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RESTORATION OF A FISHERMAN'S HOMESTEAD IN THE OPEN-AIR MUSEUM IN OPOLE

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Abstract

The paper addresses the issue of contemporary reconstruction and reconstruction of wooden architecture in open-air ethnographic museums, focusing on the example of the Opole Village Museum in Opole. The reconstruction process of three buildings – a cottage, a cottage building and a barn forming a fisherman's homestead – was analysed and the paper describes in detail the conservation methods applied, the adaptation process and the technological and ideological challenges involved in this kind of undertaking. The study emphasises the value of integrating traditional construction techniques with modern solutions, enabling the faithful reproduction of historic architecture while adapting it to new educational, exhibition and training functions. The analysis includes an assessment of the technical condition of the preserved materials, methods for their reuse and the impact of advanced monitoring technologies on the preservation and durability of the reconstructed buildings. It also highlights limitations of biological degradation of wood and the challenges of restoring authenticity in changing spatial conditions. The importance of open-air museums in the protection of cultural heritage was highlighted, in that they play a vital role in preserving the material aspects of historic buildings whilst also serving as a key educational and promotional tool for traditional rural culture. The findings emphasised the necessity of a multifaceted approach, integrating field research, historical documentation analysis and innovative diagnostic technologies. The article emphasises the necessity for additional research into monitoring and preservation methods that can contribute to more effective protection of wooden architecture, while ensuring its durability and functionality in changing environmental conditions.

Keywords: *Open-air museum; Opole Village Museum in Opole; Wooden architecture; Vernacular architecture; Conservation; Monitoring*

Introduction

There are more than fifty open-air ethnographic museums in Poland, which play a vital role in safeguarding the cultural heritage of rural communities and small historic towns. This heritage is currently at risk of being lost or destroyed due to uncontrolled development [1-3]. Therefore, any initiative to revalue or preserve it is welcome and, in many cases, essential. The challenges related to the conservation of traditional buildings [4] are not exclusive to Poland; they are also being witnessed in other developed European countries [5]. According to [6], an open-air museum is defined as 'a museum in which architectural objects and certain traditional equipment, treated as exhibits, are located in the open air.' These institutions

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facilitate direct engagement with the material culture, traditions and history of the respective regions they represent.

The Opole Village Museum in Opole is one of the most active museums of this type in Poland. For many years, it has been implementing numerous projects to preserve and popularize the cultural heritage of the Opole region. These projects have included the reconstruction of dozens of wooden architecture objects from various corners of the Opole Voivodeship. In 2022, the museum successfully completed a significant modernization project entitled 'Restoration of a fisherman's homestead and its adaptation for educational and exhibition functions, as well as renovation and extension of the water system on the grounds of the Opole Village Museum in Opole' (Fig. 1). This project marked one of the most ambitious developments in the institution's history.

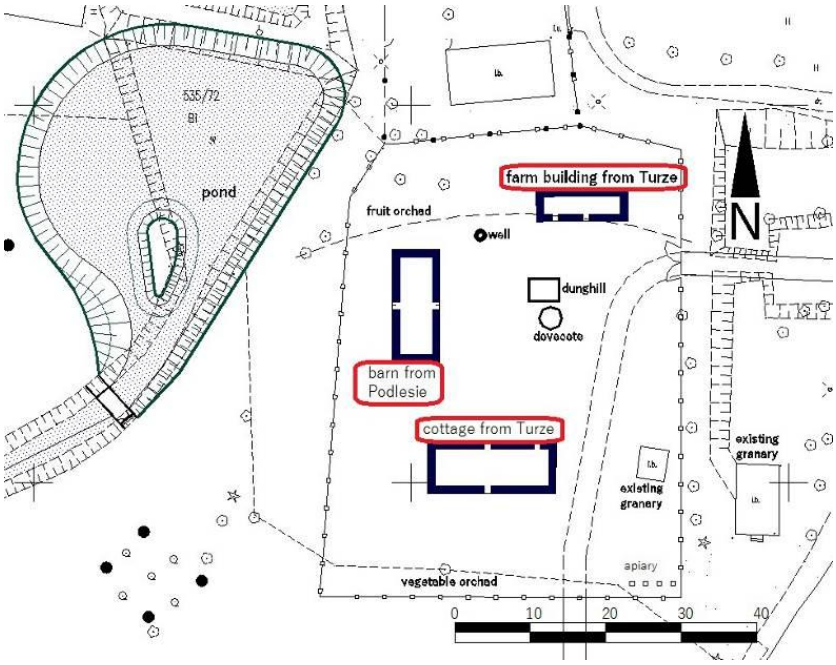

Fig. 1. Site development plan with localization of the analyzed buildings

As part of this project, three wooden buildings were rebuilt and reconstructed: a historic cottage (Fig. 2), a farm building from the village of Turze (Fig. 3) and a barn from Podlesie (Fig. 4). The process included both conservation and adaptation works, thanks to which the buildings gained new functions, namely exhibition, teaching, training and information roles. The renovation and extension of the existing water system was made possible by the natural topographical conditions of the museum grounds, a factor that was of particular importance. As a result of this project, the museum grounds have gained not only new aesthetic qualities but also educational opportunities related to the presentation of traditional fishing techniques and water management issues.

The design and construction work was carried out between 2020 and 2023. The entire project is an example of a comprehensive approach to the revitalization of cultural heritage, combining the protection of historic buildings with their modern use for educational and promotional purposes. Thanks to such activities, the Opole Village Museum not only preserves

the cultural heritage of the region but also contributes to its dissemination and understanding by future generations.

Fig. 2. A cottage building from the village of Turze

Fig. 3. A farm building from the village of Turze

Fig. 4. A barn from the village of Podlesie (right side)

Aim and working methods

The aim of this thesis was to present in detail the opportunities and risks associated with the reconstruction and restoration of wooden architecture on an outdoor museum site, with a particular focus on the technical aspects that arise during such projects. A key element was also the identification of technical problems and an attempt to solve them based on empirical field research and analysis of archival materials. In order to obtain a coherent and comprehensive answer to the research problem, a mixed-method approach was used, combining case studies and qualitative research, which allowed for an in-depth analysis of multidimensional issues.

The research process involved several stages. Firstly, detailed in situ research and analysis of the historic substance of selected objects, i.e., a cottage and an outbuilding from the village of Turze and a barn from the village of Podlesie, located on the grounds of the Opole Village Museum in Opole, were carried out. The research was aimed at determining the state of preservation of the structure, identifying the causes of damage and assessing the possibility of reconstructing the original form of the objects. The process was preceded by an analysis. of architectural documentation, including iconographic materials, photographic documentation and a building and mycological inventory available in the museum's archives.

A key stage in the research was the inventorying of the demolition material collected, which made it possible to compare it with the historical documentation. In particular, attention was paid to the analysis of surviving structural elements such as beams, roof trusses or joints, examining their technical condition, methods of processing and the system of assembly marks. During the research, an attempt was made to fit the preserved elements of the timber structure, which made it possible to assess the possibility of their reuse in the reconstruction process.

A thorough analysis of the data gathered was conducted and this was then compared with new data sets obtained during field research and archival analysis. The challenges and conclusions identified were then used to formulate further research questions, addressing both technical issues and the wider context of the conservation of wooden architecture. The results indicate the need for further research that can contribute to the development of more effective reconstruction methods, taking into account both the historical value and contemporary standards of cultural heritage protection.

Fisherman's homestead. General comments

The reconstruction of the fisherman's homestead was planned on the clearing in the southeastern part of the plot of the Opole Village Museum in Opole, which was an important element of broadening the museum exhibition and restoring the traditional settlement layout typical for the region (Fig. 5). A fisherman's homestead was reconstructed in the southern part of the clearing, giving it the characteristic features of rural buildings connected with fishing. The barn was placed in the western part, preserving the traditional building technique and the farm building, performing complementary functions, was located in the northern part of the clearing.

The project was based on an architectural and urban planning concept [7], considering the guidelines of the investor, i.e., the Opole Village Museum in Opole. The main objectives of the project were to reconstruct the buildings and to create a coherent cultural landscape that would faithfully reflect the layout and character of the former fishing settlements [8].

The project involved the renovation and reconstruction of the existing water system, which included the enlargement of the existing pond. The objective of these works was twofold: to enhance the aesthetic and functional qualities and to recreate the traditional natural environment in which the fishing settlements functioned. Furthermore, traffic routes were designed to meet the needs of the homestead, ensuring convenient access to the various buildings and harmonious integration with the surrounding area.

Once the conservation and construction work had been completed, the interior design project began, which included a detailed reproduction of the furnishings typical of a former fisherman's homestead. As a result, visitors can not only view the reconstructed buildings from the outside but also feel the atmosphere of former daily life inside the rooms.

Fig. 5. Reconstructed fisherman's homestead

It is worth noting that the rebuilt and reconstructed buildings are not listed as monuments in the Opole Voivodeship. Nevertheless, the open-air museum area where they are located was entered in the register of monuments of the Opole Voivodeship in 1992 and is subject to conservation protection. This protection covers both the spatial layout and the cultural landscape, which further emphasizes the importance of the entire project for the preservation of the region's heritage.

The project to rebuild the fishing settlement has not only enriched the museum's offerings but has also contributed to popularizing knowledge of traditional forms of construction and everyday life in the Opole area.

Cottage building from the village of Turze

The cottage was built around 1814 in the village of Turze near Racibórz in the south of Silesia (Fig. 6). The structure was demolished in the 1980s and the wooden elements were transported to the Opole Village Museum in Opole, protecting them from the weather.

The building consisted of several rooms in a typical functional layout for this type of building. On the western side, there were two rooms with a single entrance from a spacious hallway. In the hallway, at the junction with the living rooms, a baker's oven with a smokebox was located. In the eastern part of the cottage, there was a kitchen and a chamber connected to it. A chicken coop and a chamber were adjacent to the kitchen and the chamber was on the north side [9].

The body of the cottage is of mixed timber construction. The rafter-collar roof truss was reinforced, supplemented and rebuilt in many places. The roof was thatched. The gables of the cottage were boarded with vertical boards. Traditional carpentry joints were used in the roof construction. The ceiling was made as a wooden chamfered beam. A plank floor was made on the ceiling beams and a clay covering was made on top of it. A well-preserved ceiling beam with an inscription of the date of the cottage's construction - ‘Anno 1814’ - proved to be a valuable artifact.

The only surviving elements of the window joinery were the window jambs. Part of the jamb-mounted element allowing the door to be bolted was preserved, as well as individual iron elements, the wrought iron hooks of the door joinery, which served as a model for their

restoration. Based on the surviving photographs, the walls in the living area on the inside were plastered and painted. However, there were no traces of plastering on the preserved wooden elements, the elements that formed the base for plastering, or the marks of the masonry elements on them.

Fig. 6. A historic cottage building from the village of Turze

Barn from the village of Podlesie

The barn was built in the 19th century in Podlesie (Fig. 7). The structure was dismantled in 2015 and transported to the Opole Village Museum in Opole [10].

Fig. 7. A historic barn from the village of Podlesie

A barn of simple, compact form, constructed in timber frame construction. The symmetrical, gabled roof was covered with a grey embossed tile in a near-square shape. The tile was similar in form to the so-called Muldenfalziegel with double overlap, manufactured at the Siegersdorfer Werke Friedrich Hoffmann in Zebrzydów near Bolesławiec (formerly Siegersdorf). Classic carpentry joints were used in the erection of the building. The construction elements were pre-treated with an axe and smoothed with an axe. The wooden parts of the

construction were cut with a handsaw. No system of assembling carpentry markings was located in the roof trusses.

The roof construction is a timber purlin system without rafters. The gables of the barn were boarded with vertical boards. On the basis of the preserved photographic documentation, it was found that over the years the boarding of the walls and gables, in the place of previously destroyed wooden elements, was repeatedly replaced and supplemented. The interior of the building was functionally divided into three parts - the central pass-through part and two side parts used for storing grain and hay. Two gates, about 5.0m wide, led to the passage part.

Farm building from the village of Turze

The farm building was erected around 1910 in the village of Turze near Racibórz in the south of Silesia. No building material suitable for reconstruction has survived to the present day. The body of the building was formed from two perpendicular blocks covered with symmetrical pitched roofs. A single room was formed in the main body, with a low door leading into it. The lower, narrower annexed block provided an arcade for utility equipment.

Reconstruction

The cottage house was rebuilt in the southern part of the plot, following the traditional principle of location, according to which buildings of this type were oriented with their front facing south [8], [11-13]. The reconstruction work included the restoration of the wooden walls, the ceiling over the ground floor and the roof trusses, as well as the chimneys, cookers, the kitchen range and the window and door frames. The reconstruction was guided by a detailed building inventory, supported by photographic documentation. The newly introduced structural elements were adapted to the dimensions of the preserved original fragments, with the foundation beams made new from scratch. Traditional sand-lime plaster was applied to the walls of the living areas, which were covered with lime paint in a natural white shade. The internal and external installations and connections were designed from scratch, considering modern technical standards. All wooden elements have been treated with fire retardants, biocides and water repellents to ensure the durability and safety of the building.

The barn was rebuilt without extensions in the eastern part of the plot, restoring its original location and massing [12]. Inside this building, transformed for its new function, a multi-purpose hall was designed as an independent steel structure in the form of a cuboid. The partitions of this structure are made of materials that provide adequate acoustic and thermal insulation, allowing a variety of uses for the space. The centerpiece of the interior is an impressive aquarium with a capacity of around 7.0m³, which serves both a decorative and educational function. Following completion of the works, the facility has been repurposed for exhibition, training and information functions in accordance with the investor's concept. The permanent exhibition ‘The Voice of the Fish’ is the main attraction of the site, attracting nature lovers and educators alike.

The farm building was located in the northern part of the plot, opposite the cottage. Due to the lack of surviving artifacts, the building was reconstructed entirely from newly acquired materials, based on a historical building inventory. In the reconstruction, care was taken to faithfully reproduce the structural and aesthetic details so that the building fits harmoniously into the spatial layout of the plot.

The complex was rebuilt on completion in a way that combines respect for historical values with modern solutions while ensuring the functionality and attractiveness of the buildings.

Conservation and construction issues

The conservation methods and choice of materials and technology during the restoration of both the cottage and barn were varied and individually tailored to the individual elements of the buildings. The approach took into account both aesthetic and functional qualities, attempting

to preserve the original character of the buildings as much as possible while adapting them to their new functions. The conservation, repair and supplementary works were carried out in accordance with conservation principles, with full respect for the historical and cultural values of the buildings.

The scope of the works included the reconstruction and restoration of all three buildings, with simultaneous restoration of the preserved historic elements, including wooden details that were particularly vulnerable to degradation. During the course of the works, the principle of minimal necessary interference with the historic structure of the building was applied to protect its authenticity. The dismantled elements were carefully stored and then rebuilt or reconstructed, making maximum use of original materials that were in good condition.

All decisions regarding the choice of materials and technology were based on a detailed assessment of the state of preservation of the buildings and their structural elements. The measures taken were aimed not only at preserving but also at enhancing the durability of the buildings so that they could fulfill their functions in the future. The preservation of building materials that had historical value was a priority and their use for reconstruction was subject to a detailed assessment in terms of load-bearing capacity and technical condition (Fig. 8).

Fig. 8. Artifacts from a cottage from the village of Turze (a, b, c) and from a barn from the village of Podlesie (d, e, f)

Due to changes in function and the need to adapt to modern standards, the barn was rebuilt in a simplified form, without the extensions that had previously been located on its eastern side. Inside the building, a spacious multi-purpose hall was designed with a steel, self-contained structure (Figs. 9 and 10). The room's partitions are made of materials that provide adequate acoustic and thermal insulation to improve comfort. The hall also houses an aquarium with a capacity of approximately 7m³, which forms part of the modern educational exhibition.

Fig. 9. Reconstruction of a cottage building from the village of Turze in a storage hall

Fig. 10. An internal steel structure independent of the external "layer," which is a barn from the village of Podlesie

After the reconstruction, the facility serves as an exhibition, training and information function, organized as part of the permanent exhibition ‘The Voice of the Fish,’ in accordance with the investor's concept. The scope of activities is outlined below:

1. Upon verification of the actual technical condition of the structural elements, it was found that the amount of usable material was less than half. A number of the surviving timber elements of 2020, when the mycological and structural opinion was prepared, had deteriorated further [14].
2. Compared to the cottage, a more detailed building inventory was prepared for the barn and more detailed photographic documentation was made.
3. The roof of the barn was tiled with lap tiles in a color and form similar to that inventoried prior to demolition.

In the case of the cottage building, the following actions were taken:

1. During the demolition of the cottage and subsequently, all wooden elements were numbered twice and divergently. In addition, the number plates identifying the individual elements were corroded, making it impossible to read them correctly.

2. The building inventory of the cottage was not carried out very carefully. The width of the building actually turned out to be more than 0.5 smaller than that assumed from the 1970s inventory.
3. During the trial assembly of the cottage, significant displacements of elements in the joints, visible deviations from the verticality of the wall columns and bulging of the external wall sections were found (Fig. 10).
4. Biological degradation of the stored structural timber appeared to be much more advanced than assumed prior to the documentation [15].
5. Limitations of the reconstruction of the cottage were the incomplete preserved material of the original substance, including structural and non-structural timbers, floors, boarding, window and door frames, ironwork, bottle cooker, heating cooker and plinth building blocks.

The farm building, located in the northern part of the plot opposite the cottage, was rebuilt with new materials, as no original elements survived. The reconstruction was carried out on the basis of a detailed building inventory, which took into account the historic structural solutions. As a result, the new construction of the farmhouse fully reflects the appearance of the building from before, maintaining integrity and coherence with the character of the other buildings on the plot.

Based on the above work, it is fair to say that timber testing methods are extremely important in the analysis and restoration of this type of building, being a key part of the conservation process to ensure the safety and durability of the restoration. As part of the assessment of the technical condition of the wooden elements, a number of specialized diagnostic tests were carried out, such as measurements of the moisture content of the wood, microscopic analyses and structural tests, which made it possible to detect possible damage. In addition, the assessment of the mechanical properties of the timber allowed the precise determination of the extent of repairs and protection required, which was crucial in protecting the structural integrity of the buildings.

In the future, it is also necessary to consider the continuous monitoring of the structures of these objects, which will be an essential component of the reconstruction and usage process, allowing for ongoing control of their stability and responses to environmental changes, such as variations in temperature, humidity or loads. It is suggested to install modern monitoring systems that enable real-time tracking of the technical condition of the buildings, including analysis of potential foundation settlement, structural deformation, moisture levels in wooden elements and more. The use of advanced wireless monitoring technologies, such as IoT (Internet of Things), will facilitate faster detection of issues and more effective responses in case of threats, which is an invaluable element in ensuring the long-term durability of the structures [16, 17].

Thanks to the research methods used, the reconstruction process could be carried out with a precise analysis of the condition of the objects, which ultimately enabled the restoration with full attention to the authenticity and durability of the historic buildings.

The issue of "ideological" matters

The reconstruction of dismantled wooden architecture, particularly in the context of preserving cultural heritage involves numerous dilemmas that present both opportunities and threats. It is worth noting that these actions, while aiming to protect and revitalize valuable fragments of material culture, also carry the risk of erasing elements that were an integral part of the original designs from the spatial context. Contemporary reconstruction of such structures

relies heavily on advanced conservation technology and social and scientific decisions, making the evaluation of these efforts complex and ambiguous.

In the case of a fishing homestead, the reconstruction of structures that originally did not serve functions related to fishing raises additional questions about authenticity and alignment with the original purpose. A structure of this nature, once rebuilt, may acquire a new context, altering its functions, which might not align with the principles of heritage preservation in its traditional form. On the other hand, considering these risks, it can be observed that reconstruction offers an opportunity to preserve these structures for future generations. This represents an attempt to "restore" part of endangered heritage in a new form, even if that form deviates from its original purpose.

The issue of using building materials from dismantled structures, as is the case with the Museum of the Opole Countryside, allows for the preservation of this valuable resource from further destruction. Wood, exposed to changing weather conditions and biological corrosion, could be completely destroyed over time, making its reconstruction logical and justified. Mycological studies of the wood, conducted in the context of the cottage and barn, confirm the need for measures to protect these elements from further degradation. This enables the restoration of part of the original appearance and characteristics of these buildings, albeit in a new context.

Nevertheless, reconstruction in the original location, though it might seem the most ideal solution, is practically impossible today. Primarily, this is due to changes in spatial planning, which often mean that the original sites of these structures no longer exist in their original form. High reconstruction costs and issues related to land ownership constitute further barriers to such efforts. As a result, the only reasonable alternative is to relocate these structures to an ethnographic museum, which can serve as a "new home" for these valuable monuments.

For the management of the Opole Village Museum in Opole, the decision to reconstruct three structures dismantled in the 1960s and 1970s was likely a response to the need to protect local heritage. Such actions aim not only to preserve the buildings themselves but also the traditions and knowledge of their construction and use. The open-air museum serves educational, cultural and didactic purposes, playing an important role in cultivating regional rural culture. In this context, the reconstruction of these structures can be seen as a responsible act of preserving and passing on valuable cultural heritage to future generations.

In this way, despite the risk of losing authenticity, reconstruction can be considered an effort to protect and restore an important element of local history, which might otherwise be completely forgotten. The value of such actions lies in the fact that open-air museums fulfill scientific, educational and cultural objectives, preserving traditional, regional rural culture [18]. However, their current form and operation often lead to the trivialization of the spatial context in which the original structures existed, causing them to lose part of their authenticity. Today, they are perceived as places frozen in time and space, which may result in a certain simplification of their original significance. The modern perception of open-air museums as tourist attractions can pose challenges in conveying the full cultural value embodied by the preserved monuments.

In a broader context, it is worth noting that the original idea behind organizing open-air exhibitions was to save disappearing and deteriorating architecture. Initially, such initiatives aimed to protect unique examples of buildings that, for various reasons - mainly due to wars, neglect, or changing urbanization trends - were destined for destruction. In Poland, the paradigm of architectural preservation was particularly relevant in the post-war period, when extensive demolitions were visible, especially in the so-called "recovered territories," both

in cities and rural areas. As a result of this phenomenon, many valuable elements of architectural heritage, integral to the cultural identity of regions, were lost.

The lack of identification of repatriates with their new place of residence, combined with a challenging economic situation, led to the neglect of existing architectural spaces. New residents, forced to adapt to entirely different conditions, felt little connection to the material heritage, which was unfamiliar to them. This was further exacerbated by legislative gaps in cultural heritage protection, which failed to provide adequate mechanisms to safeguard valuable structures from destruction. Consequently, the open-air museum model of preservation emerged as a response to contemporary challenges.

In Poland, amidst widespread demolitions and dismantling of wooden architecture, open-air museums gradually became almost the sole places where fragments of traditional buildings could be preserved. Many of these structures, once integral parts of the rural landscape, were relocated to such institutions, creating a kind of "exhibition" of local history. While the initial goal was to protect these structures from being forgotten, today, these artificial, isolated enclaves are increasingly viewed as tourist products serving educational and marketing purposes. They contribute to the attractiveness of regions by drawing in tourists [19, 20].

The article analyzes the process of reconstructing three wooden buildings at the Museum of the Opole Village, considering both technical and conceptual aspects. These projects combined traditional construction techniques with modern solutions, which allowed for the preservation of the historical values of the structures while adapting them for new educational and exhibition functions. The difficulties related to the limited availability of original materials and the need to adapt the buildings to contemporary usability standards were discussed. The importance of detailed diagnostic research and monitoring as key elements of heritage protection was emphasized [16, 21, 22].

Conclusions

The reconstruction of wooden architecture in open-air museums is an effective method of preserving cultural heritage, but it requires precise planning and the application of appropriate conservation methods.

The limited availability of original materials and their degradation pose significant challenges in the reconstruction process, which can be minimized through effective monitoring of technical conditions and the use of advanced technologies.

Moving buildings to open-air museums, despite the risk of losing some authenticity, is an important way to protect the disappearing wooden architecture and promote local history and culture.

Further research on monitoring and conservation methods could contribute to the development of more effective strategies for protecting architectural heritage in changing environmental and social conditions.

References

[1] D. Kuśnierz-Krupa, M. Hryniewicz, Ł. Bednarz, O.Ivashko, *Original research procedure as an important stage of heritage site investigation: the case of the manor and garden complex in Wrocanka*, **Muzeologia a Kulturne Dedicstvo**, **12**(4), 2024, pp. 109-132, DOI: 10.46284/mkd.2024.12.4.6.

[2] D. Kuśnierz-Krupa, I. Sandu, P. Tišliar, Ł. Bednarz, A. Dmytrenko, O. Ivashko, K. Cechini, *Awareness of local communities about the value of their city's cultural heritage and the need to protect it on the example of selected historic towns in the Małopolska region (Poland)*, **Technical Transactions**, **121**(1), 2024, DOI: 10.37705/TechTrans/e2024007.
[3] J. Kobylarczyk, M. Hryniewicz, M. Krupa, A. Mamedov, J. Marchwiński, *Place of cultural heritage in the contemporary image of Jarosław,* **Wiadomości Konserwatorskie: Journal of Heritage Conservation**, **70**, 2022, pp. 64-70, DOI: 10.48234/WK70JAROSLAW.
[4] I. Sandu, *Modern Aspects Regarding the Conservation of Cultural Heritage Artifacts*, **International Journal of Conservation Science, 13**(4), 2022, pp. 1187-1208.
[5] K. Kuśnierz, D. Kuśnierz-Krupa, *Cultural landscape of Røros – inscribed in the UNESCO World Heritage List*, **Teka Komisji Urbanistyki i Architektury. Oddział PAN w Krakowie**, **46**, 2018, pp. 649-660.
[6] J. Czajkowski, **Muzea na wolnym powietrzu w Europie**, KAW, Rzeszów 1984, p. 5.
[7] Z. Bomersbach, **Program funkcjonalno-użytkowy**, Opole, 2020.
[8] P. Opałka, **Projektu odbudowy drewnianej chałupy i budynku gospodarczego ze wsi Turze oraz stodoły z wsi Podlesia**, Nysa, 2021.
[9] T. Chrzanowski, M. Kornecki, *Powiat raciborski, zeszyt 13*, seria: **Katalog Zabytków Sztuki w Polsce**, **VII, województwo opolskie**, Instytut Sztuki Polskiej Akademii Nauk, Warszawa 1967, pp. 432-433.
[10] B. Dubiel, A. Kośmicka, **Inwentaryzacja budowlana**. **Znakowanie**, Opole, 2015.
[11] T. Chrzanowski, M. Kornecki, **Sztuka Śląska Opolskiego. Od średniowiecza do końca w. XIX, Wydawnictwo Literackie**, Kraków 1974, p. 432.
[12] P. Opałka, **Program of construction and conservation works for the barn from the village of Podlesie**, Nysa 2021.
[13] J. Wojakowska, **Projektu odbudowy drewnianej chałupy z Turze**, Opole, 2007.
[14] E. Miśniakiewicz, **Opinia mykologiczno-budowlana elementów drewnianych chałupy ze wsi Turze,** Opole, 2007.
[15] E. Miśniakiewicz, **Opinia mykologiczno-budowlana elementów drewnianych stodoły z Podlesia**, Opole, 2020.
[16] Ł.J. Bednarz, **Monitoring diagnostyczny obiektów historycznych**, Wrocław: Oficyna Wydawnicza ATUT - Wrocławskie Wydawnictwo Oświatowe, 2023.
[17] G. Wojciechowska, Ł. Bednarz, N. Dolińska, P. Opałka, M. Krupa, N. Imnadze, *Intelligent Monitoring System for Integrated Management of Historical Buildings*, **Buildings**, **17**(7), 2024, Article Number: 2108, DOI: 10.3390/buildings14072108.
[18] Z. Żygulski, **Muzea na świecie. Wstęp do muzealnictwa**, PWN, Warszawa, 1982, p. 7.
[19] J. Kaczmarek, **Produkt turystyczny. Pomysł, organizacja, zarządzanie**, PWE, Warszawa 2010, p. 74.
[20] J. Mokras-Grabowska, *Kultura ludowa w polskiej turystyce – autentyczność czy komercja?*, in: **Kultura i turystyka– razem czy oddzielnie?**, (Editor: A. Stasiak), Wyd. WSTH, Łódź 2007, p. 258.
[21] M. Lisińska-Kuśnierz, M. Krupa, K. Paprzyca, J. Syguła-Cholewińska, K. Kuśnierz, O. Ivashko, *Deterioration of wood by microorganisms in a historical building on the example of a historical health resort vill***, International Journal of Conservation Science**, **11**(4), 2020, pp. 905-916.

[22] D.S. Bajno, A. Grzybowska, Ł.J. Bednarz, *Old and modern wooden buildings in the context of sustainable development*, **Energies**, **14**(18), 2021, Article Number: 5975, DOI: 10.3390/en14185975.

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