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SEMANTICS OF GEOMETRIC FIGURES IN MODERN FACADE SOLUTIONS

Karimjon Kuranbaevich Polotov

Senior Lecturer, Andijan State Technical Institute, Andijan, Uzbekistan

Abstract: The article considers the problem of visual information content of modern architecture. Architecture and the emotional world of a person are interconnected. The loss of the inherent information content by architecture has a negative impact on the quality of the urbanized environment of modern cities. The semantics of architectural images built on the basis of geometric figures has its own temporal development. The geometric figure as an archetype retains its key role in creating the image of an architectural object. However, the traditional reading of the form in modern design practice receives a new understanding.

Keywords: geometric figure, archetype, semantics, facade, visual information.

ZAMONAVIY FASAD YECHIMALARIDA GEOMETRIK SHAKLARNING SEMANTIKASI.

Karimjon Kuranbayevich Polotov

Andijon davlat texnika institute katta o'qituvchisi, Andijon, O'zbekiston

Annotatsiya: Maqolada zamonaviy arxitekturaning vizual axborot mazmuni muammosi ko'rib chiqiladi. Arxitektura va insonning hissiy dunyosi o'zaro bog'liqdir. Arxitekturaga xos bo'lgan axborot mazmunining yo'qolishi zamonaviy shaharlarning shahar muhiti sifatiga salbiy ta'sir ko'rsatmoqda. Geometrik figuralar asosida qurilgan me'moriy obrazlar semantikasi o'ziga xos vaqtinchalik taraqqiyotga ega. Geometrik figura arxetip sifatida me'moriy ob'yekt obrazini yaratishda o'zining asosiy rolini saqlab qoladi. Biroq, zamonaviy dizayn amaliyotida shaklni an'anaviy o'qish yangi ma'noga ega.

Kalit so'zlar: geometrik figura, arxetip, semantika, fasad, vizual ma'lumot.

СЕМАНТИКА ГЕОМЕТРИЧЕСКИХ ФИГУР В СОВРЕМЕННЫХ ФАСАДНЫХ РЕШЕНИЯХ

Каримжон Куранбаевич Полотов

старший преподаватель, Андижанский государственный

технический институт, Андижан, Узбекистан

Аннотация: В статье рассматривается проблема визуальной информативности современной архитектуры. Архитектура и эмоциональный мир человека взаимосвязаны. Потеря архитектурой присущей ей изначально информативности негативно отражается на качестве урбанизированной среды современных городов. Семантика архитектурных образов, построенных на основе геометрических фигур, имеет свое временное развитие.

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Геометрическая фигура как архетип сохраняет свою ключевую роль в создании образа архитектурного объекта. Однако традиционное прочтение формы в современной проектной практике получает новое осмысление.

Ключевые слова:геометрическая фигура, архетип, семантика, фасад, визуальная информация.

Modern architecture strives to follow the latest technical advances and maintain continuity in its development. Therefore, the tendency to combine different disciplines is spreading. Architecture as a socially oriented field of activity is developing in the direction of involving sociology, psychology, economics and technical sciences in the design process. As a result, many interdisciplinary studies have appeared that look at the problems of modern architecture from different perspectives. Much attention is paid to architectural phenomenology, the phenomenon of visual perception, coloristics and the basics of composition. Primary geometry issues are still poorly resolved in facade details. Architectural form is considered as a system, which is very reasonable. However, the role of individual elements of this system in terms of information content has not been sufficiently studied. In addition, the communication requirements for the architectural environment are increasing every year.

At the end of the 20th century. Much attention was paid to learning the language of architecture. Researchers associate this phenomenon with the processes of style formation. Already in the second half of the 19th century. simultaneous presence of different stylistic directions is observed. It is this variety that has led to the expansion of semantic interpretations of individual elements in the image of an architectural object.

Modern architecture is characterized by the active use of innovative technologies both at the design stage and during project implementation. This led to the emergence of new "non-canonical" [p. 3, 4] metaphors in the architectural language.

Architecture has its own semantics as part of the modern communication environment [2]. Semantics studies the rules of interpretation of symbols, i.e. touches on figurative and symbolic aspects of architecture [9, p. 81-82].

Geometry forms the basis of architecture and actively participates in the formation of its language. Simple geometric figures (archetypes) originally carried a semantic load [6]. Ancient man used symbols to express his thoughts about the world around him.

We can find images of such symbols on various household items, walls of houses and clothes. All decorative compositions are created on their basis. Images of geometric figures-symbols are often found in such compositions: circle-sun, square-earth, triangles-mountains (or forests); spirals representing the ideas of the infinity of existence, constant development or eternal motion.

Each cult system created its own paradigms that define the semantics of geometric figures. It should also be noted that each culture has interpreted this or that sign (figure) in its own way.Let's look at the meaning of the main numbers.

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The circle has always been a universal symbol. It has no beginning and no end. Therefore, in many traditions, the circle represents the Cosmos, the universal space. Its main task is the symbolic representation of celestial bodies. In Christianity, the circle was associated with ideas about the world and infinity.

The square is found in the decorative compositions of the oldest cultures. The square symbolized the foundations of the universe, the four cardinal directions. The square was also associated with land and fertility. For example, in Greco-Roman tradition, it was a symbol of Aphrodite (female fertility power).

The triangle was associated with the magical number three. An equilateral triangle, with its apex pointing upwards, was the symbol of the supreme deity in Christianity and Judaism. The triangle with the apex pointing down was often associated with the feminine principle.

Order systems deserve special attention. Based on "natural" prototypes, they gradually acquired more and more strict and compact geometric shapes. For the ancient Greeks, the column represented the human body. This is indicated not only by the numbers of the caryatids and atlantas, but also by the names of the individual elements of the order. In postmodernist architecture, ordered compositions change their visual appearance and have a completely different semantic meaning (Ricardo Bofill, Michael Graves, etc.).

The language of architectural form, as mentioned above, refers to sign or semiotic systems. Their content is expressed using certain symbols or codes. In this case, we will consider geometric figures.

Yu.I. Kurbatov identifies two types of codes that are semantically opposite in the architectural language. The first is the encryption code. He is responsible for the news. The second code is the decryption code. It represents continuity [5].

Innovation in architectural form complicates perception; allows a person to participate in the creative process.

Continuity, on the other hand, is designed to facilitate perception. It brings the architectural image closer to a person, includes it in the framework of humanitarian culture and connects it with psychological needs. This is where an intuitive reading of a code based on cultural traditions takes place.

The combination of these two codes in the language of architectural forms is always a reflection of the era. It gives an idea of the level of cultural development, priorities, national characteristics and the structure of cognitive psychology [5].

An important factor to consider when developing facade planes is visual perception. Visual ecology is concerned with the development of ecological principles for the construction of material objects that meet the "standards of vision" [8]. In this case, it determines the degree of saturation of the facade plane with geometric elements, the nature of their relationship and location. These parameters describe the visual data content of the object that enters our field of

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vision. The lack of information, as well as its excess, negatively affects the psycho-emotional state of a person [8, p. [43-45].Therefore, it is necessary to create a clear and comfortable image of the architectural space.

It should be noted that the perception of facade planes depends on the characteristics of the environment. First of all, this is the nature of the neighboring buildings. In the historical centers of cities with low-rise or medium-rise block buildings, the street frontage is a continuous line of facade planes. Any new facility must be properly incorporated into the existing development plan. New micro-districts are characterized by the development of multi-storey areas and the presence of open spaces, which provide more variability in the points of perception of the building facade.

In an urbanized environment, a person should be able to move easily and recognize familiar landmarks. Therefore, there should be no break with the past in design decisions. Examples of popular architectural structures show that their authors to one degree or another consciously refer to historical models. In this way, they create recognizable and memorable architecture.

Architects have repeatedly turned to simple forms. To some extent, this was also related to the utilitarian function of architecture. However, they continued to preserve the tradition of carrying the semantic load.

Let's consider the options for using geometric figures in the development of composite solutions for facade planes of buildings and structures.

The most common use of geometric shapes on the facade is openings. In addition to their utilitarian function, they also perform the function of forming the facade plane of the building.

In the first buildings, the sizes of the holes and their shape were determined based on technical possibilities (building materials, production technology). The sacred symbolism of the form was also taken into account in religious buildings.

Geometric shapes on the facade can be seen in the nature of the stone. The pattern of iron, the size and shape of stone blocks or bricks determine the unique structure of the facade surface and the scale of the building.

Covering the facade with different materials is also a very traditional method that is widely used today.

Mosaics have been used in the architecture of many countries, which makes it possible to create national decorative patterns. The semantics of decorative compositions often performed protective functions, serving as a kind of amulet. Here it is appropriate to recall the carved decorative elements of Russian huts, stone carvings on the walls of old Russian churches, and decorative patterns made of plinths.

In modern architecture, the use of traditional decorations in facade decoration becomes primarily an indicator of the continuity of regional traditions. Their semantics refers to a

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person's roots, origin. Such elements have historical information content.

Recently, two trends in the use of geometric shapes in the design of architectural objects should be noted.

The first direction continues to develop the trend of high technology and pragmatism. On this front, it is expressed in the rational structure of aircraft, which allows to standardize their production.

In the second direction, he takes into account the latest achievements of science and technology and makes maximum use of them. But at the same time, living nature is used as a basis for creating visual images (bio-technological direction). This trend is not new either. He only received further development. Here, one can observe the increasing complexity of both individual elements and the geometry of the entire structure. New types of geometric figures called fractals are emerging.Fractal geometry allows us to create a visual representation of continuous development and change that is useful for human perception[4].

The emergence of complex geometry, to a certain extent, is connected with the development of design technologies that allow its reproduction and calculation [1]. Despite the technical complexity of such solutions, the semantics of the resulting visual image turns out to be simple and understandable. At an intuitive level, one can read its natural basis, which is rare in the modern urban environment.

At the same time, loyalty to simple forms remains.

An example of this is the Inotera headquarters project in Taipei (architecture firm tecArchitecture, 2004). The basis of the virtual solution was the combination of traditional Asian architecture and high-tech elements. The facade of the building is made of panels that imitate traditional Taiwanese tile work. The panels are rectangular in shape and change size and color as their height changes. Parametrization was used in the separation of facades [1].

HAEAHNAarchitecture specialists have developed a 33-story office building project for IFEZ. The distinctive feature of this skyscraper is its dynamic style. The facade of the whole complex is a set of exact geometric numbers [7].

Experts say that in the architecture of the modern world, there are more and more objects that are compact and pragmatic in their form, but distinguished by the accuracy of details and quality of execution. Preference is given to forms that allow creating energy-efficient buildings, as well as reducing their construction costs.

The purpose of the building should also be taken into account. Large public building projects "broadcast" completely different information to the world than housing projects.

The projects of famous architects stand out from each other. They are distinguished by the bright individuality and style of the author (Zaha Hadid, Daniel Libeskind, Norman Foster, etc.). To some extent, they set the direction for the movement of architectural thought. But it should

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be noted that such objects are unique. They are often treated not as architectural objects, but as self-sufficient works of art without any context. It is not for nothing that they are called sculptural buildings in professional circles.

CONCLUSION

History is characterized by periodicity. The history of architecture also in the last century, large public and religious buildings were distinguished by their bright individuality. Building structures, on the contrary, kept the traditional character of their forms, distinguished only by the decoration of their facades.

Currently, the development of design solutions for the facades of residential buildings continues in the direction of the variety of details, finishing materials, color range and plasticity of the facade (partitions and relief geometry). Such decisions are justified by the possibilities of the modern construction industry.

Using the semantics of geometric figures as a means of certain continuity to introduce familiar elements into new images allows expanding the boundaries of architectural creativity. Thus, without losing touch with the past, it is possible to create fully contextual forms that are oriented towards the future.

Based on the above, it can be said that geometric figures play a major role in the formation of the facade of modern buildings. Initially, simple geometric figures played an important role in the construction of architectural structures and became archetypes in both architecture and cultural traditions. This is a circle, square, triangle. They are given different semantic meanings. First of all, these numbers were included in the world perception system. They had a sacred meaning.Currently, the semantic meaning of figures is mainly determined by the function they perform.

The format and geometry of the holes allows us to determine the type of building (residential, public, industrial). The division of the facades (glass cutting, different cladding panels) helps to establish the correct size of the structure.

The geometric shape of the individual elements of the facade, on the one hand, shows the high technological level of the building, and on the other hand, it reproduces the living environment. Architectural ecology in its modern interpretation mainly includes the level of comfort of the visual environment created by the facade planes of the buildings that surround us. Thus, an attempt is made to create an ecological and comfortable visual environment for a modern city.

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