

JUSTYNA KOBYLARCZYK\*

## IDEAS ABOUT ARCHITECTURE / ARCHITECTURE OF THE IDEAS

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### WYOBRAŻENIA ARCHITEKTURY/ ARCHITEKTURA WYOBRAŻEŃ

#### Abstract

Contemporary architecture is a mixture of intuition, unlimited imagination and rationalism implemented in the particular stages of the design. Sometimes it impresses with its uniqueness manifested in a complicated form, sometimes in a simplicity. Digital design, eliminated all restrictions of the architecture. As a result of the creative idea, it has a direct impact on the process of implementation. Integrated systems such as CAD / CAM / CAE allow to create bold and complex designs so that the ideas of architecture are transformed into the architecture of the ideas. Despite the available possibilities, architecture simple in its form is still appreciated as it determines the high visual values of the place and the architectural form itself in a clear way and without unnecessary means of expression. It is difficult to indicate the direction of the development of the architecture. However, a skilful combination of unlimited possibilities of intuition and rationality seems to be the most accurate.

*Keywords: contemporary architecture, intelligent architecture, digital design, intuition, rationalism*

#### Streszczenie

Architektura współczesna jest swoistą mieszaniną intuicji, nieograniczonej wyobraźni oraz racjonalizmu w poszczególnych etapach projektowania. Niekiedy zachwyca swą niezwykłością przejawiającą się skomplikowaną formą, innym razem prostotą. Za sprawą cyfrowego projektowania architektura dziś pozbawiona jest ograniczeń. Jako wynik zamysłu twórczego ma bezpośrednie przełożenie na proces realizacyjny. Zintegrowane systemy typu CAD/CAM/CAE pozwalają na realizowanie śmiałych i skomplikowanych zamysłów projektowych, tak że wyobrażenia architektury zamieniają się w architekturę wyobrażeń. Mimo wspomnianych możliwości nadal architektura prosta w swej formie cieszy się uznaniem jako ta, która w czytelny sposób bez zbędnych środków wyrazu decyduje o wysokich wartościach wizualnych miejsca i samej formy architektonicznej. Trudno jest więc jednoznacznie wskazać drogę, którą dziś podąża, z czym kojarzy się jej przyszłość. Jednak najbliższe wydaje się umiejętne łączenie zarówno nieograniczonych możliwości intuicji jak i racjonalizmu.

*Słowa kluczowe: architektura współczesna, architektura inteligentna, cyfrowe projektowanie, intuicja, racjonalizm*

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\* Assoc. Prof. D.Sc. Ph.D. Arch. Justyna Kobylarczyk, Chair of housing Development, Institute of Urban Design, Faculty of Architecture, Cracow University of Technology.

## 1. Ideas of architecture

Ideas about architecture are directed towards an unlimited and surprising form as well as technology, that makes it low energy, intelligent, etc. However, it does not preclude admiration of the forms that are simple in their geometry. Sometimes, the lack of additional, complicated features can be considered as unique and these still forms stand out from the environment and do not need additional means of expression.

Regardless of the adopted tendency, architecture, must not only amaze but also meet the requirements regarding functionality. Contemporary architectural forms should be created in respect of the natural environment and its shrinking resources. Taking into account, these principles, created objects are situated in a suitably planned environment that allows users to pursue a healthy lifestyle, which is one of their most important and urgent preferences<sup>1</sup>.

The spatial conditions in question should also be ensured by the proximity of natural elements and space of a recreational and sporting character. The buildings themselves are equipped with new technologies that provide energy from renewable sources. With the use of new technologies – distributed control systems, climatic conditions can be fully used without additional human control, which makes it possible to define them as intelligent. Nowadays, centralised systems are converted into dispersed ones, which gives them autonomy of operation (important, for example, in security control of the object). Each element should be additionally integrated with the others. It allows to control, microclimatic conditions prevailing in the building, which leads to savings in the operation of the facility. And so, among other things, the temperature inside the object is controlled based on weather information collected from the weather station. In order to provide suitable conditions, the building is either protected against excessive heating or „opened” to sunlight. Many possible solutions can ensure it. The simplest or one of the simplest is the ability to control blinds whose appropriate position is adjusted to the angle of the sun’s rays. They can protect against too intensive insolation or the contrary, provide access to the light. There are also examples of objects changing their position, adapting to the climate conditions. One of them is the “Water villa” at the Veerse Poort team in Middelburg, the Netherlands. Recent years have shown that the way of thinking about contemporary architecture has changed. It is connected with the development of new technologies, both in terms of design as well as in the field of construction or material solutions. The economic factor of the whole process is also important. It includes the costs of planning (from the conceptual stage) through the design, implementation, operational phase and in the last stage – demolition, including recycling and utilisation. The LCA analysis, easily and quickly documented by the BIM system, allows to collect all possible information about the object. This new approach towards designing is a breakthrough in relation to previous years and trends that are part of the development of architecture and the process of its shaping.

Today, architecture is also the result of growing awareness of environmental threats, dwindling resources and changes in climate conditions. These processes result in energy problems, hence the trends in architecture such as the aforementioned intelligent construction, solar architecture or low-energy building. The indicated directions are interrelated and

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<sup>1</sup> This subject was elaborated by the the author in the work: J. Kobylarczyk, Assessment of the quality of the living environment in selected cities of the Podkarpackie Province after the transformation period, in the first decade of the 21st century, Cracow University of Technology, Kraków 2012.

serve the same purpose – concern for the condition of the natural environment. For the same reason, sustainable construction or Green Architecture has also become widespread. It seems that the principles of sustainable design have become a part of the thought and image of contemporary architecture, which regardless of the form reflects its criteria. And although the first sketches, the intentions of the objects can arise intuitively, the next stages of the design are the result of rational thinking about the form. The increasing popularity of the BIM system supports this theory. Each project activity is well thought out and coordinated. From the initial idea about the object, the investor is aware of the cost of construction, building materials, the operation of the facility, including necessary repairs, etc. The same applies to the period in which these activities will be undertaken. They are determined in advance so that each contractor can plan the various stages of the life of the object.

## 2. Challenges of contemporary architecture

Regardless of the adopted tendency and accepted manner, the architecture of today and the architecture of tomorrow are the results of technological possibilities. They are present at every stage of the object's creation and functioning, whether it is an expression of passion for simple or more complex forms. It is difficult to discuss objects with organic forms without mentioning the work of Frank Gehry. His architecture in the early 90s was accompanied by digital tools that allowed him to create the most complex forms dominated by curvatures and difficult to define shapes, which due to the possibilities created by digital design became possible to fabricate. This tendency is reflected in many realisations. Among others, the Kunsthau Kunsthaus in Graz, from 2003 by Peter Cook and Colin Fournier<sup>2</sup>.

„Friendly Alien” is a facility recognised around the world due to the plastic, biomorphic form designed using advanced CAD techniques. The object contrasts with neighbouring, traditional residential buildings not only because of its block but also because of the used materials. The surfaces made of acrylic glass with protruding „jets” that allow the daylight to enter the building, attract the spectator's attention and reminiscent of lightness. The lighting has become an integral and important element of the entire body, whose façade is illuminated at night by over 900 fluorescent lighting spots. The lighting is controlled therefore it is possible to display images, films and animations, which qualifies the building into the category of the multimedia architecture. The windows of the building are not located randomly. The image of the area seen through them is a real gallery of landscapes observed from the inside of the building. An inseparable element of the structure is “Eisernes Haus” – a cast-iron construction from the 80's<sup>3</sup>.

“Friendly Alien” reflects on the moment when architecture becomes art and rationalism dominates over intuition. The collision of these “worlds” allows for the blurring of the boundaries between them and the exposure of what becomes the effect of this “mixture”. It is often accompanied by elements that stimulate the senses responsible for interpreting architecture. These feelings cannot be enclosed in the frame of rationalism. Fleeting events created by the sequences of light illumination, the sounds that fit into the rhythm of urban life, and

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<sup>2</sup> K. Januszkiewicz, *Komputery i architektura*, Archivolta 1(57)/2013, Węgrzce, p. 36–37.

<sup>3</sup> K. Januszkiewicz, *op.cit.*, p. 36–37.

finally the beauty of the object and space. The impact force of all these phenomena is so great that it transforms into an event in the urban space.

The intuition of creators and recipients allowed for the implementation of many other objects that can be called unusual. It is, among others, the house with the integrated wings of the Boeing 747 a floating house located on near the ocean in Australia, as well as a house in the Sonoran Desert, Tucson, Arizona. Each of these objects is located in a different place, but each of them is an event that would not occur without the intuition.

Regardless of whether these examples of architecture are assessed positively or negatively, their uniqueness is undeniable. Even the house in the desert, which completely blends into the surroundings. Through the distinction in the space, these buildings appeared as extraordinary phenomena, in which intuition gives way to rationalism, and rationalism gives way to intuition.

The house with the wings of the plane is like a dream about flying, about freedom, lightness and being carefree in the clouds. There is no possibility of an unsuccessful landing or falling, only joy of experiencing all the impressions of carefree floating in the air – an unlimited space.

The building was located on a 20-hectare plot in Malibu near the ocean, mountains, and the vast valleys. Strength, beauty and the extent of the landscape can be admired almost in the clouds while standing on the wings of the plane. The unique view adds extraordinary character to the whole premise. Listening to the interview with the owner it was difficult not to forget her decision concerning the guest part of the building, which she was afraid to expand. It was out of the fear that the guests would soon become the members of the household.

The sex of the owner of the house is reflected in its feminine shape dominating over the sharp edges. Francie Rehwald also took care of the feminine atmosphere inside the building. It's full of warmth, life and colour, although the architect intended to keep the interior raw.

Although almost every part of the house has been thought out, the greatest impression is triggered by the construction of the roof, which was made of Boeing wings. They have become an important element of a flat, self-supporting roof, that requires almost no pillars or supports. The wings were placed on a concrete structure and fixed at selected points with steel frames<sup>4</sup>.

The imagination, idea and intuition played a key role in the design of this house. However, the creation of the building required also precision, a rational approach to all design and implementation phases, also regarding the transport of aircraft wings. Even such a seemingly prosaic element in the whole complex undertaking was extremely important and difficult. The value of the idea lies not only in its unique form but also in the approach to ecology in architecture, as secondary materials, including used aluminium, were used in the implementation of the assumption. Therefore it can be said that the object is a mixture of intuition and rationalism, interesting architecture and respect for the environment, which today is an inseparable element – a tendency in the contemporary architecture<sup>5</sup>.

The second mentioned object is “a levitating house”, floating over the ocean in Australia. The illusion of floating was obtained due to its location. The house was seated on a shaft recessed just off the mountainside by the Fairhaven Beach.

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<sup>4</sup> <http://www.bryla.pl/bryla/1,85298,4576746.html>.

<sup>5</sup> <http://www.bryla.pl/bryla/1,85298,4576746.html>.

The architects from the F2 Architecture studio achieved the impression of levitating by placing the house a few dozen meters beyond the slope, resting the object on a 40-meter high pole, which was connected to the mainland by a footbridge with glazed covers. This manipulation creates an impression of the object hanging in the air. The support located from the side of the hill that provides access to the house is invisible at this height.

The solid of the object evokes the image of a gazebo covered with a hipped roof closing the one-story form. It recalls associations of a floating object, which by its cubature and shape is not a contrast to the surroundings. This contrast is introduced by the colour of the assumption maintained in dark shades distinct from the blue of the ocean. The colour of the water can also be admired from the inside of the Pole House, which has glazed planes opening the view of the ocean<sup>6</sup>.

Also, in this case, the architecture of the object can be assessed more or less positively, but it is undoubtedly an event – something extraordinary. The idea and intuition were undeniably the impulses that gave birth to the “levitating house”. However, without a rational approach to its implementation, it would remain only a thought, never a fulfilled dream. The closeness to the landscape is also remarkable. The architecture coexists with the surrounding. In some fragments, it blends into it, in others, it grows out of it. The ocean is like a symbol of life detached from everyday worries and duties, a dream of peace and independence in the full sense of the word.

Another noteworthy implementation includes a house in the desert. The very location of the facility seems extraordinary. The desert is associated with a place impossible or extremely difficult to live in. It has nothing to do with the comfort or high quality. The space open to sandstorms, high temperatures and lack of water is an extreme condition. The Dust architectural office proved that the desert is the place where life is not only possible but can be delightful, comfortable and unusual. It is a unique landscape blending with the architecture that is its inseparable element. The indissoluble shape of the object and the desert landscape is determined by a simple, horizontal form of the building and its elevations preserved in warm colours that refers to the surrounding rocks.

The object is made of blocks of clay which provide insulation against heat and allow to maintain the appropriate microclimate. Large surfaces of raw walls cut by glazed planes intensify the proximity of the desert landscape and individual elements of low greenery. The rocks constituting the closest scenery of the object became an inspiration for designing the entrance zone of the house accented with stone blocks arranged in a chaotic manner evoking the image of falling fractions of rocks. Glazed walls can be moved freely, controlling the opening to the landscape<sup>7</sup>.

Without intuition, sensitivity and passion for the natural world, it would be difficult to plan such a building. However, its implementation results from meticulous thoughts, rational thinking preceded by a dream, a dream about a home in the desert.

The presented examples prove that great realisations need both the intuition of the creator and the specific thinking so that the intuitive idea could become reality. They also require technologies that follow the unlimited imagination of the creators and facilitate the

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<sup>6</sup> <https://podroze.onet.pl/ciekawe/the-pole-house-niesamowity-szybujacy-nad-oceanem-dom-w-australii/4bce8y1>.

<sup>7</sup> [http://www.luxlux.pl/artukul/super-domy-dom-na-pustyni-sonora-tucson-arizona-25063/galeria\\_3#artGallery](http://www.luxlux.pl/artukul/super-domy-dom-na-pustyni-sonora-tucson-arizona-25063/galeria_3#artGallery).

implementation of complex projects. One of the most commonly used processes is Building Information Modeling and Building Information Management. Both systems allow for full investment control. They model and manage information concerning the creation of the object. The modelling takes place using digital techniques and influences the concept of data structures, while information management allows controlling activities at individual stages of design as well as the implementation and functioning of the building<sup>8</sup>.

BIM allows to „organise and control investment processes by using the parameters of the digital building model to exchange information on asset components throughout the investment cycle. The benefits result from centralised data exchange, visual communication through three-dimensional objects, early recognition of capabilities, sustainable and effective, interdisciplinary and interactive design, on-site control, updating the documentation to the real state, changes of the design as well as during construction and operation, efficiently developing asset components and model of the object in the investment cycle from the first concept to the demolition of the building”<sup>9</sup>.

The majority of the recognised and complex investments is created with the application of the BIM system. There are also those whose implementation is extremely difficult and stretches over time becoming unprofitable because the system was not used during the design phase. The benefits of using BIM are also connected with large savings in the use phase of the facility. They include a reduction in energy consumption and environmental pollution. This idea is close to sustainable energy-saving construction that turns towards the use of renewable energy sources and concern for the environment.

### 3. Closing remarks

Imagination and realism are indispensable in the creative process. Without intuition and imagination, it would be difficult to consider the initial concept. The architectural sense, as well as a rational approach to design, are equally important regardless of the accepted manner allowing for the implementation of the geometrically simple architecture, or that characterised by biomorphic shapes. It allows for the realisation of even the most complex concepts. It is often possible with the use of new digital technologies or investment management systems. They lead to savings in the construction and operation of the facilities. These savings amount to 20% of cost reduction at the construction stage, and 33% in the remaining stages of the life of the building<sup>10</sup>. BIM also allows to reduce energy consumption by storing it inside the building materials. Their production is associated not only with its absorption but also with the emission of greenhouse gases.

New directions of architecture development following the ecology manifested in Green Architecture, or balanced design are the signs our times. The new trends allow, among others, for the reduction of consumption of resources, their re-utilisation and, as a conse-

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<sup>8</sup> J. Magiera, *Review of new BIM technologies and processes*, [in:] *Innovative challenges in building technology*, Building Research Institute, Warsaw 2017, p. 665.

<sup>9</sup> A. Tomana, *BIM, Innovative technology in construction. Basics, standards, tools*, Krakow 2016.

<sup>10</sup> D. Kasznia, J. Magiera, P. Wierzowiecki, *BIM in practice. Standards, implementations, case study*, PWN, Warsaw 2017.

quence, environmental protection<sup>11</sup>. It primarily leads to a reduction in energy demand and, more importantly, it limits the destruction of the natural environment – its resources and quality by reducing air, water and soil pollution, as well as noise and vibrations. The concern for the state of the natural environment is also a concern for people and their health. Although the progress of science and technology also in the field of architecture results from rational thinking, the first design idea often results from the intuition of the creator and his ideas. Without it, subsequent design stages and later implementation would be impossible. It seems, therefore, that the subjected intuition and rationality should be treated equally. Without them, architecture could not exist.

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<sup>11</sup> D. Kasznia, J. Magiera, P. Wierzowiecki, *op.cit.*, p. 18.