

RESTORATION, OPERATION AND INCLUSION OF MUSEUMS IN LARGE CITIES WITH NOISE LOAD

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Abstract

The article reveals the features of the functioning of historical buildings, redesigned for a museum function. The specificity lies in the fact that most of these museums are located in large cities with a number of environmental problems and noise load, which negatively affects both the state of structures and decor. On the example of two objects - the former Poltava provincial zemstvo (Poltava Museum of Local Lore) and the Palace of Israel Poznansky (Museum of the City of Lodz), the restoration work carried out with an emphasis on the restoration of wall paintings in the interiors is characterized. Considerable attention is paid to the problem of reasonable adaptation of historical buildings for use by people with disabilities, including the problem of familiarization with the museum exposition of people with visual impairments. The article is illustrated by the works by the authors S. Baiandin and P. Baiandin.

Keywords: Museum objects; Historical buildings; Restoration; Noise loads; People with limited mobility

Introduction

Modern techniques and changes in lifestyle often challenge the traditional substantive understanding of buildings as fixed and unchanging entities as expressed in the articles by A. Yaneva [1] and P. Gryglewski *et al*, [2]. Since the 1970s, the adaptation of the architectural heritage to a new function has become increasingly important and an essential part of the transformation of modern cities. This approach and perspective were particularly expressed in the Declaration of Amsterdam of 1975 as well as in the Convention on the Value of Cultural Heritage for Society adopted in 2005, the so-called Faro Convention. According to this documents adaptation usually means a transformation of the building by adapting it for different purposes than those which it served so far.

Regarding historic architecture, this mainly involves the incorporation of new functions into the spatial arrangement of the interior, as well as the functional transformation of the immediate surroundings of the building. Despite the limitations, which are associated with work in the existing structure, this task is undertaken by the greatest architects such as Renzo Piano, Jean Nouvel, Ieoh Ming Pei as well as the architects' cooperative Jacques Herzog and Pierre de

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Meuron. In the case of all these artists, the dialogue between the architecture of the past and contemporary design takes different forms, from the search for coherence and compatibility of architectural languages from different times to the construction of conscious contradictions. These aspects are more widely discussed in J. Sowińska [3].

An important reason for the necessary adaptations to new functions are the ownership changes that have taken place within the existing buildings over the years and the correlated changes in the functions of the historic buildings. Most often these are the functions which currently cannot be continued [4] (this applies to fortifications, palaces, industrial and vernacular monuments associated with local tradition, and in recent years in Western Europe utility needs (and thus the need for modernization works) increases with their age, as functional requirements are constantly changing (a wide selection of interesting adaptations of churches to new functions is presented by Fernanda Castro).

Among many important requirements for historic buildings is nowadays such an aspect as taking the needs of people with disabilities in their access to cultural and broadly defined historical-artistic heritage into account. Therefore, currently the main dilemma accompanying the adaptation of historical buildings to their modern function is the scope of the adaptation and modernization works. Aspects related to the adaptation of historical buildings for new purposes are presented in an interesting way in the article by P. Molski [5]. According to him, it is usually believed that the greater the scope of adaptation works, the more usable value of the building increases, but its historic value decreases. At the same time, however, a successful revitalisation can create a new interest in a place on the part of tourists (here we may recall the iconic example of the Roman Forum being included in the circle of interest of researchers and tourists from the beginning of the 19th century as a result of research under the guidance of the archaeologist Carlo Feà).

All dilemmas mentioned above as well as the fact that currently in Central Europe more than 40% of investments concern modernization and restructuring of already existing buildings [4] make an intensive reflection on the part of architecture theoreticians as well as architecture conservators necessary as a supplement of practitioners' activities in this field [6].

Environmental problems are of paramount importance in most countries of the world, especially in large cities. The main polluter of the environment in large cities is motor transport, which forms a number of environmental loads on the urban environment, the main of which is gas pollution, which for large cities amounts to 60–80% of gas emissions, noise and vibration from traffic on the city's road network.

The process of propagation of noise, sound pressure and vibration to the adjacent buildings has a particular negative impact on the objects of the architectural heritage. The systematic effect of sound pressure of different frequencies and vibration vibrations from traffic flows affects many elements of buildings and structures. This is especially evident in buildings of historical value. The preservation of the primary decors and murals of the facades, their duration of existence in the initial state is the main task for the operation of these objects.

The experience of observing and studying these influences on the deformation of facade elements indicates the need to determine the permissible normative indicators of the impact from these environmental loads, formed by the negative influence of traffic flows. When creating planning solutions for the formation and development of city development, taking into account existing historical objects and developing methods for protecting these objects already in the existing urban development, it becomes necessary to develop uniform normative permissible values of influence on decorative elements of the facades of the architectural heritage. Formation of normative permissible indicators of environmental loads from automobile traffic is of significant value for the preservation of objects of the world and national heritage.

Materials and methods

The tasks of the research determined the choice of scientific methods, which became the method of historical analysis, the method of cultural analysis, the method of ethnographic

analysis, the descriptive method, the method of field research, the method of laboratory research, and the method of comparative analysis. General problems of museification and the state of cultural heritage were studied by P. Spiridon and I. Sandu [7], P. Spiridon *et al.* [8], L. Pujia [9], and Florescu *et al.* [10] and problems of interaction between a historical object and the environment were studied by Y. Ivashko *et al.* [11], D. Chernyshev *et al.* [12], M. Dyomin and Y. Ivashko [13]. Aspects related to the concept of a work of art in relation to restoration were investigated by M. Orlenko and Y. Ivashko [14]. Restoration technologies are presented in articles and monographs by M. Orlenko [15], M. Orlenko *et al.* [16], M. Orlenko [17, 18]. Aspects concerning the period of the late 19th-early 20th centuries and the Art Nouveau period are covered in the articles by M. Dyomin and Y. Ivashko [19], Y. Ivashko *et al.* [20], Y. Ivashko *et al.* [21], Y. Ivashko *et al.* [22], Y. Ivashko *et al.* [23]. Sources related to the training of specialists in the field of restoration were also analyzed [24, 25].

A separate block of publications is devoted to the period under study in the cities of Ukraine and in Lodz – these are articles by K. Stefański *et al.* [26], A. Dmytrenko *et al.* [27], J. Sowińska-Heim [28], M. Laurentynowicz-Granias [29], K. Stefański [30]. The breadth of the studied literature was explained by the breadth of the tasks set and their versatility, since the issue of the functioning of city museums in architectural monuments invariably entails issues of their protection and restoration, elimination of negative external influences associated with the strengthening of urban processes (environmental degradation, noise loads, an increase in the number of engineering systems, additional loads on the soil due to the compaction of surrounding buildings, etc.), the issues of attracting high-level specialists to carry out restoration and restoration work and the problems of inclusiveness, taking into account the provision of accessibility for visitors with limited mobility.

Results and Discussion

Restoration of the former building of the Poltava provincial zemstvo – now the Poltava Museum of Local Lore

The authors investigated the history of construction and the ongoing restoration of the Poltava Zemstvo based on materials kindly provided by the directorate of the Poltava Museum of Local Lore, Kyiv archives and old printed publications, and field examinations of the painting were also carried out. The building of the Poltava Provincial Zemstvo (otherwise – the Zemskyi House, Fig. 1) is considered the first and most prominent representative of the "Ukrainian national style". In the literature, you can see its various names – until 1917 it was called "South Russian" or "Little Russian", Viktor Chepelyk used his term "Ukrainian architectural modern", Vladimir Yasievich – the term "Ukrainian folk style" and "Ukrainian (neo-Ukrainian) style". If we consider this phenomenon on a pan-European scale, against the background of similar phenomena in Finland (Finnish national romanticism – "northern modernism"), Poland ("Zakopane style", Catalonia ("modernismo")), in our opinion, the name "Ukrainian national romanticism".

At the end of 1902, the initial design of the building of the Poltava zemstvo by the zemstvo architect Oleksandr Shyrshov was approved. The project was executed in the neo-Renaissance style, however, due to the conflict between the author and the customer, the architect was changed and the design was entrusted to the famous architect Volodymyr Nikolaiev, who retained the original layout, but redesigned the style of the main façade – also in the neo-Renaissance tradition. The presented second project also caused a flurry of criticism among the artistic elite, as a result, in 1903, the expert examination of the project was entrusted to the famous artist Serhii Vasylykivskyi, who convinced the customer of the imperfection of the project, the need to stop the already begun construction and in an additional competition. In June 1903, the project of Vasyl Krychevskyi was chosen by a majority of votes, which was approved by the Poltava Zemstvo.

Despite the difficulties in the construction process, the unique building in the national Ukrainian style was built in several years: at the end of 1904, construction and finishing work was completed in two side wings, in 1905 – roofing work, in 1905–1908 – construction work in the central parts and in the middle wing.



Fig. 1. The building of the former Poltava Provincial Zemstvo (now – Vasyl Krychevsky Poltava Local Lore Museum). Current state under restoration. Photo by P. Baiandin, 2022.

The uniqueness of the Poltava zemstvo lies in the fact that all the features that characterize the folk architecture of Ukraine and its originality are concentrated here: tower tops analogous to wooden churches with hipped roofs, trapezoidal openings, ceramic and flat decor.

We will dwell in detail on the painting of the interiors of the Poltava Zemstvo. The first such example is the folk-style paintings of the Celebration Hall. In September 1905, by the efforts of the workers of the merchant Vengerov, the walls of the facades and interiors – all halls, rooms, corridors – were painted with mineral paints from the John Gernand factory. In May of the same year, the artist Serhii Vasylykivskyi was invited to paint three monumental historical panels in the hall of the zemstvo assembly. The panels were painted on canvases measuring 13×17 arshins (924.56×1209.04cm). Serhii Vasylykivskyi invited the famous Kharkov battle painter Mykola Samokysh to co-authorship. Get dressed, and let's go to Poltava now, M. Samokysh recalled Vasylykivsky's words. We will find as much material as you want there in the Ethnographic Museum and Skarzhynska Collection. Let's look on the spot, think about it and make a draft painting. It is necessary to make sure that they do not even dream of it, because this is the first house in the Ukrainian style [31].

Samokysh did a great job of searching and analyzing Ukrainian folk ornaments of Poltava, Kyiv and Chernihiv provinces – embroidery, tableware, church sewing, murals of huts, studied artifacts in museums in Kyiv and Poltava and private collections. These materials in the form of sketches were combined into albums. Later Mykola Samokysh published an album of 40 colored lithographs "Motives of Ukrainian Ornament" (1902). The publication first introduced the wide circles of the Russian Empire to the original Ukrainian folk art. The special interest in the topic of Ukrainian folk ornament is evidenced by the fact that the album was republished in 1903 in Prague and in 1904, according to some sources in Kharkiv, according to others in St. Petersburg.

The decoration of the Celebration Hall was dictated by its structure – the cruciform space was covered by an elliptical vault. As conceived by Serhii Vasylykivskyi, picturesque ornamental phytomorphic decor was placed on the walls, made according to sketches by Mykola Samokysh, which complemented three thematic panels by Serhii Vasylykivskyi with the participation of Mykola Uvarov and Mykhailo Berkos. The main axis of the hall was closed by the thematic panel "Election of the Poltava Colonel Martyn Pushkar", to the left of it – the panel "Cossack Holota and the Tatar", to the right – the panel "Romodan Way". Each plot had a symbolic semantic meaning: the panel "Election of the Poltava Colonel Martyn Pushkar" – the democracy of the top

leadership election, – the panel "Cossack Holota and the Tatar" – military valor in the defense of their homeland, the panel "Romodan Way" – trade relations and entrepreneurship of the Poltava region. The authors' study of the stylistics of ornamental painting on the walls of the Celebration Hall proved that they were based on ornaments of Ukrainian church embroidery. At the same time, Mykola Samokysh skillfully combined elements of the Western and Eastern styles, which is explained by the similarity he recognized between the Ukrainian and Crimean Tatar ornament. He considered this similarity to be the result of the mass capture of Ukrainian women by the Crimean Tatars.

The unique interior murals were completed in 1908 and the building was consecrated and opened in the same year. It is noteworthy that in the structure of the zemstvo there was a natural history and history museum open to free visits.

The provincial zemstvo and the natural history museum existed until 1919, then all administrative and managerial functions were abolished, the Soviet administrative body was located on the two lower floors, and the museum remained on the second floor. The new owners did not pay due attention to the architectural monument. In 1920, the entire building was redesigned for the "Central Proletarian Museum of Poltava Region". From then until the present day, the building retained its museum function and only changed the name of the museum.

The years of the Second World War turned out to be tragic for the museum, when, during the retreat from Poltava in 1943, German troops destroyed the historical buildings of the city as much as possible. In September 1943, all above-ground floors with halls and basements were completely burned down.

The first work on the restoration of the unique monument began already in 1946 at the initiative of Vasyl Krychevskyi's colleague Petro Kostyrko. In 1946–1947 he completed the first reconstruction projects in the architectural and design workshop of the Kyiv State Art Institute. However, due to financial problems, restoration work began much later, in 1954. In 1954–1961, new working drawings for the restoration of the architectural monument were made by the Poltava architects V. Krachmer, N. Kvitka, Ye. Andreiko and others. It was their project that formed the basis for the restoration work.

The museum was reopened to visitors only 21 years after the destruction, in 1964. Despite the efforts of the architects to get as close as possible to the authentic look of the building, not everything was recreated. Instead of a unique green-blue glazed tile, the roof was covered with an ordinary one due to the fact that the technologies for manufacturing glazed tiles in Opishnia and Myrhorod were lost and there were no corresponding masters. It was also not possible to reproduce the ornaments and panels of the halls in accordance with the originals.

The next stage of the restoration of the building falls on 1992–1995, when, thanks to A.-L. Vainhort made panels with swags, ornamental paintings on a vault were made and three thematic panels of the Celebration Hall were painted by the Kyiv muralist Leonid Totskyi. The basis for the painting of the panel was materials from the funds of the Museum of Local Lore – an album with photographs by Josef Chmielewski (1908) and an album of colored lithographs by Mykola Samokysh "Motives of Ukrainian Ornament" (1902). When recreating the ornaments on the walls, L. Totskyi used Chmielewski's photographs and redrawn them by hand using a magnifying glass, which did not allow reproducing the ornament with maximum accuracy. This also applied to the reproduction of the original colors of the ornaments.

The next stage of the restoration and reconstruction of interior paintings began in 2021; Kyiv artists-restorers S. Baiandin and P. Baiandin, who have experience of similar work on unique architectural monuments, were invited to perform the paintings.

Before the start of the painting, a full-scale examination of all surfaces for painting was carried out and the presence of structural cracks in the brickwork, which existed as early as the 1995 restoration period and were not injected, was recorded. It is because of this that the panel "Elections of the Poltava Colonel Martyn Pushkar" L. Totskyi painted on a separate canvas-stretcher, and did not stick the canvas with the picture on the wall.

Natural and laboratory studies of the remains of the base of the paintings established that the paintings in the Celebration Hall in 1905 were made on lime-sand plaster of a weak structure,

which required an additional thickness of the plaster layer (under the panel "Election of Poltava Colonel Martyn Pushkar" – 60mm). When clearing the areas from the lagging plaster layer, areas filled with glazed tiles were identified, that is, initially the builders used materials not intended for this for the plaster filler. On the surface of the plaster layer of 1905, traces of fire and soot of 1943 were revealed, which were not cleaned up during the restoration of 1956–1962 and were simply covered with a new layer of plaster 15mm thick. This led to an increased thickness of the plaster layer – the original, to which the post-war layer was added, resulting in an average layer thickness of 75mm.

During the restoration of 1992–1995 in order to stabilize cracks in the masonry, a layer of reinforcing gauze was glued on top of all layers of plaster and finishing putty was applied. This brought some results and the cracks did not appear for some time on the surface of the walls.

Before developing sketch designs for the murals, the authors studied historical photographs, published articles, documentaries, as well as such iconographic materials:

- from the funds of the Poltava Museum of Local Lore – an album with photographs of views of the building interiors by photographer J. Chmielewski (1908);
- from the funds of the Poltava Museum of Local Lore – project proposals of P.H. Kostyrko;
- from the Vernadsky National Library of Ukraine in Kyiv – M. Samokysh's album – 40 color lithographs "Motives of Ukrainian ornament".

Based on the iconographic base, S. Baiandin and P. Baiandin analyzed the author's style of the artist M. Samokish and compared his ornaments of 1906–1908 with paintings by L. Totskyi 1995.

As a result, the following discrepancy was identified.

Composition and silhouette of the ornament. When overlaying in the Photoshop computer program the original drawing of Samokysh's painting, obtained by us from aligned scans of the ornament (taken from Chmielewski's photo of 1908), on the photo of restored Totskyi's ornaments, numerous rough differences in the drawing are noticeable, the silhouette of some ornaments on the overall composition of the interior.

Plastics of forms. In almost all ornaments the plasticity of the form is broken, the local connections are distorted (Fig. 2).

Tonal relations. The analysis of tonal relations in archival photographs revealed a discrepancy between the tone of the background of the ornament and its elements, both to each other and to the interior as a whole.

Color solution. The color scheme also does not correspond to the original painting by M. Samokysh. Many elements of the ornament have changed color, in many places there are no gradations – both colored and tonal. Samokysh's painting is characterized by a restrained color scheme, his works are always based on an accurate drawing.

Elements of ornament. Numerous elements of the ornament – leaves, flowers, plant stems, acorns, bunches of grapes and geometric shapes – are either missing, or replaced, or modified.

Analyzing the paintings in the Celebration Hall and comparing the painting of M. Samokysh in 1908 with the painting of L. Totskyi in 1995, there were significant differences between the original and reproduced ornamental painting. The main stages of reproduction of authentic ornaments in the boxes, in the arch above the choirs, above the side doors, in the arch above and below the panel "Election of Poltava Colonel Martyn Pushkar" were as follows.

The first stage:

- search for archival photos and videos with the interior of the Celebration Hall of different periods. Selection of material for compiling a complete picture of the ornament;
- study of M. Samokysh's style of painting, analysis of his writing, drawing and author's style. Selection of materials of his similar works;
- study of written sources about the course of painting works in the hall in 1906–1908 and during the restoration of 1992–1995 (Fig. 3).

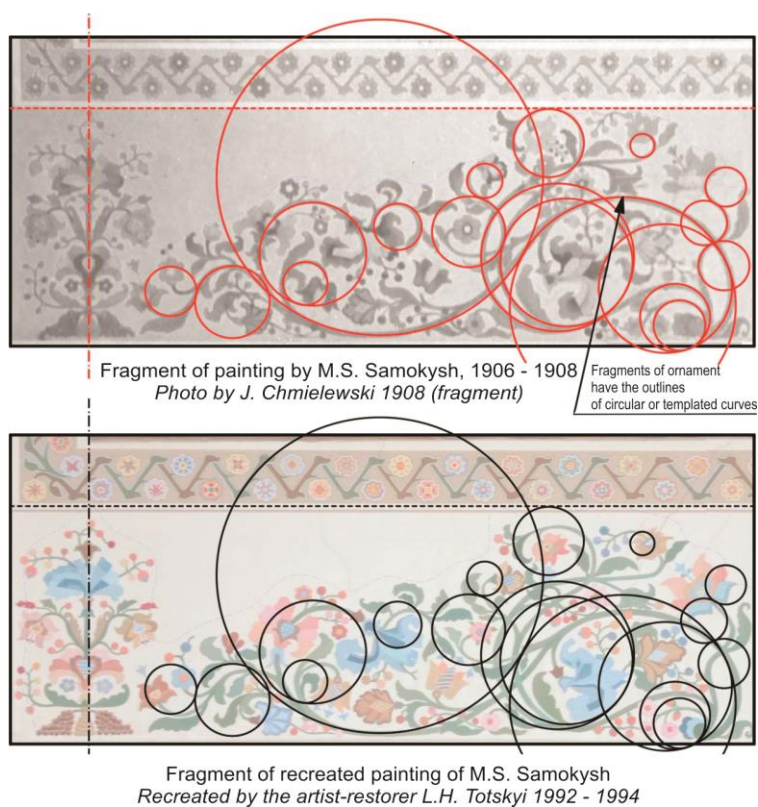


Fig. 2. Comparative analysis of plasticity and shape of the ornament (Original according to the photo of 1908 and restored in 1992–1994). Scheme developed by S. Baiandin and P. Baiandin, 2022

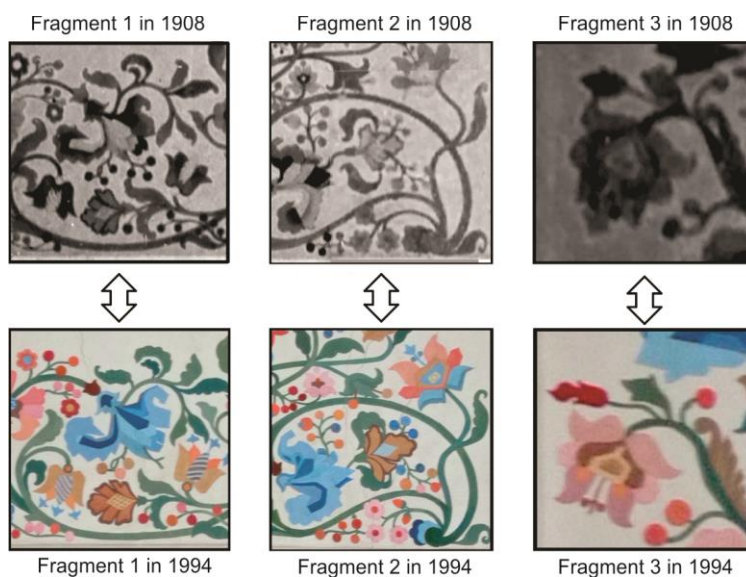


Fig. 3. Comparison of individual elements of the ornament – the original one (according to the photo of 1908) and restored as a result of restoration 1992–1995. Scheme developed by S. Baiandin and P. Baiandin, 2022

The second stage:

- correction and processing of photos in Photoshop;
- combining fragments of ornaments from photos and videos;
- cutting out a single fragment and aligning it in the frontal scan.

The third stage:

- scaling of the sweep of the ornament in accordance with the pre-prepared drawings of the interior.

The fourth stage:

- reproduction of the ornament in accordance with the original 1905 (Fig. 4).

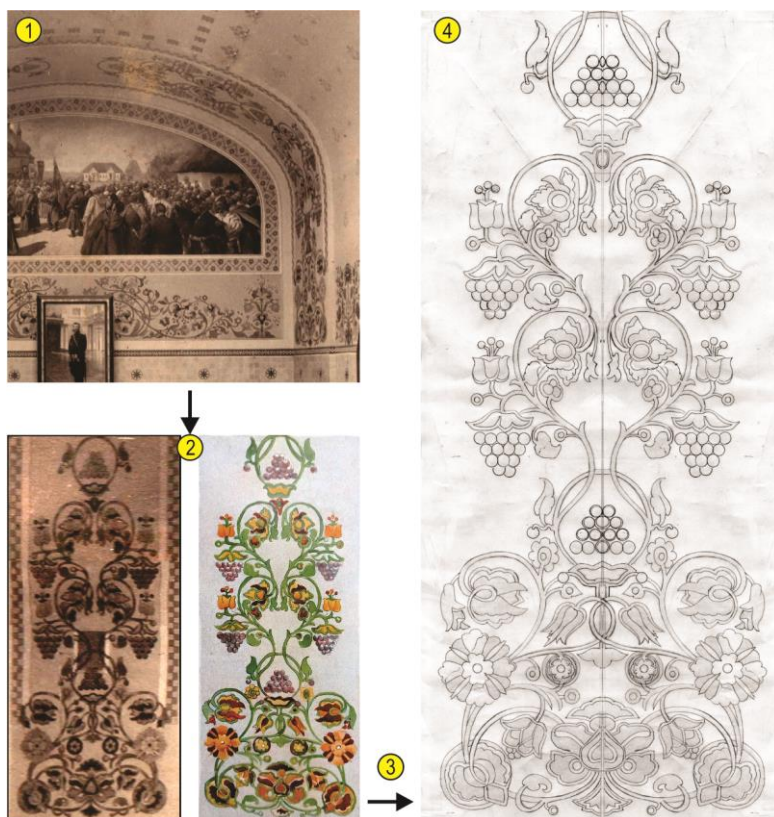


Fig. 4. The main stages of restoration of the ornament pattern
(on the example of the ornament in the arch above the picture).
Scheme developed by S. Baiandin and P. Baiandin, 2022

At the beginning of 2021, the following discrepancies in the ornament were observed in the lodges of the Celebration Hall: differences in the plasticity of the ornament and in individual elements (flowers, leaves, stems), inconsistency of tonal relationship between painting elements and other interior elements, including ornament background flowers and berries are different in tone), too bright, open colors, while the author's palette Samokish more restrained in color, no authentic extensions of tone and color in the ornament (flowers, leaves, stems), no light outline of the ornamental background, and dark fine outline of the ornament contour.

The ornament in the arch above the choirs had the following inconsistencies: differences in the plasticity of the ornament and violated the overall geometric framework, differences in filling the background ornament (general silhouette of the ornament), differences in individual elements (flowers, acorns, leaves, stems), inconsistency of tonal relationship between itself and

other elements of the interior, in particular the background of the ornament, too bright, open colors, while the author's palette Samokish more restrained in color.

The ornament above the side doors and above and below the panel "Elections of Poltava Colonel Martyn Pushkar" had the following discrepancies: differences in filling the background ornament (general silhouette of the ornament), numerous differences in ornamental plasticity, broken general geometric framework numerous differences of individual elements of the ornament (flowers, bunches of grapes, leaves, stems), inconsistency of tonal relationship of painting elements to each other and to other interior elements, including the background of the ornament, too bright, open colors, while Samokysh's palette is more restrained in color scale.

It should be noted that the restoration of the Celebration Hall interior is only part of the restoration project of the museum building, which includes many other things: from lightning protection and installation of anti-ice systems on the roof to alarm and video surveillance systems and modernization of the museum. An essential part of the restoration project is the adaptation of the museum building for use by people with disabilities.

The modern Ukrainian building codes (for example, DBN B.2.2-9: 2018 or DBN B.2.2-40:2018) contain quite strict requirements to ensure full accessibility of public buildings for people with disabilities, including for people moving on wheelchairs and for the visually impaired). However, quite often the fulfillment of these requirements contradicts the requirements of preserving exterior and interior appearance of the building – a monument of architecture. Thus, the arrangement of ramps or lifts significantly changes the appearance of the entrance group, the requirements of contrasting markings of handrails, the first and last steps of the stair flight, etc. contradict the preservation of historic interiors, it is not always possible to arrange an elevator in a historic building (both for planning and design reasons), etc. Therefore, in each case, the reasonable adaptation of a historic building for the needs of people with disabilities is a complex task that requires a non-standard creative solution.

While public buildings are the most difficult to accommodate for wheelchair users, the most difficult task in exhibition and museum facilities is to provide access to visually impaired or lost sightings. There is currently no one-size-fits-all solution to this problem.

In the case of the restoration of the former building of Poltava Provincial Zemstvo, which now houses the Poltava Museum of Local Lore, the problem was facilitated by the presence of facades, which, unlike the main facade, are not decorated with ceramic decor and go to the courtyard, as well as ancillary premises where the historic interior has either not been preserved or has never been of significant artistic value. Therefore, the entrance from the yard, equipped with an inclined lift, was used to organize the entrance to the building, which is accessible to people moving on wheelchairs. As there are no facilities for elevators in the building, the accessibility of the first and second floors for people with limited mobility is provided by inclined lifts installed in secondary stairwells (the total number of such lifts in the building reaches 11).

The authors of the project also found an opportunity to install toilets accessible to people with disabilities on the ground floor.

The first steps have been taken to make the museum's rich exposition accessible to the visually impaired or completely blind. It is assumed that there are tactile exhibits in each hall, however, their number is small – one or two per hall.

Organization of the restoration process of interior paintin

We have developed a detailed design of the scaffolding for the Celebration Hall with a 3D model for the general contractor who was responsible for the construction of the scaffolding. The upper levels of the scaffolding have been stepped to provide maximum access to the vault surface. The main frame of the scaffolding was erected from framed scaffolding, and the upper level was covered with solid wooden platforms (Fig. 5).

We fenced all the platforms where the work takes place with a triple fence (double fence at the top and one side at the bottom – protecting against falling of the tool or material).

For access to places that are difficult to access from the scaffolding, we have assembled 12 pedestals (height – 420mm, width – 600mm, depth – 800mm), from which there is good access

for work. To lift parts of scaffolding, materials, water and tools to the upper level (to a height of eight meters), an electric hoist with a carriage on an I-beam was installed.



Fig. 5. Scaffoldings in the Celebration Hall. Photo by P. Baiandin, 2022.

Restoration work requires a lot of attention to detail, so good lighting of the work surface is very important. Therefore, we laid temporary power grids and installed LED lighting with lamps on the entire working area of all forest levels. For work under artificial light, the preferred light heat gradation is as close as possible to natural sunlight, so we used lamps with a light heat of 3000 Kelvin.

For drawing cartoons and their piercing, selection of a color palette and mixing colors on the scaffolding, work tables were placed on the upper large level. All materials that do not have a lot of weight were placed in a warehouse on the upper level of the scaffolding in direct working access, and heavy materials such as plaster and putty were placed on pallets right next to the hoist area.

Full-scale study of the surfaces state with applied painting before restoration

Before starting work on the restoration of painting, S. Baiandin and P. Baiandin conducted field studies of the state of painting. When examining the painting, the safety of the paint layer, its connection with the base, the presence of peeling paint and plaster, cracks, craquelure were checked. The author's painting technique and style were determined.

When examining the base of the painting, first of all, attention was paid to cracks and traces of sticking on the walls and vault. The depth of the cracks was determined – whether they pass only through the upper layers of the paint layer, putty and plaster, or whether these cracks are of a constructive nature and go straight through the wall. The type of cracks determines the method of strengthening and preparing the base.

At this stage, detailed measurements of the entire room were carried out, dimensional drawings were drawn up, which will later serve as the basis for cartograms.

The building of the Poltava Museum of Local Lore was built of red clay bricks of the standard size 60×120×250mm (the strength of the brick is very low, produced by local production in Opishnia). The Celebration Hall in the plan is elongated along the major axis and has a cruciform outline of the plan – the central part is covered with a vault, and the side boxes on both sides are covered with slabs on I-beams. There is a balcony with a choir place above the main entrance. The flooring under the hall consists of metal I-beams on which wooden beams and the floor rest. The vault of the central volume is made of parallel metal trusses resting on brick walls. The trusses are assembled from a double riveted corner. There are numerous traces of damage

from the 1943 fire – some truss elements are bent. Reinforced concrete slabs 10cm thick and about 25cm wide are laid on the lower belt of the trusses, which form the vault (Fig. 6). The distance between the trusses is approximately 2.5m. The roof of the tiles rests on the upper chord of the trusses. The attic above the hall is unheated. The roof of the tiles rests on the upper chord of the trusses. The attic above the hall is unheated. The central volume of the hall has a skylight in the center of the vault.



Fig. 6. Repair process of the vault surface. Photo by P. Baiandin, 2022.

Basically, on the surface of the walls and the vault, the original lime-sand plaster of very weak strength was applied, as well as the plaster from the period of the post-war restoration of 1954–1962, when the collapsed part of the vault in this room was also restored. Some areas on the right and left walls (from the side of the boxes) (at a height of 2.5 to 5 meters from the floor level in the hall) are covered with cement plaster, which is badly cracked. With the last restoration 1992–1996 on top of the cracked plaster, two layers of gauze were glued, which performs a reinforcing function, preventing cracks from showing through in full to the surface.

As mentioned above, on the wall where the panel "Elections of Poltava Colonel Martyn Pushkar" is placed, as a result of post-war restoration the total thickness of the layer of lime-sand plaster was increased to 75 and sometimes 90mm, but the strength of the plaster layer is low. Also on this wall there are large diagonal cracks that go right through the entire building. Basically, they run along the ventilation ducts that are inside the walls. A similar problem with cracks is noted on the opposite choir place wall.

The reason for the appearance of these cracks has not been precisely determined; it is known that they were already in 1995, when the last restoration was being completed. It is because of the presence of these cracks that the artist-restorer L.H. Totskyi decided not to glue the canvas painting onto the wall, but to mount it on a separate wooden canvas-stretcher on metal anchors hammered into the wall.

Restoration of the surface for painting (removal of degraded plaster and preparation of the base for painting)

The procedure for preparing the base for painting was as follows. In the areas of cracks, the plaster layer was removed. At the same time, a small area was cleared and it was recorded whether the crack passes only in the plaster layer, or through the brickwork of the wall. After that, the lagging plaster was removed. If the crack passed only along the plaster layer, then the crack was pointed with a slight indent in both directions so that the opening width was no more than 10cm. If the crack passed not only through the plaster, but also through the supporting

structures, then the decision to eliminate it was coordinated by the chief designer of the project. The minimum measure for strengthening in the event of a structural crack in the brickwork is the installation of a galvanized metal welded mesh on dowels (mesh wire – 1.0mm in diameter, cell dimensions 10×20mm).

Especially severe damage to the surface was recorded in the places where the walls were locked due to the leakage of heating pipes inside the walls, as well as the leakage of the expansion tank of the heating system located above the vault in the attic. In these places, large losses and the presence of fungus were recorded. Due to this, it was necessary to completely clear these areas from the lagging plaster and treat the surface with an antiseptic. When clearing, the artists constantly tapped the plaster, defining the edges of the lagging surface.

The surface of the plaster was strengthened with a deep penetration primer Ceresit C17, paying particular attention to the crevices and the perimeter of the remaining plaster in order to avoid its subsequent lagging. The drying and setting time of the primer was 24 hours. In some cases, injection with casein-lime solution was used.

All large losses were strengthened by laying polymer meshes with a density of 120–145g/m², with a mesh of 5×5mm, in the plaster layer. All cracks in the plaster were reinforced by laying polymer meshes with a density of 60g/m², with a mesh of 3×3mm in the plaster layer. Knauf Rotband plaster was used to replenish plaster losses. Before applying the plaster to the wall, the surface was pre-moistened with water, with special attention paid to the plaster board: the entire perimeter of the old plaster was especially carefully reinforced with a new plaster mixture, pressing and pressing to the edges so that the plaster penetrated into all the cavities of the old plaster.

To ensure the integrity of the plaster surface in the areas of joints of new and old plaster, the paint layer and a layer of finishing putty were removed around the areas of loss to a width of up to 80 mm, reaching a layer of reinforcing gauze. To do this, we used an angle grinder with a speed regulator and a "coral" attachment, which allows you to carefully clean without damaging the reinforcing layer of gauze. To avoid heavy dust, we connect a dust extractor with a construction vacuum cleaner to the tool. After cleaning, Knauf HP FINISH finishing putty was applied on losses with a polymer mesh of 45g/m² and a cell of 2.5×2.5mm.

After the last layer of the finishing putty had dried, it was cleaned with an eccentric sander with a dust extraction and a vacuum cleaner connected, using a wheel with a grain size of P-150.

The cleaned surface was primed with Ceresit C17 SUPER before painting.

Preparation of drawings and cartoons for painting

In the course of the preparatory work on the restoration of paintings, S. Baiandin and P. Baiandin carried out an additional detailed analysis of the ornamental painting in the Celebration Hall. Using the computer programs Adobe Photoshop and ArchiCAD, they were able to superimpose an aligned ornament, obtained from an archive photo of Chmielewski in 1908, on the layer of the dimensional drawing, and on it, superimpose a photo of the painting, recreated during the last restoration of 1992–1996, in a third layer.

After that, the discrepancy between the painting existing today and the original became obvious, as was mentioned in the previous section. Painting 1992–1996 was completely filmed before the start of the restoration work.

It was decided for the Celebration Hall to restore each ornament of the monumental paintings in accordance with the original on the basis of the available archive photos. After straightening the ornament from the photograph into the frontal projection and scaling it, it was printed on a large scale (approximately 1:4 – 1:10) and the drawing was drawn with a pencil. Then the resulting picture was scanned and the electronic image was processed. In some cases, it was necessary to repeat this process several times in succession to obtain the highest quality and accurate drawing.

At the same time, each time the artists printed the ornament in a larger size and increased the degree of its drawing and detailing. If the ornament had a geometric pattern, the ArchiCAD program was used, where a geometric pattern in a vector was built on top of a scanned image or

an aligned archive photo. This allowed restoring the accuracy of the original geometry of the ornament. I often had to combine vector computer graphics and hand-drawn graphics.

After the work on drawing the details was completed, the scanned pattern of the ornament was scaled and printed on a plotter in the first scale, the printed stripes with the pattern were glued together and the required cartoon of the ornament was obtained. If necessary, additional edits were made and details were drawn. After that, they proceeded to piercing the cardboard with a needle, and thicker needles (usually with a diameter of 1.4–1.0mm) were used to pierce the main lines of the pattern and silhouette of the ornament, and thin needles were used to pierce the remaining parts (usually with a diameter of 0.3–0.5mm). To pierce the pattern, a layer of fabric was placed under the cartoon (2 layers of a terry towel or thick geotextile with a density of 250–300g/m² are best suited for these purposes). After piercing, the cartoon was turned over and laid on a smooth surface, after which the remaining paper was sanded around the holes from the needle with sandpaper on a hand grater. For cleaning, we used P-100 grit sandpaper.

Order and technology of painting restoration

The painting was done with acrylics. Whitewash "Indeko-plus" from Caparol was chosen. The color palette was mixed using Vollton- und Abtonfarbe D230 Dufa dispersion dyes. This paint has good hiding power and is resistant to mechanical stress, and also has a fairly high moisture resistance. On a previously prepared primed surface, 2–3 layers of imprimatura were applied. Then, after the paint had dried, the cardboard was positioned, fixed on masking tape, and the drawing was transferred with powder (finely grated coal). After that, the body of the ornament was painted (usually in 2 layers) and the drawing was transferred again with powder. The advantage of transferring a drawing with powder is the ability to quickly transfer the drawing many times and the absence of drawing lines from a pencil. The contours of the ornament pattern were emphasized by a smooth thin outline no more than 2mm thick.

After that, small details were prescribed, contouring was performed. The outline was outlined in a warmer brown shade.

Painting is performed according to the color scheme, that is, all shades of colors are mixed in advance in containers with a volume of 1–3 liters, depending on the area of the surface to be painted. For ease of use, the colors are poured into jars with a volume of 100 and 40 ml. Thus, the entire set of colors used is at hand when working. In painting, gradations and transitions from one color to another were used within the outline of the ornament drawing. The last stage of work on writing the ornament was the outline drawing. The edge contrast allows the body of the ornament to be painted softer in tone, and also emphasizes the elasticity and movement of the lines, which corresponds to the main technique of painting in the style of Ukrainian national romanticism and Art Nouveau.

Restoration of Poznański Palace – Museum of the City of Łódź

Łódź is a representative example of a city in Central Europe where the architecture has undergone numerous adaptive changes since the end of World War II [32]. It is also worth mentioning that the city of Łódź is referred to as the "Polish Manchester" due to a similar layout of the city streets and its strong connections with the textile industry.

The industrial character of the city was a key factor influencing its architectural and spatial form. After the political turn of 1989, Łódź was greatly affected by the overlapping processes characteristic for a post-industrial and at the same time a post-socialist city [33].

After the nationalisation of the textile industry in Łódź in 1945, the magnificent and well-preserved palaces and factory villas (belonging to the wealthiest city families: the Scheiblers, Poznańskis and Heinzels [30]) were transformed into public buildings such as museums, schools of higher education, art academies or city council offices.

Particularly noteworthy are monumental palaces from the late 19th and early 20th century, belonging to the family of wealthy cotton factory owners of Jewish origin – the Poznanskis. The buildings of the Poznanski family empire were subject to numerous changes in ownership and thus also functional changes after World War I.

Comparing examples of 20th-century adaptations of buildings in Łódź with adaptations of buildings in Poltava, we can find many similarities between the transformation of the city hall in

Poltava and the fate of Izrael Poznański's palace located on Ogrodowa Street. The building in Łódź was designed and executed in several stages, from 1898 to 1902, by architects Juliusz Jung, Dawid Rosental and Adolf Zeligson. Originally, the building was intended to be a representative seat of one of the wealthiest factory owners in Łódź at the turn of the 19th and 20th century, currently it is the seat of the Museum of the City of Łódź. At the same time, it is one of the most interesting factory owner's residences of the 19th century in Europe (Fig. 7).



Fig. 7. The former Poznański Palace (now – Museum of the City of Łódź).
Photo by A. Pawłowska, 2022.

The building combines various and extremely decorative, dynamic French forms in the style of the Second Empire, concealing magnificent interiors with a monumental staircase and representative rooms: the dining room and the mirror room.

The function of the building, erected for Izrael Poznański, was subject to many transformations, from its original function as a residence, through the Treasury Office (right after World War I), the seat of the Voivodship Office (in 1927–1939), the seat of the Civilian Board of the 8th German Army (during the Nazi occupation of Poland). After World War II Poznański Palace again became the seat of the Provincial Office of Łódź. In 1975, the provincial authorities abandoned some of the rooms in the palace and handed them over to the newly established Museum of the History of the City of Łódź (from 2009 Museum of the City of Łódź), which in subsequent years began to successively take over other interiors [29].

From the very beginning of its existence, the museum institution started the reconstruction, renovation, revalorization and conservation of the palace in order to restore the representative building to its former glory. As a result of conservation work and the Museum's acquisition of subsequent historic rooms of the palace, the rooms have largely regained their original appearance. Between 2017 and 2020, the Izrael Poznański Palace underwent another thorough conservation restoration, which in addition to the façade and roof, included a significant part of the museum rooms within the basement and first floor.

Particularly noteworthy are the adaptations made to meet the needs of people with disabilities, especially the way in which inaccessible to visually impaired people architectural details and wonderful decorative *panneaux* in the Large Dining Room are presented. The arrangements in the interiors of the Museum of the City of Łódź were made as part of various programs, e.g. 3D models of textile machines were created as part of the project "Wokół Wielkiej Łodzi" (the project was co-financed by the Museum of Polish History within the framework of the 'Patriotyzm Jutra' programme). The spatial boards were created as part of the project carried out together with the University of Łódź "Sztuka łódzka w kontekście sztuki europejskiej. Wykluczeni/Włączeni" POWR.03.01.00-00-T141/18.

Significant here are spatial boards (typlographics) showing paintings from the main Dining Room in the Palace of Izrael Poznański by Smuel Hirszenberg (1865–1908), with allegorical themes. This room has a sumptuous decor referring to the art of the court Baroque. The whole decoration has its own clear ideological programme emphasized by monumentality, splendour and symbolism.

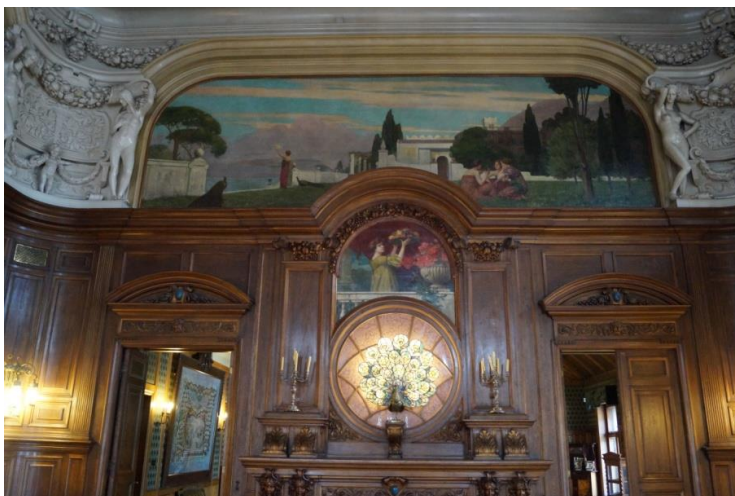


Fig. 8. "Farewell" by Samuel Hirszenberg (1903) in the interior of the Dining Room.
Photo by A. Pawłowska, 2022

The interior decoration comes from the last palace reconstruction started after 1900, shortly after the death of the senior member of the family, Izrael Poznanski. Therefore, the symbolic decoration of the northern wall is dominated by elements that speak of immortality, transience and the cyclical rebirth of life. In 1903, Samuel Hirszenberg, upon order of the Poznański family, painted a series of decorative paintings for the representative interiors of the Palace, which at that time was undergoing redevelopment. The Dining Room is decorated with four oil paintings, up to the present day preserved in situ. Three of them, "Farewell" (Fig. 8), "Entrance" ("Horseman against the city upon a hill") and "Muse", fitted into the decorative frieze running under the ceiling. The fourth painting (*panneaux*), entitled "Girl with Fruit" ("Fortuna"), was placed above the fireplace. All paintings were permanently glued to the wall. The programme of painting and sculpture decoration of the dining room interior can be read as a symbolic story about the Poznański family and the "promised land".

It should be added here that the convex tyflographic charts presenting the paintings to people with sensory disabilities are always supplemented with co-call Audio Description (from Latin *Audio* (pertaining to hearing, sound) and Latin *Descriptio* (pertaining to drawing, describing) is a verbal description of visual content conveyed aurally to blind and partially sighted persons) that fully describe the presented objects, which enables visually impaired visitors to better understand the content of the paintings [32].

Conclusions

Studying the experience of repurposing historical objects in Poltava and Lodz for city museums and the peculiarities of their functioning and restoration made it possible to conclude that the main problem is to adapt the building to the new conditions of the urban environment and to new functional requirements, as well as to find a compromise between the demonstration of the building itself (where with exteriors preserved authentic interiors, made at a high artistic level) and a demonstration of the museum exposition.

The main difference in the urban environment is the increase in traffic, which in turn is a source of adverse effects on historic buildings (and on museum visitors), such as air pollution, increased noise and vibration levels. Studies of the impact of noise and vibration environmental loads in urban areas from vehicles on cultural heritage sites require in-depth study. Determining the allowable normative indicators of impact on the object as a whole and on individual decorative elements will allow in the future forming general world normative principles and methods of protection of objects of world cultural significance.

The problem of reasonably adapting historical buildings for use by people with disabilities is in itself quite complex, since the means of ensuring accessibility (ramps, lifts, visual and tactile elements of accessibility) significantly change both the external and internal appearance of an architectural monument. Traditionally, the most difficult task is to ensure accessibility for people moving in wheelchairs, since such a device requires the most significant changes in the architectural and planning structure of the building (ramps, elevators or lifts, special requirements for the width of doorways, corridors, stairs, specially equipped toilets etc. A common practice that allows a compromise between the requirements of accessibility and preservation of the authentic appearance of a building is the construction of the most significant space-planning accessibility elements (ramps, elevators, lifts (including inclined ones – on existing stairs), specially equipped toilets etc.) in minor parts of the building, less artistically valuable, and / or where authentic interiors have not survived.

But in the case when the building is used as a museum, the main task is not so much to ensure movement around the building for people with disabilities, but also to provide them with the opportunity to fully familiarize themselves with the museum exposition. Here, the most difficult task is to provide such an opportunity for people with visual impairments. The experience of the Museum of the City of Lodz in tackling the problem of accessibility deserves a detailed study. It should be recognized that, despite the use of such means of ensuring accessibility as tactile exhibits, audio guides describing the exhibition and explanatory plates in Braille and tyflographics, the problem is far from complete and requires further research in this area.

Another problem is related to the preservation of authentic painting in the interiors of such objects. Using the example of the Poltava Museum of Local Lore, it is shown how, due to external reasons, the authentic decor of the building was lost, and subsequent restoration and restoration work could not fully achieve the authenticity of the paintings, which required a more thorough restoration in 2021. It is argued that the guarantee of the restoration as close as possible to the original is to conduct thorough pre-restoration research.

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