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EXPERIENCE IN THE RESTORATION OF OUTSTANDING CULTURAL HERITAGE SITES

DOŚWIADCZENIE W KONSERWACJI WYBITNYCH MIEJSC DZIEDZICTWA KULTUROWEGO

Abstract

The restoration of destroyed cultural heritage sites – restitution – combines the experience of traditional construction and modern restoration technologies and methods. This approach was pioneered by the restoration of the Old Town in Warsaw to its original form and continued with the restoration of the destroyed shrines of Ukraine – the St. Michael's Golden-Domed Monastery and the Assumption Cathedral of the Kyiv Pechersk Lavra.

Keywords: *experience, outstanding cultural heritage site, restoration*

Streszczenie

Odrodzenie zniszczonych obiektów dziedzictwa kulturowego – restytucja – łączy w sobie doświadczenie dawnego budownictwa z nowoczesnymi technologiami i metodami konserwatorskimi. Zapoczątkowała ją odbudowa Starego Miasta w Warszawie w jego pierwotnym kształcie, a następnie odbudowa zniszczonych świątyń Ukrainy – Monasteru św. Michała Archanioła o Złotych Kopułach i soboru Zaśnięcia NMP w Ławrze Pieczerskiej w Kijowie.

Słowa kluczowe: *doświadczenie, konserwacja, wybitne obiekty dziedzictwa kulturowego*

1. INTRODUCTION

The Russian-Ukrainian war has led to significant losses in the field of cultural heritage in Ukraine.

Given the extent of the damage to and destruction of cultural heritage sites, priority emergency measures are already being taken to preserve them for subsequent recovery and restoration, taking into account the accumulated experience of recovery after World War II[1].

In addition to the actual experience of reproducing and restoring outstanding objects, the authors considered the following aspects:

- justification of the feasibility of reproducing damaged and destroyed objects in their original forms;
- the debate over whether to preserve the original function of the reproduced objects during their reconstruction and possible options for reprofiling[2]
- taking into account territorial specifics when planning the reconstruction of cultural heritage[3].

2. JUSTIFICATION OF THE FEASIBILITY OF RESTORING DAMAGED AND DESTROYED OBJECTS IN THEIR ORIGINAL FORMS

Classical restoration based on conservation involves restoring a monument to its original form when part of the object has been preserved, and sufficient evidence of its pre-destruction appearance is available, including measurements, drawings, photo fixation, and preserved artefacts.

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[1] Y. Ivashko et al., *Preparing for the post-war reconstruction of historical monuments in Ukraine: Considerations in regard of the ongoing Polish post-WWII experience and international law on the protection and conservation of historical monuments,* "Muzeológia a kultúrne dedičstvo" 2023, no. 11(1), pp. 53–71; T. Kozłowski et al., *Teoretyczne i prawne zasady odbudowy zabytków architektonicznych w Ukrainie, które ucierpały w trakcie agresji rosyjskiej,* "Teka Komisji Urbanistyki i Architektury Oddziału Polskiej Akademii Nauk w Krakowie" 2022, no. 50, pp. 391–408; A. Nadolny et al., *In-fill Development Architecture, as Element of Post Second War Reconstruction of City of Poznan. Case Study of Joseph Stübben's Extension Plan of the City from Years 1902–1918,* "International Journal of Conservation Science" 2023, no. 14(1), pp. 57–74.

[2] R. Boix et al., *Comparing creative industries in Europe.* "European Urban and Regional Studies" 2016, no. 4, pp. 935–940; A. Dmytrenko, O. Ivashko, Y. Ivashko, *Development of Creative Economy Objects as a Means of Industrial Territories Revitalization,* [in:] V. Onyshchenko et al. (eds.), *Proceedings of the 3rd International Conference on Building Innovations: ICBI 2020*, "Lecture Notes in Civil Engineering", vol. 181, Cham 2022, pp. 487–495; O. Ivashko, *The issues of conservation and revitalization of the monuments of industrial architecture,* "Wiadomości Konserwatorskie – Journal of Heritage Conservation" 2019, no. 58, pp. 113–117; J. Kobylarczyk et al., *Methods of Revitalizing Historical Industrial Facilities – International Experience,* "Wiadomości Konserwatorskie – Journal of Heritage Conservation" 2020, no. 62, pp. 97–103.

[3] M. Dyomin et al., *Development trends and problems of large Ukrainian historical cities in the twentieth and twenty-first century: case study of urban tendencies and problems of revitalization of an industrial district,* "Wiadomości Konserwatorskie – Journal of Heritage Conservation" 2021, no. 65, pp. 26–36.

To some extent, a “breakthrough” in the field of traditional restoration was achieved by Jan Zachwatowicz and his colleagues during the reconstruction of the Old Town in Warsaw (Ill. 1).



Ill. 1. Buildings of the Old Town in Warsaw. Photo by Y. Ivashko, 2022

It was after the reconstruction of the Old Town that a specific branch of restitution was introduced into the restoration process, i.e., the reconstruction of a destroyed object in its original form.

If we talk about the example of Ukraine, the destruction of cultural heritage sites began with the establishment of Soviet power.

When the idea of reconstructing the original forms of the St. Michael's Golden-Domed Cathedral with the bell tower and the Assumption Cathedral of the Kyiv-Pechersk Lavra was considered, the surviving original remains and the available documentation differed.

The fact is that both St. Michael's Golden-Domed Cathedral and Assumption Cathedral have a long history, starting from princely times; they went through several construction periods and radically changed both their appearance, size, and decoration from the times of Kyivan Rus to the Baroque era and even in the 19th century (Ill. 2).



Ill. 2. The Assumption Cathedral in the process of reconstruction. Photo from the Y. Ivashko's collection

In the case of the St. Michael's Golden-Domed Cathedral and Assumption Cathedra, it was ultimately decided to recreate both cathedrals as they appeared during the peak of their architectural development, namely for the period called the Ukrainian Cossack Baroque.[4]

Whereas the original appearance of damaged or destroyed religious objects is preserved as much as possible during reconstruction, a combination of authentic and modern elements is permitted in some cases when reconstructing monuments of industrial architecture. We will mention the Kyiv "Mystetskyi Arsenal", "Stary Browar" in Poznan (Ill. 3), "Fabryka Norblina" (Ill. 4), and "Elektrownia Powiśle" (Ill. 5) in Warsaw.

[4] M. Orlenko et al., *Issues and Methods of Restoration of Kyivan Rus Period Foundation Masonry,* "International Journal of Conservation Science" 2024, no. 15, Special Issue, pp. 335–348.



Ill. 3. “Stary Browar” in Poznan. Photo by Y. Ivashko, 2023



Ill. 4. “Fabryka Norblina” in Warsaw. Photo by Y. Ivashko, 2022



Ill. 5. “Elektrownia Powiśle” in Warsaw. Photo by Y. Ivashko, 2022

3. THE DEBATABILITY OF PRESERVING THE ORIGINAL FUNCTION OF REPRODUCED OBJECTS DURING THEIR RECONSTRUCTION

In the case of the St. Michael and Assumption Cathedrals, it was clear that they would be returned to their original function as a shrine; the question concerned only their subordination to certain church structures.[5]

Unlike religious sites, the restoration of public and residential facilities opens up great opportunities for their repurposing, which is common. The experience of Europe, in particular Poland, demonstrates the wide range of possibilities for repurposing these buildings. A large number of such industrial architectural monuments are concentrated in Lodz.

Thus, revitalised monuments of industrial architecture usually combine several functions.[6] As international experience with the repurposing of such facilities shows, they most often serve the food industry, textile production, electronics, and beverage production, located in accessible central areas of large cities with good transport accessibility.[7]

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[5] M. Orlenko et al., *The influence of ideology on the preservation, restoration and reconstruction of temples in the urban structure of post-totalitarian states,* “Wiadomości Konserwatorskie – Journal of Heritage Conservation” 2020, no. 61, pp. 67–79.

[6] O. Iwaszko, *Społeczna przyroda nowych artystycznych kierunków w miejskim środowisku,* “Przestrzeń/Urbanistyka/Architektura” 2018, no. 2, pp. 167–175; M. Orlenko, O. Ivashko, *Art-Clusters as a New Type of Buildings: the Specificity of the Spatial Solution and the Features of Restoration during the Redevelopment Process (The Experience of Poland),* “Smart Project, Building and City / Środowisko Mieszkaniowe (Housing environment)” 2017, no. 21, pp. 109–115.

[7] M. Dyomin et al., *op. cit.*

4. UKRAINIAN EXPERIENCE IN THE RECONSTRUCTION OF OUTSTANDING OBJECTS: ST. MICHAEL'S GOLDEN-DOMED MONASTERY

The restoration of outstanding shrines in Ukraine combined traditional construction experience and modern restoration technologies, which allowed these objects to be revived in a short time.[8]

Unlike the Assumption Cathedral, where part of the ruins and the Chapel of St. John the Theologian have been preserved, only the part of the foundations of St. Michael's Golden-Domed Cathedral, the bell tower, and part of the wall with the Economic Gate were preserved after they were blown up by explosives in 1936.[9]

Archaeological research on the foundations of the cathedral allowed us to deepen our knowledge of the construction experience during the times of Kyivan Rus and the Ukrainian Baroque.[10]

Studies of the foundation remains of the western porch from the Baroque period have shown a change in the foundations' masonry techniques, which were built of broken bricks and rubble stone on cement mortar. The foundations of the northern porch were built of rubble stone and broken plinth on cement mortar.

Further examinations of the foundations' condition proved that, as a result of the explosion, they had lost their bearing capacity, and it was not possible to rebuild the entire large volume of St. Michael's Golden-Domed Cathedral on them.

Several options for arranging the foundation system of St. Michael's Golden-Domed Cathedral and St. Michael's Bell Tower were considered. In the scientific works of M. Orlenko, these options were described: consolidation of the base soil of various types (cementation, silicification), arrangement of foundations from piles of various types with an independent grillage, and strengthening of existing foundations by various methods.[11]

After evaluating all the options, a monolithic reinforced concrete slab 1 m thick was used for the foundation of the bell tower. The approach to masonry was innovative: the system of "thin walls" of the bell tower (70–80 cm instead of the original 3–4 m) allowed for the creation of additional rooms inside.

A different approach was used for the foundations of the St. Michael's Golden-Domed Cathedral. In particular, as M. Orlenko noted, bored, drilled, and crushed piles were used to transfer loads from the reinforced concrete grillage slab, which ensured the flexible interaction of both the existing foundations and the piles to the lower, reliable soil layers. Access to the authentic foundations was provided by holes in the grillage slab, and the bored piles were located around the authentic foundations, thereby avoiding damage to them. At the same time, the type of piles was selected in accordance with the predicted loads in different parts of the cathedral.

The study of the original masonry remains of the above-ground part of St. Michael's Golden-Domed Cathedral revealed the techniques of the Kyivan Rus period. In particular, the central part was built of a plinth using a mixed technique with a recessed row, and the width of the walls varied from 1.25 m in the apse to 1.35 m in other parts. The semi-columns of

[8] M. Orlenko et al., *Issues and Methods…*, *op. cit.*

[9] M. Orlenko et al., *The experience of studying the fundaments of the 11th – 18th centuries and methods of their preservation and conservation,* "Muzeológia a kultúrne dedičstvo" 2022, no. 10(1), pp. 33–52.

[10] *Ibidem,* pp. 33–52.

[11] *Ibidem,* pp. 33–52.

the apses were lined with a patterned plinth. During the Ukrainian Baroque period of the late 17th and early 18th centuries, the side chapels were built of brick and rubble stone set in lime mortar.



Ill. 6. Masonry of the cathedral walls. Photo from the Y. Ivashko's collection



Ill. 7. The process of laying cathedral walls. Photo from Y. Ivashko's collection

The reconstruction of this unique object combined construction techniques form the periods of Kyivan Rus and the Baroque with modern restoration technologies (Ill. 6, 7).

Since the above-ground volumes of the cathedral and the bell tower were built in the winter, different types of winter shelter on the building site were used for laying brick walls: a winter shelter with temporary heating was arranged throughout the volume, and a separate winter shelter was arranged on the main dome of the cathedral (Ill. 8).



Ill. 8. Winter shelter on the main dome. Photo from the Y. Ivashko's collection

The next stage was plastering the walls of the cathedral and the bell tower and decorating them with icons and stucco. When painting the walls, modern technologies were used that ensure their durability, in particular, silicate paints from the company "Caparol".

The restoration of the decoration of the cathedral's interior was based on the study of preserved frescoes and mosaics, smalt deposits in the collections of the St. Sophia Reserve, archival photographs, descriptions, and analogues from the Byzantine, Kyivan Rus, and Baroque periods.[12]

Based on these materials, an iconographic system of paintings of the central core (in the Kyivan Rus style) and the side chapels of St. Barbara and St. Catherine (in the Baroque style) was developed.[13]

Accordingly, sketches and designs for mosaics, murals, icons, iconostases, and floor designs were developed.[14]

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[12] S. Baiandin et al., *Use of Historical Painting Concepts by Modern Methods in the Restoration of Architectural Monuments,* "International Journal of Conservation Science" 2022, no. 13(2), pp. 381–394; Y. Ivashko et al., *State-of-the-art Technologies of Imitation of Mural Painting from the Kyivan Rus and Baroque Periods in the Reconstructed St. Michael Golden-domed Cathedral in Kyiv,* "International Journal of Conservation Science" 2022, no. 13(1), pp. 147–162.

[13] M. Orlenko, Y. Ivashko, *The concept of art and works of art in the theory of art and in the restoration industry,* "Art Inquiry. Recherches sur les arts" 2019, no. 21, pp. 171–190.

[14] M. Orlenko et al., *Reproduction and Restoration of Iconostases of Ukrainian Churches,* "International Journal of Conservation Science" 2023, no. 14(2), pp. 511–526.

5. CONCLUSIONS

The experience of the Ukrrestavratsiia corporation has shown that modern restoration activities combine the traditional principle of conservation and respect for the object's authenticity with the use of modern materials and technologies that provide better long-term protection of the object and help address its emergency condition. The example of St. Michael's Golden-Domed Cathedral and Assumption Cathedral in Kyiv has shown what problems arise when reconstructing such objects. The St. Michael's Golden-Domed Cathedral and the St. Michael's Bell Tower is just an example of the combination of construction traditions from Kyivan Rus and Baroque period with modern materials and structures, with the aim of approximating the buildings' pre-destruction appearance as closely as possible (Ill. 9).



Ill. 9. The reconstructed complex of the St. Michael's Golden-Domed Monastery. Photo by Y. Ivashko, 2022

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