

**FEATURES OF THE HARMONIZATION OF VOLUME-SPATIAL ARCHITECTURE OF MODERN HOUSING IN THE HISTORICAL ENVIRONMENT OF THE POLISH CITY OF GDANSK**

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**Abstract.** The Polish city of Gdansk is a rather interesting and special European city in terms of architectural features of the city's historical development. And after the Second World War, Polish architects did a great job of restoring the city, preserving the historical architectural heritage and harmonizing modern architecture in the historical context. This scientific study analyzes the peculiarities of the reconstruction of the historical districts of the city, the implementation of international charters, the peculiarities of the historical architecture of the Polish city, and defines the main architectural styles that are widespread in the historical districts of the city. Three architectural objects from historical periods are analyzed: Renaissance (the Kamienica Czirebergów-Frederów building, Baroque (the building at Długi Targ Street 20), Classicism (the building at Mariacka Street 14). The features that combine the architecture are analyzed all three styles, in this way we determine the features of the historical architecture of the city.

The peculiarities of the harmonization of the facade architecture of modern housing in the historical buildings of the city of Gdańsk are determined. According to our own methodology, we determine the principles that are most suitable for harmonizing the modern with the historical during design. An analysis of the built object on Szeroka Street (architect A. Taraszkiewicz) of modern housing in the historical context is carried out, according to the criteria developed according to the scheme, such as shape, color scheme, size, balance, facade fabric, proportions of window and door openings and materials used in construction. As a result of the analysis according to the criteria, the principles of harmonization, according to which the architecture was formed, are determined. It discusses the challenges faced in designing and building in the historic district and how the city government, the public, the client and the architects consolidated their efforts to solve the complex issues.

**Keywords:** historical buildings, modern housing in historical buildings, historical architecture of Gdańsk, harmonization.

**Introduction.** Most large European cities have a valuable and carefully preserved historic center, where modern buildings may appear from time to time. The emotional tension caused by such projects, both at the design stage and at the construction stage, reaches the highest level of creative involvement of the public. Designers, architects and engineers perform their tasks in extremely limited historical and spatial conditions, and also have technical problems related to the preservation of valuable remains of historic buildings that can be found on the construction site. These problems were most acute in cities that suffered significant damage as a result of the war. Such cities include Gdansk, where the destruction of buildings in the city center during the Second World War reached almost 90% [1].

The historical center of Gdańsk was rebuilt in the post-war years, however, this reconstruction was not a true, literal reconstruction of the pre-war elements. Almost all significant monuments have been reconstructed, the main lines of the streets have been rebuilt, the city panorama has been recreated, but at the same time the urban fabric has been radically transformed, adapted to the requirements of modern urban planning. A residential area has been created in the area of the historical center of the city. Therefore, during the reconstruction, the main emphasis was placed on

residential construction, which makes up a large part of the fabric of this new – and at the same time old – urban organism. Architecturally, the reconstruction of Gdańsk was a fascinating combination of modernism, socialist realism and historical heritage [2].

Despite the successful reconstruction of the city by the post-war generation of builders, Gdańsk still needs to fill spaces with new houses, replenish blocks and fragments of street facades. However, these actions are taking place under different conditions than after the Second World War, as they have to take into account the provisions of the Venice Charter.

This Charter, adopted in 1964 by the Second International Congress of Architects and Technicians of Historic Monuments in Italy, calls for the protection and preservation of the original structure and materials of historic buildings and for maintaining a clear distinction between all newly added elements and the original historic architecture. Article 9 of the Venice Charter is the most relevant here, which says: "Restoration is considered as a unique measure of monument protection. The goal of the restoration is to preserve and reveal the aesthetic and historical significance of the monument, which is based on careful treatment of the historical substance as an authentic document. The restoration ends when the hypothesis begins; as for hypothetical reproductions, any additions deemed necessary for aesthetic or technical reasons must differ in the architectural form of the monument and bear the signs of our time. Archaeological and historical studies of immovable monuments should always precede restoration and accompany restoration works" [3].

**Analysis of the latest research.** Investigating the problem of harmonization of modern residential architecture in the historical context, the studies of various authors were analyzed. Among domestic scientists, it is possible to single out the scientific research of K.V. Serheieva, L.S. Martyshova, who in his work entitled: "Interrelationship of modern buildings in the historical center of the city on the example of Kharkiv", touch on the issue of harmonization of new architecture in the Ukrainian city of Kharkiv [4]. Also, among the domestic works, the scientific work of Yu.O. Kharaborska, K.V. Sukharevskiyi, who in their work "Approaches to the design of modern architecture in a historical environment" [5] investigate the features that can be used to design modern architecture in a historical context. Among foreign studies, there are many scientific works by European and American authors, such as Susan Macdonald, Michael Davies, Roger Hunt, Iain Boyd, and others [6-9]. Also important for analysis are the scientific works of Turkish authors such as A. Kaçar, F. Semerci and Yuceer Hulya, Ipekoglu Basak. In their works, they investigated the methods of analysis of modern architecture in the historical context [10-11].

**The goal of the work.** The object of the study is the architecture of modern housing in the historical buildings of the city of Gdansk, the subject of the study is the peculiarities of the harmonization of volumetric and spatial solutions. The purpose of the study is to analyze the features of the historical architecture of the Polish city of Gdansk, and to determine the principles of harmonization of volumetric and spatial architectural solutions of modern housing in the historical districts of the Polish city of Gdansk from the point of view of use. In the research, it is necessary to pay attention to the spatial and aesthetic aspects of the projects, which contribute to a harmonious combination with the historical fabric of the city.

**Research methodology.** Primary data was collected by searching for photographs, project drawings, observations and documentation of historical buildings in the city of Gdańsk. The study also includes the study of architectural styles, elements, proportions and materials used in historical buildings. Secondary data is collected from scientific journals, books, articles and online resources related to the historical architecture of Gdańsk, urban planning and international charters for the preservation of historical architecture. Data on architectural styles and elements of historic buildings are analyzed to understand the historical context of the city of Gdańsk. This analysis will allow to identify architectural styles and features characteristic of Gdańsk, such as Gothic, Renaissance, Baroque. The analysis of modern housing is focused on determining the principles and characteristics of harmonization between modern housing and historical architecture. It examines how modern architectural solutions can respect and integrate with the existing historical fabric. The study includes the analysis of specific examples of modern housing projects in Gdańsk that successfully harmonize with the historical context. These studies will provide insight into the design strategies, materials and

spatial solutions used to achieve harmonization.

**Presenting main material.** For proper harmonization when designing modern housing, it is important to analyze the historical context of the street and the architecture of the city in general. The architecture of the city of Gdansk is very old and developed. Almost all architectural styles typical of European cities are developed in the city. These are romanticism, with its castles, and gothic, renaissance, baroque, rococo, classicism, eclecticism, neostyle, modernism, and social realism. Perhaps the style by which the Polish city is most recognizable is the architectural styles from Gothic to Classicism. Kamienica Czirenbergów-Frederów can be named as an example of Renaissance architecture (Fig. 1).

The building is an apartment building, which refers to the art of the ancient Greeks and Romans. It was owned by several noble families of Gdańsk: the Borstelins, the Kerls (Ernst Kerl, the owner of the house since 1600, was a city official and then the mayor, his sister Anna was the wife of another mayor – Jan Chyrenberg), Chyrenberg Freder. The coat of arms of the latter – with the image of a heron – is located above the portal, that is, the decorative frame of the front door. The wall with the main entrance (facade) has its modern appearance thanks to the reconstruction of 1620 according to the project of the famous Abraham van den Bloke. On the facade are twelve Renaissance medallions, which were probably made in the 16th century. A medallion is a round bas-relief that was frequently used as a decoration in Renaissance, Mannerism, and Baroque architecture. Roman emperors are depicted on the medallions of the building [12].

Above the windows of the second floor, on the left, you can see: Vespasian, Trajan Nero. Between the windows of the second floor are images of Caracalla and Octavia (wife of Nero, daughter of Claudius). Domitian, Octavian Augustus (the first Roman emperor) are depicted above the first floor. Between the windows of the first floor, on the medallions, we see Livia (the third, beloved wife of Octavian Augustus) and her grandson Claudius, and below - Tiberius, Livia's son, as well as Valentinian. The tenement house is crowned with an attic with three Latin inscriptions: "ALTAE CADUNT VITIIS", "INVIDIA", "VIRTUTIBUS INFIMAE SURGUNT". The proportions and dimensions of window openings are formed during this period of the city's history as the basis for all future buildings in the historic center of the city.

In the Baroque period, a characteristic triangular attic appears. As, for example, in the house at the address: str. Długi Targ 20 (Fig. 2). The luxurious baroque facade, the pride of the street, dates back to 1680, when a house was built on the connected plots. Between the windows of the first floor we can see its pilasters. A pilaster, already known in ancient architecture, resembles a flat pillar attached to a wall. It consists, like a column, of a base, a shaft and a capital. The pilasters are additionally decorated with herms, i.e. human torso figures supporting the head. The rest of the stem is filled with fruits and flowers. Instead of bases, pilasters have consoles – crowns. Gargoyles are masks with grotesque facial features. They appeared in earlier styles, their task was to scare away evil forces. Here they play the role of a console, that is, a decorative support. Cantilevers can also support balconies, cornices and columns. Above, above the herms, we see simple pilasters passing through two floors. When a column, pilaster, or half-column spans more than one story, we call it a grand order. Great order can be seen in other houses of Gdańsk. Between the pilasters are placed festoons, that is, ornaments in the form of a fruit and flower garland, fixed in two places. The top of the facade has a stepped shape, narrowing towards the top. The cracks, or "top steps", are decorated with volutes, as well as fruit garlands. On the sides of the window in the attic are two images in the form of medallions. They represent the rulers of Poland. On the right, the medallion depicts Jan III Sobieski. He is easily recognized by his characteristic mustache and hairstyle. King John loved to come to Gdańsk with his large family and court. In addition, he reigned in 1680, when the house was built. A metal sculpture of an eagle crowns the top of the building.

An example of classical residential architecture can probably be called the house at the address: st. Mariacka 14 (Fig. 3). It has a modest classical facade and is one of the smallest houses on the street. Also, his porch does not look too spectacular: the stairs do not pass in front of the terrace, but are drawn into its borders. The terrace is not decorated with stone slabs, only a wooden balustrade. The tenement house has one floor with a superstructure, that is, a superstructure narrower than the house itself, in which there are additional rooms. The pediment ends with a

simple cornice, on which a low pediment rests. On the side of the annex, cornucopias are carved in stone. This is a popular theme in art related to Greek mythology. According to her, Zeus, the most powerful of the gods, had to hide from his father Kronos as a child. He was raised by a goat named Amalthea. During the game, Zeus accidentally broke his horn, and then, not wanting it to go to waste, had the horn filled with whatever the person holding it desired.



Fig. 1. Kamienica  
Czirenbergów-Frederów (photo  
by Rafał Peplinski)



Fig. 2. Building at the  
address: Długi Targ str. 20  
(photo by Aleksandra  
Wolska)



Fig. 3. Building at the address:  
Mariacka str. 14 (photo by  
Google maps)

So, after analyzing the most famous architectural objects from the three most popular styles in the historical districts of the city, it is possible to come to the conclusion which principles of harmonization are best used when designing modern housing in a historical context. An important feature of the historical architecture of Gdańsk is the facade fabric and the proportions of the window openings. It is not difficult to see that despite the change in architectural styles, we continue to see the same window proportions from house to house. Another important feature of historical architecture, which helps in harmonizing with modern architecture, is the attic characteristic of Gdańsk houses. Mainly triangular in shape, it is repeated on almost every building and, together with the narrow facade, forms a recognizable silhouette of the city's architecture, which is desirable to repeat when designing modern housing in historical buildings.

An example of harmonization. A scientific study analyzed the works of Polish architects in the city of Gdansk. Among them, it is possible to single out the projects of building modern residential architecture between historical brick buildings. These projects, although they solve a similar problem of preserving and highlighting the historical urban fabric, differ significantly in the way of achieving this goal. Differences reflect not only spatial, but also technical aspects, thanks to which each presented project is an exceptional and unique example of interdisciplinary communication for solving complex architectural problems. One of these projects is the construction of modern housing in a historical building, which we will analyze according to our own methodology.

A project by A. Taraszkiewicz built a large complex combining multi-apartment residential and commercial functions in 2013, on Szeroka Street, in the very heart of the historic city of Gdańsk (Fig. 4).

Despite its extremely prestigious location, the area, degraded by the war, was for decades an unpleasant "hole" in the neighborhood, waiting for proper use and development, to merge with the urban fabric into one. Project work on the complex of new buildings took place in a rather calm atmosphere, but important debates took place between the authorities, architects and the public. Public organizations representing the residents considered the new buildings to be a reconstruction of pre-war buildings. Adhering to the principles of the Charter of Venice, due to the lack of original iconography, the conservation authorities favored modern design. The architects shared their position with the

security authorities, and set themselves the goal of designing a house that would respect the heritage of the past, but testify to the time in which it was built. However, the architects had to take into account the guidelines for preserving historical elements. These instructions determined the town planning plan and the scale of the new building. The height of the building, as well as the rhythm, width and height of the facades of the buildings correspond to the historical divisions of the site, confirmed by archaeological finds. and presented in the 1866-1869 Situations Plan von Danzig by D. Buhse (Stankiewicz 1959).



Fig. 4. Szeroka Street, before and after the construction of the residential complex.  
Photo by A. Taraszkiwicz

The design of the complex clearly refers to the historical buildings of Gdańsk, but at the same time it is completely modern. The modern expression of this architecture is defined by a typical modern facade, based on the achievements of the international style, "fresh" architectural details (for example, minimalist beams or lintels made of channels) and modern building materials and technologies, for example, zinc-titanium metal sheets used as a facade material [13].

The quarter has a deep two-story underground parking lot, which is needed due to the lack of sufficient parking spaces in the central part of the city. During the excavation work for the parking lot, valuable remains of the Gothic brickwork of three walls were discovered. These historical elements, having an oval vault, conflict with the functional and technical solutions proposed in the project, thus delaying the development of the entire project.

The issue of preserving the historic brick walls became the main issue during the discussions between the authorities and the architects.

In agreement with the security authorities, it was decided to cut the walls into large four-meter pieces, fix them in steel clamps specially designed for this purpose, remove them and move them to a military training ground for drying and preservation. After the construction of the reinforced concrete floor above the underground parking, the walls were returned to the place where they were assembled and placed according to their historical orientation and position, but one and a half stories higher, that is, at the level of the first floor.

In the scientific study, this complex was analyzed according to its own system of criteria. The design approach is modern. Modern materials, modern architectural style were used. The socio-economic status of the house is affordable-comfortable or elite. The residential complex is built in a historically formed ensemble in a dense row of historical buildings. The height is medium-floor. The shape of the complex is similar to the surrounding architecture, rectangular, narrow from the main facade. The complex is built as a single object consisting of many parallelepipeds of this shape. The size is not large, it is harmoniously combined with the historical building due to its similarity in size. The facade fabric is made of window openings. A characteristic element of the historical buildings of this area of the city are rather large windows in relation to the entire facade fabric. As a result, the architects of modern housing decided to use this in their project and built even larger window openings, most often they are balcony windows. The color scheme of this complex is not monotonous. There are forms of dark brick, there are forms with ventilation facades with sand-colored slabs, and even gray-green elements using metal as a material. All this very harmoniously resonates with the colorful colors of the surrounding historical buildings and historical architecture of the city of Gdańsk. The architecture of modern housing does not have its

sovereignty between the historical context and is well balanced with it, harmoniously combined old and new housing architecture. The principles of harmonization by preserving the facade fabric of the windows and silhouette harmonization were used for the design [14].

**Conclusions and prospects for further research.** In the article, we came to the conclusion that the methodology of analysis of modern housing in historical buildings is often based on the definition of key principles of harmonious combination. Thanks to this analysis, the process of combining modern architecture with historic buildings can be achieved with sensitivity and care. We have identified several principles that guide such harmonization, including preservation of the facade fabric of windows, repetition of dominant elements of the historic building, linear harmonization, formation of background buildings for the historic street, formation of superstructure on the historic street and repetition of the silhouette.

Analyzing the historical architecture of Gdańsk, it becomes clear that certain features stand out and continue to influence contemporary residential architecture in a historical context. Large front windows, pitched roofs and small house shapes are some of the defining characteristics that have influenced the design of modern housing in Gdańsk. Using these elements, modern architects can design buildings that blend organically with their historic surroundings, enhancing the overall aesthetics of the city.

It can be confidently stated that the preservation of the facade fabric of the windows and the repetition of the silhouettes of the buildings are the most important principles of the formation of modern housing architecture in Gdańsk. By preserving the facade fabric of the windows, contemporary architects can honor the historic character of neighboring buildings while allowing for the use of modern materials and technologies. Repetition of building silhouettes allows new structures to blend in with their surroundings and create a unified and harmonious streetscape.

We analyzed one of the most successful projects of harmonization in the city of Gdańsk, architect A. Taraszkiewicz. As a result, we have seen that the combination of modern housing in historic buildings is an important aspect of urban planning and design. By carefully considering historical context and architectural principles, architects can design buildings that respect the past while also meeting the needs of the present. In the case of Gdańsk, the preservation of large front windows, pitched roof features and small house forms played a significant role in the development of modern residential architecture, providing a beautiful and cohesive urban environment for both residents and visitors.

In the perspective of the following studies, it is necessary to formulate a methodology for the design of modern residential architecture in the historical districts of cities. To determine the features of architectural and planning solutions of modern housing in the conditions of historical buildings. Use the results of the research to determine the features and principles of harmonization in the formation of modern housing architecture in the historical districts of large Ukrainian cities.

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### ОСОБЛИВОСТІ ГАРМОНІЗАЦІЇ ОБ'ЄМНО-ПРОСТОРОВОЇ АРХІТЕКТУРИ СУЧАСНОГО ЖИТЛА В ІСТОРИЧНОМУ СЕРЕДОВИЩІ ПОЛЬСЬКОГО МІСТА ГДАНСЬК

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**Анотація.** Польське місто Гданськ є доволі цікавим і особливим європейським містом в плані архітектурних особливостей історичної забудови міста. І після другої світової війни, польські архітектори зробили велику роботу, по відновленню міста, зі збереженням історичної архітектурної спадщини і гармонізації сучасної архітектури в історичному контексті. В даному науковому дослідженні аналізуються особливості реконструкції історичних районів міста, виконання міжнародних хартій, особливості історичної архітектури польського міста, визначаються основні архітектурні стилі, які є масовими в історичних районах міста. Проводиться аналіз трьох архітектурних об'єктів з історичних періодів: ренесанс (будинок Kamienica Czirenbergów-Frederów, бароко (будинок за адресою: вул. Długi Targ 20), класицизм (будинок за адресою: вул. Mariaska 14). Аналізуються архітектура усіх трьох стилів, таким чином визначаємо особливості історичної архітектури міста.

Визначаються особливості гармонізації фасадної архітектури сучасного житла в історичній забудові міста Гданськ. За власною методологією визначаємо принципи, які найбільш підходящі для гармонізації сучасного з історичним при проектуванні. Проводиться аналіз побудованого об'єкта по вулиці Szeroka (архітектор А. Taraszkiewicz) сучасного житла в історичному контексті, за розробленою схемою критерій, наприклад форма, колористика, розмір, баланс, фасадна тканина, пропорції віконних і дверних прорізів і використані при будівництві опоряджувальні матеріали. Як результат аналізу за критеріями, визначаються принципи гармонізації, за яким було сформовано архітектуру. Обговорюються складнощі, які виникли при проектуванні та будівництві в історичному районі, та як консолідували свої зусилля, міська влада, громадськість, замовник та архітектори для вирішення складних питань.

**Ключові слова:** історична забудова, сучасне житло в історичній забудові, історична архітектура Гданська, гармонізація.

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