<sup>14</sup> For many years T. González de León worked with a group of the same workers from the town of San Salvador el Seco in the state of Puebla. The exception was the realization of the Embassy of Mexico in Berlin, where workers from Poland were employed. However, the results of their work with pneumatic hammers did not fully satisfy the architect; *ibidem*, p. 236.

only the artistic treatment of the surface. It is a structural system that withstands the passage of time, does not in fact require any maintenance, makes it possible to use manual work of unqualified workers in Mexico and most importantly – it enables to replace the flat surface of the ordinary concrete with a warm, expressive, and craft texture<sup>15</sup>.

At this point of our considerations, it is worth paying attention to visual (artistic) and aesthetic qualities of chiselled concrete (*concreto cincelado*).

The appearance of concrete surfaces depends on the mixture composition, which is used for the production of concrete, on the formwork kind and on the further possible treatment of the wall surface. Apart from searching for methods that best expose the structure of concrete, the architects constantly experimented with the colour of the material. From the 1960s, a common ingredient of mixtures for the production of concrete was white marble crushed stone which was readily available, whereas other components such as sand or gravel changed.

In order to warm up grey concrete, they gradually replaced grey sand and black gravel with pink sand of different shades and grain sizes. This colour is, among other things, a characteristic feature of *Museo Rufino Tamayo*.

The concrete, which was used to accomplish the seat of the Banamex Bank Centre (*Oficinas Centrales de Banamex*), 1986–89, was of the most intensive colour. The building was designed on the quarter corner plot in the very historic centre of the City of Mexico. The colonial residence Palacio de los Condes de San Mateo de Valparaiso was situated in the immediate vicinity of it. In colonial architecture of Mexico, soft, porous stone *tezontle* of volcanic origin, a kind of red tuff was used. It did not have the right structural strength, but it was perfectly suited to fill the walls, giving a characteristic red-brown colour to the facades of a building.

Architects were obliged to refer this project to the historical context. Therefore, the new object received the facade structure, which in scale and divisions resembled a colonial façade but was built from simplified geometric forms. However, crushed stone from *tezontle* was used for the production of concrete. Thanks to this, the façade gained the colour that blended in with the landscape of the historic centre (ill. 8).

Water-absorbing *tezontle* made it very difficult to inject concrete into the formwork at the construction site, therefore in the subsequent realisations they did not use crushed stone anymore, but only sand from *tezontle* in smaller amounts, which was combined with pink sand. Such aggregate mixtures were applied, inter alia, in two significant accomplishments from the 1990s designed by González de León, namely *Palacio de Justicia Federal* (1987–1992, with architects J. F. Serrano and C. Tejeda) and the seat of Hewlett Packard Company (1990–1996, with architect J. F. Serrano).

Apart from the characteristics of the material resulting from its composition and processing, visual elements, which derive from the concrete technology poured in situ, are also worth paying attention to. On most of the walls, there is a horizontal drawing of the connections between successive formwork layers. This horizontal rhythm appears on most objects built in this technology. These divisions resemble the structure of stone buildings<sup>16</sup>. Moreover, on the

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<sup>15</sup> *Ibidem*.

<sup>16</sup> T. González de León claimed that ‘*The use of concrete, marking its structural connections, is equivalent to panels in stone architecture. (...) For me, those lines which cross and compose façades talk about how a structure was built and how materials work*’, T. González de León, *La idea y la obra*, Fondo de Cultura Económica, México 1994, p. 23; quote after: *ibidem*, p. 237.

walls, we can see rhythmically decayed mounting bushing openings of formworks. To some extent, these structures, which are almost graphic on the scale of architectural forms, assuage the weight of the concrete walls.

In the discussed realisations apart from artistic aspects, we can also distinguish an aesthetic dimension, i.e. a specific cultural code. The appearance of the concrete walls of the huge edifices of González de León and Zabludovsky brings to mind the monuments of pre-Hispanic architecture.

Hammered or chiselled concrete resembles the structure of sedimentary rocks such as breccias or conglomerates. In Mexico, since the ancient times, volcanic sedimentary rocks have been used as building material, e.g. *tepetate* and abovementioned *tezontle* or limestone. The buildings were constructed from relatively soft stones due to lack of suitably hard tools (iron was unknown in Mexico before the arrival of Spaniards). The walls made of such materials were plastered and painted. Throughout the centuries, these layers were usually largely destroyed, exposing the rough surfaces of soft rocks that have eroded. This plasticity of the material is associated in our times with all historical monuments of Indian cultures in numerous archaeological sites. The porous texture of *tezontle* can be noticed in many monuments of colonial architecture. We can assume that in the aesthetic concept of monumental buildings by T. González de León and A. Zabludovsky – apart from formal references – the appearance of the chiselled concrete surface became an additional reference to the cultural landscape of Mexico.

From the mid-1990s, T. González de León ceased to use the laborious and troublesome chiselled concrete technology, in particular at high altitudes. He focused on the plasticity of concrete surfaces, which is obtained in metal formworks using white concrete (white cement and white marble gravel). This method of using concrete to create building plasticity became a characteristic feature of T. González de León's last period of his creative activity<sup>17</sup>.

## 5. Concrete architecture of the 1970s

In the 1970s, also many other architects used the plasticity of textured concrete to create huge objects and layouts. This type of plasticity became one of the recognisable features of Mexican architecture of that period.

Monumental buildings of the University Cultural Centre (CCU) the greatest Mexican university Universidad Nacional Autónoma de México (UNAM), which were built in the second half of the 1970s in the south of the city, belong to significant realisations. It consists of, among other things, a gigantic concert hall *Nezahualcóyotl* (designed by Arcadio Artis Espriu, 1976) and *Biblioteca-Emeroteca Nacional* (designed by Arturo Treviño Arizmendi, 1978)<sup>18</sup>.

The massive and polygonal body of the concert hall, which is situated on the edge of the volcanic natural terrains covered with low vegetation, reminds us of the mysterious monolithic object of the distant past, also due to the texture of gray concrete walls. Similarly, the library has raw concrete exterior walls (delicate vertical grooves), which contrast strongly

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<sup>17</sup> This method of creating visual qualities of architectures was called *teodocreto* – a combination of words Teodoro and *concreto* (concrete); *ibidem*, p. 236.

<sup>18</sup> M. Rodríguez Viqueira, *op.cit.*, p. 143.

with subtle material solutions of the interiors. The structure of the concrete wall surfaces is a drawing of horizontal lines of significant intervals between consecutive layers of cast concrete, whereas horizontal stripes, which were formed in this way, had a dense rhythm of vertical grooves resulting from the application of suitable forms of formwork. This plasticity of walls was applied by various designers to almost all buildings in the team, which visually unified architecture of the complex (ill. 9).

Agustín Hernández (born in 1924) is a well-known Mexican architect who used concrete as an artistic material. In his creative activity, he used concrete as a facade material, however, without any additional treatment, i.e. such as it was produced in metal formworks. Such plasticity of wall surfaces corresponded to the readability of the architectural structure of objects with a predominantly very complex sculptural form.

He designed numerous residential houses and public utility buildings using strong geometric solids in the architectural composition such as horizontally and vertically placed prisms with triangle bases.

Among his distinguished works, there are his own house and studio (1972–1975) as well as a military college *Colegio Militar* (1975–1976). In both examples, very different in scale, we can find formal references to massive bodies and spatial arrangements of great pre-Hispanic layouts such as Monte Albán and Teotihuacán<sup>19</sup>.

## 6. Summary

The massiveness and versatility of the use of concrete in Mexican architecture is determined by such extreme construction situations as the outstanding works mentioned above as well as the mass construction, which is often developed without architects. Huge slums areas on the outskirts of big cities, especially of Mexico City, constitute the background for these big realisations. The gray landscape is formed by reinforced concrete skeletons of single storey or multi storey houses filled with cement bricks and sometimes painted in bright colours. Narrow parcels, dense development, protruding upward reinforced bars of infinite buildings and cobwebs of makeshift electrical lines set very low standards of life for many Mexicans<sup>20</sup>.

Therefore, a high level of average architecture, which is created by graduates of numerous architecture faculties at Mexican universities, is really surprising. Concrete structures, in this case, are a widely used constructional and formal solution<sup>21</sup>.

Teodoro González de León is the most well-known and appreciated representative of Mexican artists who use concrete. He gave the architectural forms unusual plasticity by skillfully combining a compositional structure with a concrete technology. He created unique poetics, which combined monumental character and pathos with the roughness of forms and materials and simultaneously with numerous cultural references to architectural traditions of his country. That is why this architect of European functionalism became one of the most

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<sup>19</sup> *Ibidem*, p. 144.

<sup>20</sup> S. Padilla Galicia, E. Ribbeck, *Colonias populares en la ciudad de México. Urbanismo informal y autoconstrucción*, [in:] S. Padilla Galicia (ed.), *Urbanismo informal*, Universidad Autónoma Metropolitana – Azcapotzalco, México 2009, p. 26–49.

<sup>21</sup> *Arquitectura poblana*, Colegio de Arquitectos de Puebla, Puebla 2009.

appreciated Mexican artists. He became the one who raised the concrete structure to the rank of a work of art and thus deserved the name of a poet of concrete.

Also, other remarkable architects contributed to the enhancement of concrete prestige as an architectural substance. The poetics of Mexican concrete architecture consists in skilful manipulation of form, mass, and plasticity of the material. The reinforced concrete technology, which was introduced in Mexico along with European functionalism, gained a national dimension in the hands of sensitive authors, combining modernity with local tradition.

Concrete in Mexican architecture proved to be economically and climatically appropriate. However, Mexican artists are credited with developing specific poetics of this substance, which refers to the landscape and nature, cultural tradition, and aesthetic sensitivity of Mexicans.

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