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WILL MODERNITY BECOME A TRADITION?

CZY NOWOCZESNOŚĆ STANIE SIĘ TRADYCJĄ?

Abstract

When the Roman Pantheon arose, probably its creators were aware of the modernity of the emerging object, but did they realize that they create architecture of the future? In the architecture of the 50s and 70s of the 20th century, we find beautiful, sometimes spectacular geometrical forms – spherical structures of the Sydney Opera House, Jorn Utzon's, hyperbolic paraboloides by Felix Candela[2]. Which of them will remain the architecture of the future? Which of them will evoke at our descendants emotions similar to our experiences, when visiting Rome we enter the Pantheon? Is the only determinant of the architecture of the future an innovative form? The chapter presents a comparative analysis of the design methodology of Felix Candela and Jørn Utzon on selected examples of artists' works. The similarities and differences between the architects' methods of work have been defined in the context of the Architectural Geometry[3].

Keywords: Architecture, Architectural Geometry, thin shell structures, Felix Candela – Jørn Utzon

Streszczenie

Gdy powstawał rzymski Panteon, zapewne jego twórcy świadomi byli nowoczesności powstającego obiektu, ale czy zdawali sobie sprawę, że tworzą architekturę dla przyszłości? W architekturze lat 50.–70. XX w. odnajdujemy przepiękne, nieraz spektakularne formy geometryczne – sferyczne przekrycia Opery w Sydney Jørn'a Utzona, paraboloidy hiperboliczne Felix'a Candeli[4]. Obiekty nowoczesne, o nowatorskiej konstrukcji, zaskakującej formie. Które z nich pozostaną architekturą przyszłości? Które z nich będą wywoływać u potomnych wzruszenia podobne do naszych przeżyć, kiedy zwiedzając Rzym wchodzimy do Panteonu? Czy jedyną determinantą architektury przyszłości jest nowatorska forma? W rozdziale przedstawiona została analiza porównawcza metodologii projektowania Felix'a Candeli i Jørn'a Utzona, na wybranych przykładach dzieł twórców. Określone zostały podobieństwa i różnice metod pracy architektów, w kontekście Geometrii Architektury[5].

Słowa kluczowe: Architektura, Geometria Architektury, cienkie konstrukcje łupinowe, Felix Candela – Jørn Utzon

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[2] Sroka-Bizoń M., *Architektura definiowana geometrią?*, Czasopismo Techniczne, 2010, no. 7-A2, p. 347.

[3] Architectural Geometry is an area of research, which combines applied geometry and architecture. H. Pottmann, A. Asperl, M. Hofer and A. Kilian firstly used the term "Architectural Geometry" in 2007 in their book at the same title. Cooperation of three geometers and an architect gave a great effect. – Sroka-Bizoń M., *Architectural geometry* [in:] *Proceedings of the Czech-Slovak Conference on Geometry and Graphics 2016*, Ostrava 2016, p. 11.

[4] Sroka-Bizoń M., *Architektura definiowana geometrią?*, Czasopismo Techniczne, 2010, no. 7-A2, p. 347.

[5] Geometria Architektury to obszar badań, który łączy geometrię i architekturę. H. Pottmann, A. Asperl, M. Hofer i A. Kilian po raz pierwszy użyli terminu „Geometria Architektury" (Architectural Geometry) w 2007 roku w swojej książce pod tym samym tytułem. Współpraca trzech geometrów i architekta dała wspaniały efekt. – Sroka-Bizoń M., *Architectural geometry* [in:] *Proceedings of the Czech-Slovak Conference on Geometry and Graphics 2016*, Ostrava 2016, p. 11.

1. THE PAST – THE FUTURE

The Roman Pantheon was built approximately 125, in the reign of Emperor Hadrian's command; probably it has been designed by Apollodorus of Damascus. The building has been located in the place of the earlier, burnt Pantheon of Agrippa from the time of Augustus. The architect received a difficult task of incorporating the remains of the original building into a new project. The huge rotunda constituting the main part of the Pantheon is covered with a dome with a diameter of 43.3 m with a central opening (*oculus*), which provides interior lighting[6]. The ability to cover by dome such a large space, which was presented for the first time in the history of architecture, still awakens adoration and admiration for the building's constructors. Undoubtedly, Apollodoros of Damascus has designed a modern object with innovative architectural and constructional solutions.

Authors of this year's conference theses, in one of them, referring to the relationship between the past and the future, are claiming: *Like any other useful thing, architecture wears out and falls into the past; if the thing belongs to the space of art at the same time, the departure is gentle but always irrevocable. Such a past may mean death, non-being, oblivion, but after some time, usually for incomprehensible reasons, there may be – a resurrection.* Referring to the issue of modernity, the authors of the conference's theses state: *The modernity of architecture means existence beyond tradition, beyond the past. Modernity arises today, in the present; it means hope related to – the future. The term modernity includes faith in originality and technological innovation; it is a realization of rationalism, it assumes the primacy of reason. Shape, form, idea, that which is essential to call a thing art – is added by the artist free of charge! Modern architecture is not the architecture of the future, it is the architecture – for the future. The architecture of the future does not exist; it will be in the future.*

The Pantheon was founded as a temple founded in honour of the divine patrons of Rome. In 609, the Byzantine emperor Fokas donated the building to Pope Boniface IV. By virtue of the Pope's decision, the "emperor's gift" has been adapted on the Christian temple, the church dedicated to Saint Virgin Mary of the Martyrs. In the 14th century, the building was adapted for defense purposes and served as a fortress. Thanks to the function changed over the centuries, the Pantheon – an "architectural useful thing" survived. It did not share the fate of other temples of ancient Rome, which were dismantled. The unusual qualities of the architecture of the building provided it with belonging to the space of art, and his modernity made him an example of Architecture for the future. The architect Apollodoros probably was aware of the modernity of the solution he designed, but did he predict that his building is Architecture for the future? Did he dream about the fact that his authorship's object will survive, in almost unchanged form, 1,900 years? Could he have imagined that this building would be visited by millions of people?

Formulating the thesis that the Pantheon has become Architecture for the future thanks to its modernity, it provokes its further extension, that Modernity of Architecture is a guarantee of its immortality, duration. Authors of the conference's theses present this issue as follows: *Creators believe in the existence of avant-garde architecture. They believe that the avant-garde determines the future of architecture.*

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[6] Piskadło A., *100 najsłynniejszych budowli*, Wiedza Powszechna, Warszawa 1988, p. 48, http://www.pantheon-rome.com/history-of-pantheon (access: 27.06.2019).

In the Architecture of the 1950s and 1970s, we find beautiful, sometimes spectacular forms of covering objects, with their modernity similar to the Pantheon dome novelty – hyperbolic paraboloids by Felix Candela, spherical coverings of the Sydney Opera House, Jørn Utzon's. Modern architectural objects, with an innovative design and surprising forms. Avant-garde architectural objects both in terms of form and applied construction solutions. Which of them will evoke at our descendants' emotions similar to our experiences, when visiting Rome, we enter the Pantheon? Is the only determinant of the Architecture of the Future an innovative form? Is it possible to comprehend this mystery of creating Architecture for the future by comparing the work of two architects, often counted among one group of artists?

2. EXPERIMENTS AND AVANT-GARDE

In 1848, Joseph Louis Lambot built a boat made of iron mesh and cement mortar. The innovative construction was presented in 1855 at the Paris World Exhibition, bringing huge success to the author of the solution[7]. A year later, another Frenchman, Joseph Monier, a gardener, performed their new concrete planters, for the orange trees, secured with a steel mesh. In this way, he wanted to protect the pots from being blasted by the roots of growing trees. Joseph Monier also presented his constructive discovery at the Paris World Exhibition in 1867[8].

The breakthrough in the popularization of reinforced concrete in Architecture was 1892, at that time François Hennebique patented the reinforced concrete structure system – Béton Arme and built in Paris the first residential building in which he applied a monolithic, skeletal structural system[9].

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[7] J. L. Lambot's boat can still be seen today in the museum in Brignoles, in a small town in the south of France: Gallotti P., *Un bateau en ciment armé âgé de 54 ans*, Le Béton Armé, 1902, no. 55, pp. 121–122, il. VI; Żywicki J., *Początki budownictwa żelbetowego w Lublinie*, Kwartalnik Historii Kultury Materialnej, 2017, no. 1, p. 56.

[8] After presenting his constructions at the World Exhibition, Joseph Monier patented his idea, and in the following years, he developed a method of reinforcing concrete structures with steel nets, introducing them to pipes and containers for water, building slabs and railway sleepers. These solutions have also been patented. In 1875, commissioned by Marquis de Taupinart Tilière, the owner of the 16th century Chazelet castle (Central Region, France), a talented gardener designed a reinforced concrete bridge. The 13.80 m long and 4, 25 m wide bridge was stretched over the moat surrounding the Chazelet castle. The construction exists in good condition up to today. – Gallotti P., *Joseph Monier*, La Béton Armé, 1902, no. 43, pp. 73–75; Żywicki J., *op. cit.*, p. 56.

[9] Francois Hennebique was a stonemason, builder – self-taught and a great construction entrepreneur; according to his design, in 1894 the first reinforced concrete bridge over the river was built in Wiggen, Switzerland. For the purpose of promoting the patented reinforced concrete technology, he built his own house in Bourg-la-Reine, Paris, also using a monolithic reinforced concrete framework. F. Hennebique's house erected in the years 1901–1903, has survived to this day in very good technical condition. The international consortium Le Beton Arme Hennebique had been active on several continents and in many countries – F. Hennebique's ideas were used, among others for the construction of the opera in Lille, mills in Nantes, storehouses in Genoa, silos in Strasbourg, sanatoriums in Switzerland, the Egyptian Museum in Cairo. From 1898, the magazine La Beton Arme propagated the design ideas of F. Hennebique, in 1900 they were presented at the Paris World Exhibition. – Karaś S., *Ścieżki powstawania technologii F. Hennebique'a*, Drogownictwo, 2013, no. 5, pp. 159–165; Żywicki J., *op. cit.*, pp. 56–57; Giedion S., *Przestrzeń, czas i architektura. Narodziny nowej tradycji*, Państwowe Wydawnictwo Naukowe, Warszawa 1968.

The residential building located in Paris at Rue Franklin designed in 1903 by the architect August Perret is considered as the first, consciously revealing the reinforced concrete structure of the object in the field of Architecture[10].

In terms of construction thin roof shell structures innovative, the Casablanca docks vaults designed by A. Perret in 1916 should be mention as one of the highlights – *they were thin as eggshells*[11]; an equally delicate construction of the roof shell was the roof of the engine house in Bagneux near Paris, designed by Eugene Freyssinet in 1929[12].

The Cement Hall designed by Robert Maillart, presented in 1939 at the Swiss National Exhibition in Zurich together with the achievements of Pierre Luigi Nervi and Eduardo Torroja[13], form a kind of culmination of the experimental stage for reinforced concrete thin roof shells structures in Architecture. The initial experiment became the basis of avant-garde architecture.

3. RATIONALIST AND DREAMER

Referring to the conference theses describing Architecture for the future, and looking for the foundations of its creation, it is interesting to compare the works of two architects Felix Candela and Jørn Utzon. Both F. Candela and J. Utzon belong to the group of architects who used thin reinforced concrete roof shells structures with a complicated geometrical structure in their work[14].

Felix Candela, a Mexican architect of Spanish origin, born in 1910 in Madrid, said about himself that he had been an architect by chance, without the slightest conviction of his abilities as an artist or designer[15]. Jørn Utzon, a Danish architect younger than Felix Candela almost then ten years, as a teenager, helped his father, the director of the shipyard in Alborg, build ship models. Perhaps if his artistic interests were have not been awakened by his uncle Einar Utzon-Frank, a professor at the Royal Academy of Fine Arts, architect Jørn would have been ship designer instead[16].

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[10] The reinforced concrete skeleton is used in the architecture of the building without any covers, it is an architectural expression of the building – *ibidem* p. 358.

[11] *Ibidem* p. 361.

[12] In the history of contemporary architecture, Eugene Freyssinet is most often referred to along with the airships' hangars designed by him in the years 1916–1922, at the airport in Orly. Parabolic cylinders of hangar's were made of repetitive, reinforced concrete construction arches. The spaces between the arches were filled with glazing. The hangars were 60.00 m high, 175.00 long, and spans of parabolic construction arches were 91.00 m long. – Charciarek M., *Twórcy architektury betonowej – „wynalazcy"*, Budownictwo Technologie Architektura, 2008, no. 3, pp. 16–19.

[13] In 1929, a stadium was built in Florence according to the design of Pierr Luigi Nerrvi, in which the architect/constructor takes full advantage of the structural properties of reinforced concrete and designs brackets with a length of 17.00 m. Eduardo Torroja uses the cantilever thin roof shell structures as the roof of Madrid Hippodrome. The length of the cantilever parts is 13.00 m.

[14] Felix Candela objected before including him in one group of artists with Eero Saarinen, Oscar Niemeyer and Jør Utzon. This excellent expert on descriptive geometry and mathematics based his design solutions on in-depth geometric analysis of the designed form. – de Anda Alanís E. X., *Félix Candela 1919–1997. The Mastering of Boundaries*, Taschen, Hong Kong – Los Angeles 2008, p. 7.

[15] *Ibidem.*

[16] https://www.pritzkerprize.com/biography-jorn-utzon

Is it possible to compare the methodologies of design work of creators often presented as representatives of a group to capture the foundations of creating Architecture for the future? Can such a comparison bring us closer to determining certain determinants of creating Architecture for the future[17]?

The basis for such a research problem may be the discussion regarding the realization of the Sydney Opera designed by Jørn Utzon. In the 1950s and 1960s, in the pages of the world architectural press, a large group of architects and architecture critics expressed their opinions on the outcome of the competition for the Opera building and further stages of the project implementation[18]. Among the participants in the discussion was also Felix Candela, presenting his critical opinion – he negatively assessed the selection of the winning work in the competition and the solution of roof covers adopted in the implementation phase. In his opinion, the construction of the Opera was possible only thanks to the work done by the constructor Ove Arup, who should be treated as a real designer of this part of the Opera, because the adopted solution differs significantly from the sketches of the competition design by Jørn Utzon[19].

F. Candela was the author of 896 design solutions in which he used thin reinforced concrete roof shells as objects' covers. As he said – he opened his umbrellas (double curved, ruled surfaces – hyperbolic paraboloid) over more than half of Mexico's area.

When in 1941, after escaping from Spain, he began his new life in Mexico, he devoted the first years in a new country to individual education in the field of mathematics and mechanics.

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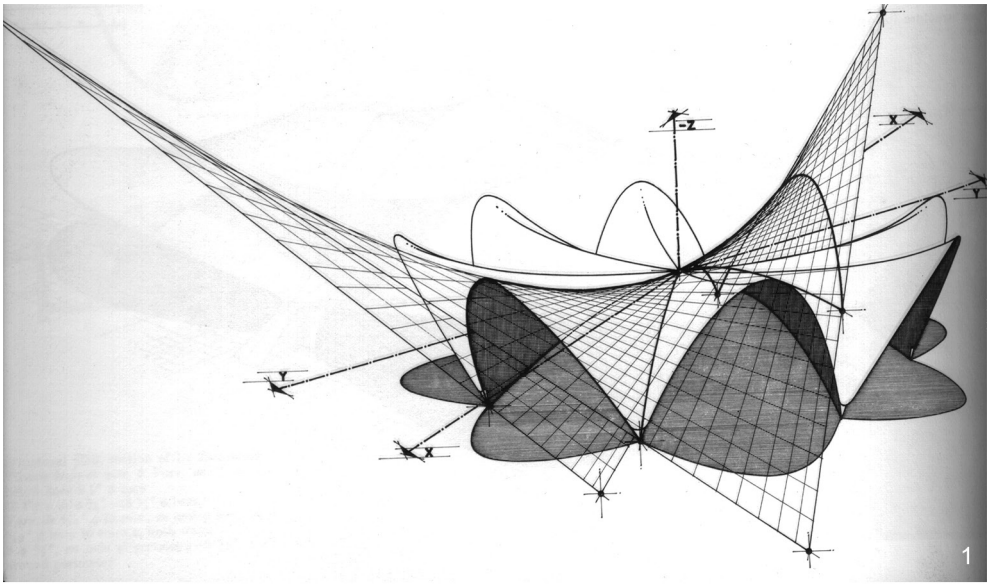
[17] Considerations regarding the methodology of architectural design are the subject of research by an extremely large group of scientists, in the context of the conducted comparative analysis, the following authors can be distinguished: Bazewicz M., Collen A., Dorosiński W.C., Gasparski W., Wrona S., Collen A. (ed.), Gawłowski T.J., Bonenberg W., Gerardin L., Hall A.D., Hillier B., Niezabitowski A., Purcell P.A., Mallen G.L., Goumain P.A., Zwicky F. The problem of morphological analysis in architectural design is also examined by Aleksandra Prokopska. The author focuses mainly on the work of Le Corbusier, but also attempts to extend the scope of research in a broader sense, taking into account creative activities, e.g. Jorn Utzon. – Prokopska A., *Analiza metodologiczna wybranych brył architektonicznych*, Zeszyty Naukowe Politechniki Rzeszowskiej. Budownictwo i Inżynieria Środowiska, 2007, no. 41.

[18] For example the course of the discussion in the group of Spanish architects is presented by Ana Esteban-Maluenda in: *Tradition vs. Technology: Periodicals as a driving force for the architectural debate: the Spanish gaze over the Pacific* [in:] J. Merwood-Salisbury, M. Dudding, Ch. McDonald (eds.), *Historiographies of Technology and Architecture. Proceedings of the 35th Annual Conference of the Society of Architectural Historians of Australia and New Zealand*, SAHANZ, Wellington 2018, pp. 140–157.

[19] *In February 1966, Joern Utzon ceased to be an architect of the Sydney Opera, whose project won an international competition nine years earlier, in 1957, replaced by a group of local architects after a series of obscure cases and discussions that provoked the resignation of J. Utzon. The apparent reason was the government's dissatisfaction with the fact that on the construction of the facility has already been spent $ 20 million, and the Sydney authorities expect to spend 30 or more million to complete the building when the initial project budget was only seven million dollars. (...) The importance of the project, the international resonance created by his unusual project and all the circumstances and incidents that led to the departure of Utzon from the stage, are focusing the attention of the audience. From a professional point of view, these facts justify trying to explain the details of what happened and why it happened. The facts are quoted largely on the basis of the articles of British and North American journals that confirm some information obtained in person (by Felix Candela) in the Ove Arup office, participant of the structural project.* – Candela F., *El escándalo de la Ópera de Sídney*, Arquitectura [Mexico], 1967, no. 98, pp. 103–110.



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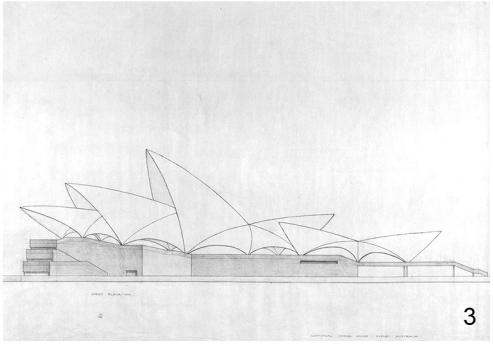
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Thanks to this, the analysis of the geometrical structure of double curved, ruled surfaces was not a problem for him. The proposed design solutions of its authorship were reinforced concrete roof shells structures of unprecedented dimensions – the thickness of the reinforced concrete roof shell, based on parabolic construction arches, in the Cosmic Rays Pavilion[20] is from 2.00 to 2.50 cm.

3.1. THE RATIONALE LOTUS FLOWER

A representative example of the works of Felix Candela can be the Los Manantiales[21] restaurant located in the township of Xochimilco, located in the surrounding of the capital city. The plan of the restaurant is based on a regular octagon inscribed in a circle with a diameter of approx. 42.00 m, over which a vault formed from four intersecting hyperbolic paraboloids (saddle surfaces) is opened. As a result of the design assumption, the interior of the restaurant is an open space, covered with a roof whose shape resembles a lotus flower. The thin reinforced concrete roof shell structure in the highest places, which are the outer arches of the vault, is approx. 8.50 m, the central point of the vault rises at a height of approx. 6.00 m. Analysing the design sketches of the adopted solution, for example, a perspective sketch of interfering hyperbolic paraboloides (Ill. 1), it can be stated that the architects consciously applied double curved ruled surfaces to the project, which could be perfectly realized in the form of thin reinforced concrete roof shells structures.

3.2. A DREAM ABOUT SPHERICAL GEOMETRY

Jørn Utzon was educated under the direction of Alvar Aalto, whom he, along with Gunar Asplund, considered his Scandinavian masters. In the 1940s, he travelled, like most of the creators of his generation, he wanted to see the world directly. In 1948 he met Le Corbusier and sculptor Henri Laurens in Paris. While on a scholarship in North America, he met Frank Lloyd Wright and Mies van der Rohe directly. After returning to Denmark, he took part in many architectural competitions, he did not build much. In 1956, the housing estate, designed by J. Utzon, was built in Kingo, the city located near Helsingor. In 1957, the Dane unexpectedly

[20] Cosmic Rays Pavilion was realized in 1951–1952 at the University of Mexico City, in Mexico City. Laboratory project Felix Candela was developed in cooperation with architect Jorge Gonzalez Reyna.. – de Anda Alanís E. X., *op. cit.*, p. 21.

[21] Los Manantiales restaurant was designed by Félix Candela in 1958, with cooperation of architects Fernando Ordóñez and Joaquín Álvarez Ordóñez. – *ibidem*, p. 63.

Ill. 1. Perspective sketch of hypar's vault for Los Manantiales Restaurant, Xochimilco, Mexico City, 1958, architects: Félix Candela, Fernando Ordóñez, Joaquín Álvarez Ordóñez, source: http://pc.blogspot.com/2006/11/restaurant-at-xochimilco-felix-candela.html

Ill. 2. Los Manantiales Restaurant viewed from the water, Xochimilco, Mexico City, 1958, architects: Félix Candela, Fernando Ordóñez, Joaquín Álvarez Ordóñez, source: de Anda Alanís E. X., *op. cit.*, p. 64, author: Erwin Lang

Ill. 3. West elevation National Opera House, competition drawings submitted by Jorn Utzon to the Opera House Commitee, 1957, Jorn Utzon, source: https://www.records.nsw.gov.au/item/917112

Ill. 4. Sydney Opera House, Sydney, Australia, 1959–1973, designed by Jorn Utzon and Ove Arup, source: https://commons.wikimedia.org/wiki/File:Sydney_Opera_House_Sails.jpg

won the competition for the Sydney Opera House project. This happened mainly due to Eero Saarinen, a jury member who recognized the work of global significance in J. Utzon's work, and with all his energy pushed the design to the victory of the competition. At the same time, this meant the realization of the winning project[22].

The building of the National Opera was to be located on the Bennelung Point peninsula, on specially prepared reinforced terrain. The designed object was to be the headquarters of the National Opera and other cultural institutions such as the theatres and exhibition halls. The spatial structure of the building has been shaped with the use of a flat cuboid and raising above it the sailing vaults. (Ill. 3.) In the realized object, each vault is built from parts of spheres with a radius of 75.20 m.

The starting point of the construction of Opera's vaults was based on the sphere, in the Jørn Utzon's design's conception. Thin roof shells membranes of the vaults were built from intermediate segments, which, according to the author, can be constructed from prefabricated elements, using only a moving arched template without the scientifically developed scaffolding system that is needed for normal thin roof shell structures[23]. When starting to develop the Opera's realization project, the vaults, in the beginning, were designed as originally outlined by the architect's imagination, but the Danish constructor, Ove Arup, who undertook the development of the construction part of the project, stated that it is necessary to renounce the original concept and change it to such which is possible to construct[24].

4. CONCLUSIONS

In terms of the complexity of the scope of projects, the objects: the restaurant Los Manantiales and Opera Sydney House are basically incomparable. The first of them is an object with a relatively simple functional program, the building area of which is approx. 5,000 m^2. The area of the Sydney Opera House covers approximately 18,000 m^2, which houses three theatres, the main concert hall, and the exhibition space. An interesting issue, especially in the context of criticisms formulated by Felix Candela regarding the way of designing the Sydney Opera by Jørn Utzon, was to compare the design methodology of geometrical form of the object, which is realized by two creators, omitting the technical parameters and functional programs of the objects. Some of the critical remarks contained in F. Candela's article were concerned on the issue of shaping the geometrical structure of the opera's sailing's vaults, the Spanish architect critically assessed the original assumptions of Jørn Utzon presented in the competition design, assessing them as sketch solutions, whose formal expression referred to emotions more than to technical ones aspects of the geometrical structure of the proposed form. Comparing the design methodologies adopted

[22] Giedion S., *op. cit.*, pp. 645–656.

[23] *Ibidem* p. 653.

[24] The first proposition of J. Utzon was the execution of vaults from on-site concrete elements, a kind of prefabricated elements shaped in wooden or steel forms. Another architect's proposal was to make roof shells of prefabricated ribs with the same radius of curvature, positioned next to each other. The structure of the vault, which was shaped in this way, was to be similar to the orange particles that make up the fruit. In the finally adopted solution, the single ribs of the vaults were to be assembled from segments cast in place, and the composite ribs reinforced with reinforcement and concrete mix shaped to create spherical vaults of the Opera House. – Prokopska A., *op. cit.*, p. 64.

by both Felix Candela and Jørn Utzon presented in numerous publications regarding the discussed objects, it can be concluded that contrary to the critical remarks of F. Candela formulated against J. Utzon, the methods used by both architects are similar. Both F. Candela and J. Utzon base their conceptual considerations on the geometric analysis of the object. Perhaps Felix Candela's geometric analysis of the object's structure and constructional aspects of its realization is somewhat deeper.

Jørn Utzon in his sketches presented in correspondence with Sigfried Giedion presents sources of sailing's vaults of the Sydney Opera House concept – the shell structure derives from the surface of the sphere, and the whole technical solution describes by the concept of spherical geometry[25]. It seems that the problems related to the realization of the Opera's spherical thin roof shells reinforced concrete structures were to a greater extent of economic and political nature – during the implementation of the facility has been appeared that it is necessary to strengthen the ground for the planned construction which significantly increased the cost of investment, the time of building construction was too optimistic plan for such a complicated functional program and an innovative form of the building. Perhaps this, what Jørn Utzon has been missed during the realization of the Opera is the implementation experience and the favourable attitude of the investor. Maybe Jørn Utzon won the competition for the Sydney Opera House too soon? But if he had more experience related to the realization of the thin reinforced concrete roof shell structures, would his competition's design be equally bold? Felix Candela has been designed his solutions based on a detailed analysis of the construction of the structure. Projections, cross-sections, axonometric and perspective drawings were the basis for adopting a specific structural solution. Undoubtedly, excellent knowledge of descriptive geometry made it easier for him to solve design issues. Interest in the construction of the object was also an additional asset. While designing and analysing the construction of the structure, he simultaneously formulated the answer to the basic realization question – how to do it? The use of the double-curved ruled surface in the Los Manantiales restaurant, the surface, which is almost dedicated to thin reinforced concrete roof shells, testifies to the masterful mastering of the architect/constructor's technique by the Spanish architect.

Are the analysed objects examples of Architecture of the Future?

Los Manantiales still functions as a restaurant, only the picturesque surroundings of the building have changed. Partial modifications of the building such as the application of the red waterproofing layer changed the original, clean form of the object. However, the work of Felix Candela continues to be an inspiration for other artists, such as Santiago Calatrava, for example.

Jørn Utzon in 1966 left the Sydney Opera building site, in some way defeated. The final realization of the building was entrusted to a group of Australian designers who led to the completion of the construction and opening of the Opera in 1973. In 2003, the Pritzker Prize was awarded to *the creator of the masterpiece of the Sydney Opera House, one of the great iconic buildings of the twentieth century, a picture of great beauty that has become known throughout the world – a symbol of not only the city but the whole country and continent*[26]. This creator was Jørn Utzon. On June 28, 2007, the Sydney Opera House was entered on the World Heritage List.

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[25] Giedion S., *op. cit*, pp. 652–657.

[26] The Pritzker Prize citation

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[5] Gallotti P., *Un bateau en ciment arme age de 54 ans*, Le Béton Armé, 1902, no. 55, pp. 121–122, il. VI.

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