Scientific Journal of Latvia University of Life Sciences and Technologies
Landscape Architecture and Art
Volume 23, Number 23

DOI: 10.22616/j.landarchart.2023.23.07

ORIENTATION OF MONUMENTAL DECORATIVE SCULPTURE IN URBAN SPACE

Andrii Polubok, Oksana Pylypchuk

Kyiv National University of Construction and Architecture, Ukraine

Abstract. This article examines and analyzes the main characteristic features of the relationship between sculpture and the external urban environment, the essence of which is the principle of its perception in certain locations, taking into account the orientation – the angles of perception of a specific sculptural composition that is projected in the urban space. The peculiarities of the orientation of monumental-decorative sculpture in architectural space are investigated. An analysis of the patterns was carried out (using real examples) and the probable directions of perception of the expressive silhouette of the sculpture were determined both in typical and in special spatial situations of the urban environment. Directions and points of view are identified, the totality of which constitutes the zones of perception of the sculptural composition depending on the specific spatial situation, which is based on a system of classifications of the external urban environment.

Based on the results obtained during the study, the types of perception of the expressive silhouette of monumental and decorative sculpture are systematized and formulated, taking into account the main and additional zones, points and directions: circular perception in closed space and open space, frontal perception in half-closed space and half-open space, frontal perception in corner space, and frontal-bilateral perception in transit space. As a result of the study, a method was developed for determining the types of perception of sculpture, taking into account its orientation and relationship with the layout of urban space. The advantage of this method is the ability to identify in advance (at the modeling and design stage) the directions of the main, additional zones and observation points of the expressive silhouette of monumental and decorative sculpture of any genre and type in urban space.

The proposed method for determining the types of perception of the most expressive silhouettes of sculptural compositions will help to more effectively model, design and install monumental and decorative sculptures, taking into account specific spatial situations and features of the urban environment.

Keywords: orientation of sculptural composition, types of perception of monumental and decorative sculpture

Introduction

For sculptural compositions, the architectural environment forms a variety of spatial features of perception, which depend on a certain type of space. Monumental and decorative sculpture in the urban environment always involves the correction and enhancement of the clarity of the silhouette, not only through its generalization, but also through its most active expression, which should always be taken into account in the main directions, in the main and additional zones of perception.

Based on the conditions of the relationship between monumental and decorative sculpture and the space of the architectural environment, special means of expressing sculptural compositions are established, taking into account certain directions, zones and points of perception of volumetric form, which depend on the specific conditions of its placement in the environment and the type of public urban space. Despite the fact that the term "round" sculpture implies the perception of a three-dimensional form evenly from all angles, in reality and in most cases, sculptural plastic of such a compositional type is not designed for equally uniform perception from all sides. This is one of the pressing problems (especially recently), which is often not taken into account by designers and sculptors working on "linking" a certain sculptural composition to a specific architectural environment with its own special conditions.

Today, theoretical studies highlight various aspects of the general relationship between monumental and decorative sculpture and architectural space, where practical and aesthetic problems, functional and psychological ways of integrating sculpture into urban space, the perception of the synthesis of sculptural art and the park environment, methods of forming architectural space with works of art are analyzed [5; 7; 8; 23; 24]. Researchers are studying ways to place monumental and decorative sculpture in urban space from the standpoint of the quality of public areas by introducing monumental and decorative sculpture into city space, where the spatial and social role of sculpture in the urban environment is analyzed [13; 14]. The experience of establishing new spatial configurations in changing urban conditions through the design of sculptural complexes is also studied, the processes of combining sculpture and architectural space are identified, based on the unique ability of plastic objects to transform the urban environment and organically live in it [15; 18; 25]. In the aspect of the general perception of three-dimensional objects in space, there are studies, the results of which demonstrate the desire to maximize the perception of an object in a space with several observation zones, where there is a preference for installing a sculptural object with a high degree of perception, in one of the best possible directions [3; 6; 11; 12; 19; 27]. Scientific works on the perception of the expressive silhouette of monumental and decorative sculpture in urban space examine the patterns of generalization of the silhouette of sculptural compositions in the aspect of the relationship of plastic objects with open public space [21; 22].

In the process of creating and constructing a sculptural composition in a real environment, the psychology of perception of a three-dimensional form is of great importance, the process of observing which is a holistic perception of the totality of the silhouettes of a given sculpture in combination with many angles of its observation [6]. One of the most interesting problems in the psychology of the perception of three-dimensional form is the relationship between the nature of the form and the choice of the most favorable points of view. It is the nature of the form of the sculptural composition that dictates the choice of the best points of view [1]. But an even more difficult problem is the design and creation of a sculptural composition in practice, taking into account the real

perspectives of perception that have developed and depend on the specific conditions of the spatial situation – the type of space according to spatial features.

Accordingly, we can state the scientific interest of this topic and its relevance. The studied material in the context of this topic shows that today there is no comprehensive study of the relationship between architectural space and monumental and decorative sculpture, taking into account its orientation in the urban environment, namely, the likely directions of perception of the expressive silhouette of a sculptural composition of various types and genres.

That is why it is important to study the issues of perception of sculpture in the context of urban space in order to obtain the necessary results that can be applied in the design of sculptural compositions in the urban environment.

Aim of the research is to develop an effective method for the orientation of sculpture and its relationship with the layout of urban space – to determine the main types of perception of the expressive silhouette of monumental and decorative sculpture in typical and special spatial situations of the urban environment.

Materials and Methods

For an integrated approach to the study, in order to systematize and generalize it, as well as to determine the relationship between the orientation of monumental and decorative sculpture and the type of architectural space, a structural analysis of the existing modern theoretical and practical material was carried out: literary sources; visual sources (monumental and decorative sculpture in the urban environment, maps – plans, master plans) [9]. The following methods were used for this purpose: 1) the experimental method (plein air studies, photography); 2) analysis of practical material (determining the relationship between the directions and silhouettes of the sculpture); 3) the structural method (structuring, determining the main and additional zones of perception); 4) the method of systematization (summarizing practical material, defining and formulating the main types of perception).

At the initial stage, plein air studies were conducted using photographic recording to address the research objectives. Based on plein air studies, research, and photographic evidence concerning the characteristics of perceiving the silhouettes of realized sculptural compositions, confirmations were obtained. These confirmations are grounded in the factors of optimal visual (physiological) and psychological perception of the realized monumental sculptural composition from various points of observation (Figure 1).

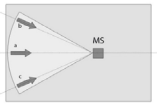
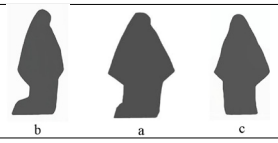
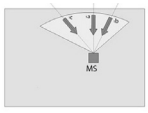
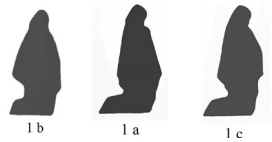
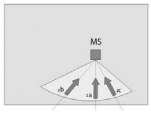
After conducting plein air experimental observations, studying and recording the main and additional directions, zones, and points of perception of the sculpture's silhouette, an analysis of practical material on silhouette perception was carried out based on the example of a realized monumental sculpture composition. A visual table was developed TABLE 1.

Analysis of practical material, taking into account this type of sculpture in a specific spatial situation, made it possible to identify and structure the main zones of perception:

1. The main zone of perception, which accommodates: the main point of the main direction – (a); additional point of additional direction – (b); additional point of additional direction – (c).
2. Additional perception zone (1), which accommodates: the main point of the main direction – (1a); additional point of additional direction – (1b); additional point of additional direction – (1c).
3. Additional perception zone (2), which accommodates: the main point of the main direction – (2a); additional point of additional direction – (2b); additional point of additional direction – (2c).

Fig. 1. "Monument to the employees of the Ministry of Internal Affairs of Ukraine", sculptor Chepelyk V.A., Ukraine, Kyiv, 1997 [author's photo]

Table 1. Comparative analysis of the perception of the expressive silhouette of monumental and decorative sculpture [created by authors]

Perceptual zones	Directions and zones of perception (plan-scheme)	Perception silhouette
Main zone		 b a c
Additional zone 1		 1 b 1 a 1 c
Additional zone 2		 2 b 2 a 2 c

Analyzing and comparing the schematic images of silhouettes created on the basis of natural shooting by a camera from each 9 points and directions indicated by letters determined the most favorable point of perception of the expressiveness of this image (grieving, kneeling) of the sculptural composition – the main point of the main direction main area of perception (a). The silhouettes of the main points of the main directions of the two additional zones of perception also remain expressive (1a, 2a). But, taking into account the genre (the human figure), the sculptural composition required a clear orientation in this space – the position of the woman's figure, which is oriented to the main axis of the square (perpendicular to Povitroflotsky Avenue in Kiev) and turned towards the larger part (ceremonial zone) of the square, which coincides with the most favorable main point of the main direction of the main perception zone – (a) (Figure 2).

Despite the fact that the sculptural composition has a full volume, stands freely in space and has the possibility of a circular view, it is not designed for perception from all sides. A slight displacement of the composition into the depth of space creates the impression of an "invitation" to the square, dividing it into two parts that are different in function and size. The analysis of the silhouettes of perception depicted in the table (TABLE 1) showed that the most expressive in all three zones are the silhouettes that are perceived in the main directions indicated by letters – (a, 1a, 2a). From all other directions of perception, the silhouettes of this sculptural com-

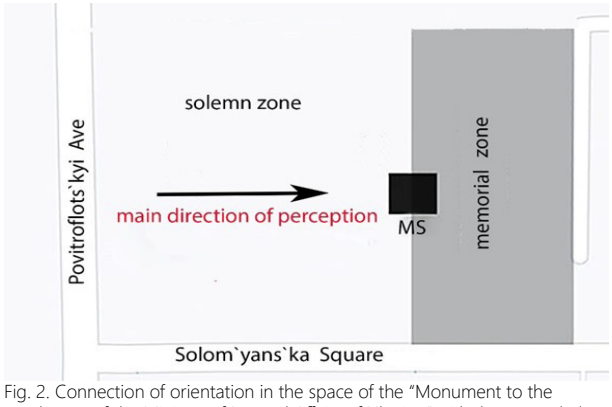


Fig. 2. Connection of orientation in the space of the "Monument to the employees of the Ministry of Internal Affairs of Ukraine" with the general plan of the city of Kyiv [10]

Fig. 3. "Monument to the founders of Kyiv", 1982. Sculptor V. Boroday, Kyiv, Ukraine [17]

Table 2. Comparative analysis of the perception of the expressive silhouette of monumental and decorative sculpture [created by authors]

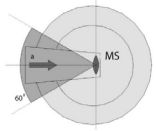
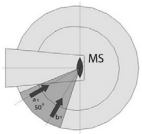
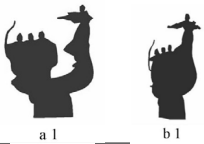
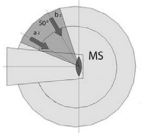
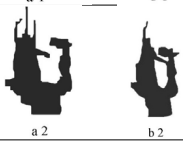
Perceptual zones	Directions and zones of perception (plan-scheme)	Perception silhouette
Main zone (60˚)		
Additional zone 1 (50˚)		
Additional zone 2 (50˚)		

Table note 2: (MS) – monumental sculpture; (a), (a1, b1), (a2, b2) – directions of perception and their corresponding silhouettes.

position came to light as secondary and not expressive for the perception of the recognizable image of the monument. The author of the monument, studying and taking into account the specific conditions of space, for the most expressive perception in a real spatial situation, more actively calculated and worked on the silhouettes of the sculpture in the main directions of the identified perception zones (a, 1a, 2a), it was these contours of the model that were corrected at the stage of the draft design. Therefore, as a result of examining this monument, attention is fixed primarily on the main direction of the main zone of perception, gradually transferring attention to additional zones.

To consolidate the results of the experiment, plein air observations were carried out using photographic recording using the example of a multi-figure sculptural composition (Figure 3).

Based on the results of experimental observations and photographic recording, and identification of the main and additional zones and directions of sculpture perception, an analysis of this practical material was conducted using a multi-figure monumental sculptural composition installed in the city as an example. A visual table has been developed to indicate the main perception zones in degrees (Table 2).

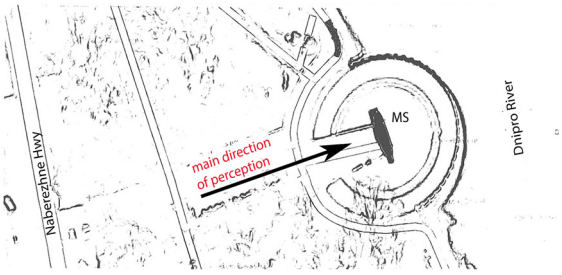


Fig. 4. The relationship of orientation in the space of the "Monument to the Founders of Kyiv" with the general plan of the city of Kyiv [10]

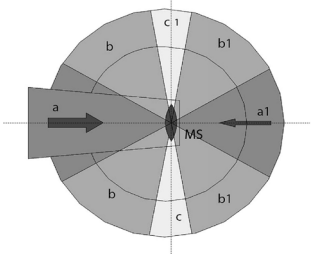


Fig. 5. Determination of the main (a, a1) directions of perception, additional (b, b1) and "blind" (c, c1) zones

In each of the 5 directions, indicated by letters, schematic images of silhouettes made on the basis of outdoor photography are analyzed and compared. As a result of the analysis of this practical material, taking into account the features of a multi-figure sculptural composition in a certain spatial situation, the main zones of perception are identified and structured with an approximate indication of degrees:

1. Main perception area (60˚), which contains: the main direction and the point of perception – (a).
2. Additional zone of perception 1 (50˚), which contains: the main direction and the point of perception – (a1); additional direction and point of perception – (b1).
3. Additional zone of perception 2 (50˚), which contains: the main direction and the point of perception – (a2); additional direction and point of perception – (b2).

The most favorable direction of perception of the expressiveness of the silhouette of a monumental sculpture is the main direction – (a), the main zone of perception, which is about 60˚. From this direction, monumental sculpture has the most recognizable image of a well-known composition. That is why the main direction of the main perception zone coincides with the planning basis of the city and the main direction of approach to the monument from the side of the Naberezhnye Highway (Figure 4).

Also, quite expressive is the silhouette from the main direction of the additional zone (1) the point of perception – (a1). Despite the fact that noticeable changes in the proportions of the composition can be traced from this direction, it still remains quite recognizable, although some details (figures) have already been combined into one whole mass, the main details of the composition are still quite recognizable – the contours of the boat, figures and waves. In the direction of the additional zone (1) the point of perception – (b1) there is a fundamental change in the proportions of the composition: the merging and unification into one mass of all the main details of the monument, which are no longer recognizable by silhouette, except for a separate female figure in the foreground. The hull of the boat in this perspective has

completely lost its expressiveness and a significant distance between the figures completely disappears. Observation of the silhouette of the composition in the direction of the additional zone (2) of the point of perception – (a2) and (b2) clearly demonstrates that the expressiveness of the silhouettes and the recognition of the image of the monument is completely lost, although from the point of the main direction of the additional zone (2) of perception – (a2) it is still enough the same basic details of the composition are recognized – the boat, human figures and waves. The analysis and comparison of the depicted silhouettes showed that the most expressive of the zones of perception defined in the table are mainly two silhouettes that are observed: from the main point of the main direction of the main zone and the main point of the main direction of the additional zone of perception, which are indicated by the letters – (a, a1). From all other points and directions of perception, the silhouettes of this sculptural composition are revealed as secondary and not so expressive for the perception of a clear recognizable image of the monument.

Despite the fact that the sculptural composition has a full volume, stands freely in space and has the possibility of a circular view, it is not designed for perception from all sides. This happens because in the additional zones of perception of the silhouette of the sculpture, its angles change and, as a result, deviating (approximately by 30˚) in both directions from the main axis of the direction of observation, the figures of the monument begin to gradually "merge" into one mass and overlap each other, thereby distorting the expressiveness of the artistic and plastic image. In general, as a result of the analysis, regarding this monumental and decorative composition in a specific spatial situation, we can conclude that the monument was installed with the calculation mainly for frontal perception from two opposite sides, which have certain viewing angles – 160˚ common areas (a, b, a1, b1), by 60˚ – main (a, a1) and by 50˚ – additional zones (b, b1). Therefore, bearing in mind the features of the compositional structure and the genre of sculpture (figurative), the second, but not the main direction of perception of the most expressive silhouette is the direction – (a1), opposite to the main frontal direction (a) of the main zone of perception of the silhouette. Also, as a result of the analysis of the expressiveness of the silhouettes of all available zones and directions of perception of this composition, the zones ("blind") of the least expressiveness of the silhouette were identified – (c, c1,) each by 20˚, respectively (Figure 5).

Thus, the influence of the main, additional zones and points of perception of known monumental and decorative compositions in specific spatial situations, on the development of their silhouette in certain directions, has been identified and analyzed.

Based on a comparative analysis of these examples of the introduction of monumental and decorative sculpture in certain types of urban environment, the main patterns of perception of the expressive silhouette of a sculptural composition were identified. It was found out how important it is to take into account the main directions of the main, additional and even "blind" zones of perception when designing and architectural "linking" of a sculpture in a certain spatial situation.

The key role for the maximum expressiveness of the silhouette of the sculptural composition and the recognition of its image is played by the definition of the main (most favorable) zone of perception, and hence the position (orientation) of the three-dimensional form in space relative to visual observation. The point of view on the object and its position (angle) relative to the visual perception of the observer are interrelated factors, which in our case are essentially identical concepts.

Results and Discussion

Based on the results obtained in the course of a comparative analysis, we can draw a general conclusion for the practical design of monumental and decorative sculpture in urban space: even if any sculptural composition is designed for perception in the center of space and is a voluminous "round" shape, its silhouette is not always from all points vision is actively expressed. Therefore, in order to perceive a more expressive and recognizable image, a conceived idea of a sculptural composition, especially for the perception of the first impression of a silhouette from long distances, one should pay attention to the main directions of perception, the main areas of perception with the main points of view. Firstly, it is necessary to choose the most favorable angle of the sculptural composition for this in relation to the observer, and secondly, to actively enhance the expressiveness of the silhouette, work it out even at the stage of designing and creating a sculptural composition, depending on the alleged main directions of observation of the sculpture, which determine the main areas of perception that have developed in a particular spatial situation.

As a result of experimental plein air studies measurements and photographic fixation, it was established that the main zones of perception sometimes differ significantly from the additional ones. This is what affects the level of expressiveness of the silhouette of a sculptural composition, which is perceived in a specific direction and zone of perception with its own points of view, which of course should be taken into account in the practical application of sculpture, which is designed in an urban environment.

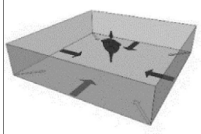
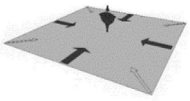
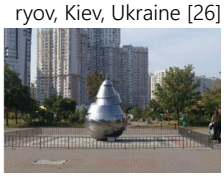
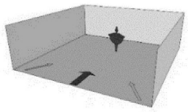
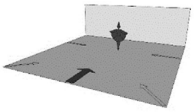
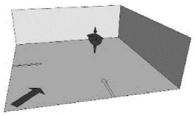
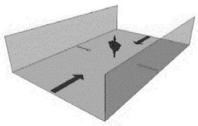
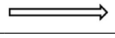
As a result of structuring the main zones of perception, based on known types of spaces according to spatial characteristics, the main types of perception of the expressive silhouette of a sculpture were identified, systematized and formulated depending on the directions and zones of perception that were formed under the conditions of a typical spatial situation – TABLE 3.

TABLE 3 presents the characteristics of the 6 main types of perception, which correspond to schematic images and real examples of typical spatial situations, along with the main and additional zones of perception (in degrees):

1. Circular perception in closed and open space – (№ 1, 2). It is characterized by the continuity of the main and possibly the existence of additional zones of perception. The name "circular" perception most accurately conveys the nature of the observation of the sculpture in space, meaning its central placement in space and the possibility of a circular view of the volume from almost all (4 main sides). The principles of perception in closed and open space, with the central (dominant) placement of the sculpture, have common features and are similar, therefore these two spatial situations opposite in character were united by one type of perception – "circular". Circular perception requires the development of maximum expressiveness of the silhouette of the sculpture, taking into account almost all directions, zones and points of observation (360˚).

2. Frontal perception in a half-closed space – (№ 3). It is characterized by a limited number of zones – one main, two additional zones of perception, taking into account the "blind" zone. This type of perception has one main (frontal) direction and two additional perception zones in a spatial situation limited on three sides by architectural structures. Frontal perception in a half-closed space requires the development of maximum expressiveness of the sculpture's silhouette, taking

Table 3. The main types of perception of monumental and decorative sculpture in the urban environment [created by authors]

No	Schematic representation of types of perception	Examples of types of perception	Characteristics of types of perception	Main zone of perception	Additional zone of perception	"Blind" zone
1		St. Peter's Square, Rome, Italy [20] 	Circular perception in closed space	360°	_	_
2		Sculpture "Pear", 2012. Sculptor A. Zolotaryov, Kiev, Ukraine [26] 	Circular perception in open space	360°	_	_
3		Monument to A. Solovyanenko, 2001. Sculptor M. Rapay, Kyiv, Ukraine [author's 	Frontal perception in a half-closed space	60°–140°	70°–90°	60°–140°
4		Monument to M. Grushevsky, 1998. Sculptor V. A. Chepelik, Kyiv, Ukraine [16] 	Frontal perception in half-open space	90°	45°	180°
5		Sculpture "Themis", 2007. Sculptor A. P. Polubok, Kyiv, Ukraine [author's photo] 	Frontal perception in corner space	90°	10°–70°	120°–270°
6		Obelisk "Hero City Kyiv", 1982. Architect V. Lashko and L. Semesyuk. Kyiv, Ukraine [2] 	Front-double-sided perception in transit space	90° and less	90° and more	–
Symbols						
			Direction of the main zone of perception			
			Direction of the additional zone of perception			
			Conditional image of the sculptural composition			
Note on table (3): a closed space with a diameter of more than 200 m with a height of enclosing elements of 10–15 m has signs of an open one [according to the sensations of visual perception].						

into account the directions of only one main zone (60°–140°) and two additional (70°–90°) perception zones.

3. Frontal perception in half-open space – (№ 4). It is characterized by the presence of one main zone and two additional directions, zones and points of perception, including a "blind" zone. Sculpture observation is mostly limited to structures on one side. Frontal perception in a half-open space requires the development of maximum expressiveness of the silhouette of the sculpture, taking into account one main frontal direction of perception, one main (90°) and two additional (45°) perception zones.

4. Frontal perception in corner space – (№ 5). It is characterized by one main and two additional directions, zones and observation points, also taking into account the "blind" zone. The perception of sculpture is limited to architectural structures from two adjoining sides. Frontal perception in a half-open corner space requires the development of maximum expressiveness of the silhouette of the sculpture, taking into account one frontal direction, one main (90°) and two additional (10°–70°) perception zones.

5. Front-double sided perception in transit space – (№ 6). It is characterized by two main opposite directions, main and additional zones and points of perception, which are limited by architectural structures from two opposite sides. Front-double sided perception in the transit space requires the development of maximum expressiveness of the silhouette of the sculpture, taking into account observation from two opposite directions, the main (90˚ and less) and additional (90˚ and more) perception zones.

To understand the method of determining the type of perception, the most typical spatial situations are induced here and the very essence of the relationship between the type of perception of sculpture and the type of space is demonstrated. The essence of this method is to determine the types of perception of monumental and decorative sculpture, depending on the directions of observation and zones of perception, which were formed in the conditions of typical spatial situations. In practical work, when designing a sculpture in space, determining the type of perception will help you orient yourself in relation to the main directions, the main zones of perception for maximum expressiveness (activity) of the silhouette of any sculptural composition in the right angles, also taking into account additional and "blind" zones, depending on the specific spatial situations. In practice, more complex combinations of types of spaces are often encountered, therefore, it is always necessary to take into account a specific spatial situation with certain features: the complexity of the terrain, zoning of space, its geometric shape, type and specifics of the environment, and more.

Properties of form such as lightness, color, texture are auxiliary; they only complement and correct the expressiveness of the main ones – scale, nature of the volume design, detailing. Therefore, the study focuses specifically on the geometric aspects of the visual perception of shape and silhouette, the basic properties of the form and the means of its expression. As for the distance from the observer to the monumental sculptural composition, the study takes into account the distance within the limits of visibility and the distinction between large and medium-sized details of its silhouette.

In the last few decades, the dissociation of sculptural plasticity from the architectural space, the loss of the relationship between them and the anti-aesthetic effect on others have affected, which often causes an uncomfortable stay in the urban environment and psychological fatigue. This often happens in the following way:

- - the theme and function of a particular urban environment is not taken into account, there is no relationship between the function of space and the theme of the sculptural composition;
- - the logic of a specific placement and installation (location, architectural "binding") of monumental and decorative sculpture is not thought out;
- - architects and sculptors often do not pay attention to the proportionality of space and monumental and decorative sculpture (scale);
- - certain means of expressing a sculptural composition are not taken into account, which must correspond to the specific dimensions of the space, sculpture and the distance of its observation (generalization of the silhouette, level of detail);
- - in specific spatial situations, the types of external spaces of the urban environment and the types of perception of expressive silhouettes of sculptural compositions are not taken into account. Often a sculptural work is installed in the architectural environment in such a way that it does not have the most expressive silhouette in the main direction of its observation for the perception of a recognizable image, and often it is installed in the most unfavorable angle in relation to the main zone and direction of perception, not to mention the "blind" areas in which the form is not perceived at all. This is due to a misunderstanding of the special tasks that are solved when introducing sculptural plasticity in the urban environment, and to some extent due to the lack of communication between the architect and the sculptor at all stages of design, especially at the initial stage of work. That is why today there is an urgent need to work on a more organic relationship between monumental and decorative sculpture and architectural space, the creation of a real synthesis of architecture, space and artistic form. The creation of harmony between sculptural plasticity and the architectural environment, more thorough methods of implementation, installation and architectural binding of monumental and decorative sculpture, taking into account all the above parameters of their relationship, becomes relevant.

In theoretical sources devoted to the principles of the relationship between monumental and decorative sculpture and the architectural environment, the relationship is mainly considered and analyzed, in which such aspects are highlighted: general relations of monumental-decorative sculpture and architectural space [5; 7; 8; 23; 24]; methods and techniques for placing monumental and decorative sculpture in urban space [8; 13-15; 18; 25] general perception of three-dimensional objects in space and aesthetic perception – sculptures in the urban environment [3; 6; 11; 12; 18; 19; 27].

In the article [15], on the example of the Olympic Sculpture Park for the Seattle Art Museum, the use of sculpture in the neglected areas of the city is considered, as interaction and integration with the urban context, to unite separate divided sections of the city in such a way that the architectural and plastic image reacts to its social, physical and economic aspect. In the context of urban planning and compositional-structural positions of the relationship between space and sculpture, an analysis is carried out (mostly of a descriptive nature) of the introduction of sculptural complexes and parks in urban environments that require new spatial configurations.

Among modern scientific and theoretical materials, articles [13; 14] about the role of visual art in the recognition of urban space and the methodology for localizing visual art in the public space of the city. The author has developed a typology of sculptural objects only on the specific basis of determining their role from the standpoint of the functional and spatial structure of the city of Poznan (Poland). But the article does not reveal in sufficient detail the specific methods of applying sculpture, which involve more universal methods for introducing sculptural compositions based on plastic means of expression, as part of the functional and spatial structure of the city, at the stage of designing the architectural environment.

The article [23] considers the introduction of elements of fine art in the urban space, in the context of the synthesis of art and architecture. These elements of art, the authors write, must be aesthetically consistent and comfortable for perception in the outer urban space, which will meet the requirements of visual aesthetics. Modern construction and urban environment create an urgent need for aesthetic perception and the creation of a visual aesthetics of the external public space. Caring for the psychological state of people occupies a special place in certain fields of science and art, the most relevant are the problems of visual ecology and aesthetics in various areas of human life in order to achieve a safe, fruitful

and productive life.

In an article [22] very close to the topic of this study, the main regularities of the relationship between sculpture and urban space are considered. Here, only the main factors that affect the perception of monumental and decorative sculpture in any city space are identified and analyzed: scale ratio, methods of placement, formation of the environment, generalization of the silhouette, detailing and perception of the expressiveness of the silhouette of the sculpture in specific spatial situations. But in [21], the importance of generalizing the silhouettes of the sculptural composition in the outer urban space of the architectural environment is already proved, as a way to improve the clarity of image perception, especially at long observation distances of monumental and decorative sculpture.

Among modern scientific and theoretical materials, special attention for the study of the topic of creating an aesthetic image of space, the emotional impact of the artificial environment on recipients (specialists and non-specialists) is caused by articles by some authors in the field of human perception and computational aesthetics, which combines science and art and becomes a new interdisciplinary field [4]. Computational aesthetics uses the computational methods of computer technology for aesthetic expression and the automatic creation of an aesthetic image. In this aspect, an important direction is being created in the future research – the creation of methods and tools for introducing sculptural plasticity into the urban environment using computer computing technologies.

Analyzing theoretical materials, it becomes obvious that today there are no sufficiently detailed studies on specific methods of applying sculpture, which involve more universal methods for introducing monumental and decorative sculpture based on determining the types of spaces in the urban environment as part of the functional and spatial structure of the city.

Conclusions

The study showed the need to observe the orientation of monumental and decorative sculpture in the process of its design, taking into account the perception of the expressiveness of its silhouette and the relationship with the layout of urban space. According to the results of the study, a conclusion was drawn – how important it is, for greater expressiveness of a certain image of monumental and decorative sculpture, to take into account and apply an actively expressed silhouette, which is observed precisely from the main direction of the main zones of perception

As a result of the study, several types of perception of the expressive silhouette of monumental and decorative sculpture were obtained, taking into account the main and additional directions, points and zones of perception:

1. Circular perception in closed space.
2. Circular perception in open space.
3. Frontal perception in a half-closed space.
4. Frontal perception in half-open space.
5. Frontal perception in corner space.
6. Front-double-sided perception in transit space.

Based on systematization, a method has been developed for determining the types of perception of sculpture regarding its orientation and relationship with urban space. The purpose of this method is to ensure a more effective process of modeling, designing, and installing (architectural "linking") monumental and decorative sculpture, considering its orientation in specific spatial situations, the primary types of external urban spaces, and the types of perception of the most expressive silhouettes of sculptural compositions.

References

1. **Arnheim, R.** Art and Visual Perception. Los Angeles: University of California, 1974, p. 392.
2. Artemco. Файл: Площадь Победы в Киеве [online 01.11.23.] https://upload.wikimedia.org/wikipedia/commons/3/37/Площадь_Победы_в_Киеве.jpg
3. **Baldwin, J., Burleigh, A., Pepperell, R.** Comparing artistic and geometrical perspective depictions of space in the visual field. i-Perception, 2014, No. 5, p. 536–547.
4. **Bo, Y., Yu, J., Zhang, K.** Computational aesthetics and applications. Visual Computing for Industry, Biomedicine and Art, 2018, No. 1(6), p. 1–19.
5. **Brenner, A.** Concerning Sculpture and Architecture. Art Leonardo, 1971, No. 4(2), p. 99–107.
6. **Ciftcioglu, O., Bittermann, M. S.** Fusion of Perceptions in Architectural Design. Conference: Proceedings of the 31st International Conference on Education and research in Computer Aided Architectural Design in Europe (eCAADe 2013), Sept. 18–20, 2013, Delft, The Netherlands. Delft: Delft University of Technology, 2013, Vol. 2, p. 335–343.
7. **Cocin, A., Munteanu, A.** Скульптура в городской среде. Tehnico-Ştiinţifică Internaţională Conferinţa, Chişinău, 2018. Chişinău: Universitatea Tehnică a Moldovei, 2018, p. 44–49.
8. **Despot, K., Sandeva, V.** Using sculpture, principle of common links between art and park. International interdisciplinary conference: Landscape transformation of the post-communist countries (SVK 38/13/F5), Oct. 17–18, 2013, Prague, Czech Republic. Prague: Landscape & architecture, p. 1–8.
9. **Ejeimi, S.** Learning research methods in art and design. J. Textile Eng Fashion Technol, 2021, No. 7(4), p. 119.
10. GoogleMaps [online 14.08.23.] https://www.google.com.ua/maps/@50.4851493,30.4721233,14z?hl=ru&entry=ttu
11. **Han, E.** Integrating Mobile Eye-Tracking and VSLAM for Recording Spatial Gaze in Works of Art and Architecture. Art Technology|Architecture + Design, 2021, No. 5(2), p. 177–187.
12. **Han, E.** Visualizing Spatial Gaze Data in the Perception of 3D Objects Art. Leonardo, 2023, No. 56(2), p. 133–138.
13. **Januchta-Szostak, A.** Methodology of visual art localization in public spaces on example of Poznan city. Urbanistika ir architektūra: Town Planning and Architecture, 2007, No. 31(1), p. 19–38.
14. **Januchta-Szostak, A.** The Role of Public Visual Art in Urban Space Recognition. Book edited by Karl Perusich. Cognitive Maps. Croatia: InTech, 2010, p. 140.
15. **Kömez, E.** Architectural Contextualism and Emerging Hybrid Morphologies: The Case of Olympic Sculpture Park for the Seattle Art Museum. International conference: New urban configurations EAAE/ISUF, October 2012, Delft, The Netherlands. Delft: University of Technology, 2012, p. 16–19.
16. Kyivmaps. Monument to Michael Hrushevsky [online 23.08.23.] https://kyivmaps.com/en/places/monument-to-michael-hrushevsky
17. Monument to the founders of Kyiv. mistaUA [online 13.08.23.] https://mistaua.com/Памятки/Памятники/пам'ятник-засновникам-києва/2363/? setcity=278
18. **Park, S.** Design Development of Sculpture as a Gateway to the city: with a focus on the case of the development project of sculpture as a gateway to the city of Pyongtaek. Archives of Design Research, 2013, No. 26(4), p. 357–371.
19. **Pfeiffer, T.** Measuring and visualizing attention in space with 3D attention volumes. Proceedings of the Symposium on Eye Tracking Research and Applications (ETRA'12), Mar. 2012. New York: Association for Computing Machinery, p. 29–36.
20. Piazza San Pietro [online 1.03.21.] https://tisamsebegid.ru/rim/ploshchad-svyatogo-petra
21. **Polubok, A.** Laws of generalization of silhouette monumental decorative sculpture. Urban development and spatial planning, 2020, No. 65, p. 258–265.
22. **Polubok, A., Pylypchuk, O.** Regularities of relationship of monumental-decorative sculpture and open public space. Urban development and spatial planning, 2021, No. 78. p. 435–444.
23. **Pylypchuk, O. D., Polubok, A. P., Krivenko, O. V.** Influence of environmental aspects of design on the aesthetics of architec-

tural space. Materials of the International Scientific and Practical Conference: Science, engineering and technology: global trends, problems and solutions, Sept. 25–26, 2020, Prague, Czech Republic. Prague: Czech Technical University, 2020, Vol. 2, p. 122–124.
24. **Rendell, J.** Art and Architecture: A Place Between. London: I. B. Tauris & Co Ltd, 2006, p. 212.
25. **Sullivan, M. R.** Synergizing Space: Sculpture, Architecture, and Richard Lippold at Lincoln Center. The University of Chicago Press, American Art, 2019, No. 33(2), p. 38–61.
26. VGORODE. В парке на позняках отремонтируют фонтан "Груша" [online 15.08.23.] https://kiev.vgorode.ua/news/transport_y_ynfrastruktura/a1189159-v-parke-na-poznjakakh-otremontirujut-fontan-hrusha
27. **Wang, X., Koch, S., Holmqvist, K., Alexa, M.** Tracking the gaze on objects in 3D: how do people really look at the bunny? ACM Transactions on Graphics, 2018, No. 6(37):188, p. 1–18.

Authors

Andrii Polubok, Phd (Technical Sciences), Assistant professor at the Department of Design, Kyiv National University of Construction and Architecture, 31, Povitroflotskyi Avenue, Kyiv, Ukraine. Research Interests: visual art, environment design, landscape design, architecture.
E-mail: polubok.ap@knuba.edu.ua
ORCID ID: http://orcid.org/0000-0001-6759-4470

Oksana Pylypchuk, Phd (Technical Sciences), Assistant professor at the Department of Design, Kyiv National University of Construction and Architecture, 31, Povitroflotskyi Avenue, Kyiv, Ukraine. Research Interests: visual art, environment design, architecture.
E-mail: pylypchuk.od@knuba.edu.ua
ORCID ID: http://orcid.org/0000-0002-1306-6071

Kopsavilkums

Rakstā aplūkotas un analizētas tēlniecības un ārējās pilsētvides attiecību galvenās raksturīgās iezīmes, kuru būtība ir tās uztveres princips noteiktās vietās, ņemot vērā orientāciju – konkrētas tēlniecības kompozīcijas uztveres leņķus, tiek projicēts pilsēttelpā. Tiek pētītas monumentāli-dekoratīvās tēlniecības orientācijas īpatnības arhitektūras telpā. Pētījumā tika veikta modeļu analīze (izmantojot reālus piemērus) un noteikti iespējamie skulptūras izteiksmīgā silueta uztveres virzieni gan tipiskās, gan īpašās pilsētvides telpiskās situācijās. Tiek identificēti virzieni un viedokļi, kuru kopums veido skulpturālās kompozīcijas uztveres zonas atkarībā no konkrētās telpiskās situācijas. Pamatojoties uz pētījuma laikā iegūtajiem rezultātiem, tiek sistematizēti un formulēti monumentālās un dekoratīvās tēlniecības izteiksmīgā silueta uztveres veidi.