

RESTORATION AND PRESERVATION PROCEDURE OF ARCHITECTURAL MONUMENTS. RAILWAY STATIONS WITH MONUMENTAL ART OF THE SOCIALIST PERIOD (ON THE EXAMPLES OF UKRAINE AND POLAND)

Mykola ORLENKO¹, Yulia IVASHKO^{2,*}, Wojciech NIEBRZYDOWSKI³,
Hubert TRAMMER⁴, Michał KRUPA⁵, Krystyna PAPRZYCA⁵

¹Ukrrestavratsiia Corporation, 6 Boryspilska Street, Kyiv, 02099, Ukraine

²Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine

³Białystok University of Technology, Faculty of Architecture, 11 O. Sosnowskiego Street, 15-893 Białystok, Poland

⁴Lublin University of Technology, Faculty of Civil Engineering and Architecture, 40 Nadbystrzycka Street, 20-618 Lublin, Poland

⁵Cracow University of Technology, Faculty of Architecture, 1 Podchorążych, 30-084, Cracow, Poland

Abstract

The article analyzes two examples of restoration socialist era railway station buildings and monumental art works. The difficulty of restoration with the reconstruction of Kyiv railway station building was that during the Second World War it was partially destroyed and many structures were in disrepair; the finishing technique of exterior facades and interiors has been changed several times. In the station building centre under the lobby a new flooring of metal structures was arranged, escalators were arranged, the roof was replaced with a copper one with existing structures reinforcement.

The stages of restoration and repair works of the upper and lower pavilions of the Warszawa Powiśle railway station are analyzed. In 2008–2009, the upper pavilion was renovated to restore the original appearance. The stone floor and glass back wall made of glass blocks were replaced with new ones. In 2009, the lower pavilion of the Warszawa Powiśle railway station was converted into a cafe-club with a change in the internal functional scheme.

The example of the new railway station in Oświęcim shows a positive example of the transfer of the mosaic in the interior of the old station building by transferring it to the new minimalism-style station building facade.

Keywords: Restoration and preservation procedure; Railway stations, Socialist period, Ukraine, Poland

Introduction

The attitude to the heritage of architecture and art of the Soviet domination period is still a topic for discussions and debates: as a result of the lack of the defined criteria for aesthetic assessment of these objects, as well as of the works of monumental art of that period, they are not listed in the monument protective registers and are destroyed gradually.

The modern methods of preservation and restoration of such complex objects are described using as examples the unique objects of the socialist era – the Central railway station in Kyiv and Warszawa Powiśle railway station; and the new station building in Oświęcim, where the mosaic dismantled from the old station was installed on the new façade. They are

* Corresponding author: yulia-ivashko@ukr.net

positive examples of the preservation of the monumental art of the socialist period, especially since in Poland during that period, the original techniques of ceramic panel pictures were used according to the local technologies.

In case of the Central Railway Station in Kyiv and the railway station in Oświęcim, given the lack of printed articles on the research topic, the authors used information from project documentations and other sources.

In case of Warszawa Powiśle railway station there are some printed articles and chapters in books, but the subject is not fully presented. The station was a part of the PhD thesis by one of the authors (Hubert Trammer), which was not published yet. The work on the PhD was connected with numerous visits in situ and taking photographical documentation, as well as the interview with people involved in the restoration and preservation process.

The analysed scientific sources can be classified according to the following aspects:

a) general issues related to monument protective and restoration activities – they define the main problems of cultural heritage degradation and the existence of architectural monuments in the structure of a modern city (this fully applies to railway stations as monuments of transport architecture, especially since these are always objects of the increased load, which are acting monuments, without restrictions that are imposed on such attractions as museums, churches, palaces, castles [1-7];

b) the issues related to the experience of specific restoration technologies – in particular, stone [8-10] and concrete [9, 11];

c) the issues that deal with the approaches to art in the restoration industry are associated with the study of monumental art in railway stations [12];

d) the general issues of reconstruction of stations, highlighted in scientific metric sources [13, 14];

e) the design documentation for Kyiv railway station building [15–19];

f) the sources connected with the topic of Warszawa Powiśle railway station [20-24], list of protected objects [25];

g) the sources covering the Polish monumental art of the socialist era [26, 27].

The study of sources and design documentation allowed us to identify issues requiring disclosure and analysis:

– comparably with other architectural monuments these stations are less highlighted in scientific sources;

– it is necessary to analyse the structural schemes, materials and problems of their emergency state, especially amid a specific increased load on these objects in comparison with other architectural monuments;

– issues of decorative finishing of facades and interiors and the methods of using works of monumental art in station buildings require additional highlighting.

Materials and methods

The tasks of the research determined the list of general scientific methods. Methods of historical analysis (to analyze the history of the construction of railway stations and stages of restoration and reconstruction work); comparative analysis (to compare restoration measures of different periods and their effectiveness, the composition of the chemicals used and restoration technologies, analysis of changes in style trends of the different times in Ukraine and Poland), graphical-and-analytical method (for the analysis of design proposals), were chosen as the main ones. Materials of design and restoration documentation and full-scale photographs were used as basic materials.

Results and discussion

Restoration of Kyiv central railway station

History of construction and problems of destruction during the Second World War

The Kyiv main railway station building faces the station square. It is a symmetrical rectangular building with a combination of three rectangular volumes combined into one whole, where the axis of symmetry passes through the main volume with the central hall; to the left and right of it there are two identical two-story halls with closing structures on both sides where the service premises are located. There is a basement under the entire building. The structural scheme of the station consists of a system of bearing external and internal longitudinal and transverse walls, reinforced concrete columns, ceilings, arched vaults with reinforcement ribs [15].

The history of the station, its materials, constructive schemes, concepts of interior solutions are reflected in the design documentation of Ukrrestavratsiia Corporation [16]. The previous design of the station by V. Shchuko (1913) remained unrealized, although at the first stage of construction, before the beginning of the First World War, the first thousand piles with a square section 30x30cm were installed. All other piles were not installed, because after installation of the first piles it was found out that they did not reach the reliable soil layers and "floated" in the running sand of the former Lybid riverbed. It was necessary either to use longer piles or to install them only on compact weak soils. A grillage was arranged on the installed piles, and the walls of the station basement made of rubble stone on cement mortar were built on the grillage. It was the end of the first stage of construction.

In the 1920s, one of the largest competitions was held: competition in 1927 for the completion of the construction of the new Kyiv railway station. The specialized design bureau was established for planning and design; they completed the project in 1930, and it was approved. However, it was proposed to decorate the facade in the style of constructivism based on the stylizations of the Ukrainian Baroque. A significant stage in this period was the study of the state of the old pile foundations, arranged according to the project of V. Shchuko. In the 1920s, they tested the piles which were not driven, for the ability to carry the load according to the new project. The competitive project by O. Verbytskyi and P. Alyoshyn included the following proposals for the use of materials:

- structures: the main structure of the lobby, two halls and suburban traffic lobby – reinforced concrete frames, in the lobby coupled with the use of the gap between them for ventilation, the reinforced concrete roof rafters are connected with the frame structure of the ceiling slabs;

- finishing: to decorate the main facade with natural stone (grey or grey-red local granite); the planes around the hall windows can be covered with warm limestone; hall wall pilasters can be decorated with dark granite or polished labradorite to emphasize the reinforced concrete frame structure of the halls; the bottom of the concourse – from natural cameo; along the axis of the main march, there is the figure of Lenin; the lower walls of the concourse are decorated with tiles or natural marble.

On archival photographs in the historical note to the project, one can see how the initial idea of the station and the building itself was changing during its operation. The new station was put into operation on February 23rd, 1932. It was a building with a combination of constructivist features and modernized motives of Ukrainian architecture in an elevated faceted gable of the central part, with a system of reinforced concrete frame structures with brick filling; the concourse was spanned with parabolic reinforced concrete arches filled with a thin reinforced concrete slab between them, which followed the outline of the arches. Above the arches and the slab, which were a monolithic structure, there was the roof. The waiting rooms were spanned with reinforced concrete frames filled with brick walls. The basement ceiling was the reinforced concrete ribbed slab on the reinforced concrete columns and walls; the ceilings of

the first floor were beamless reinforced concrete; the side building extensions are made of brick with a reinforced concrete frame.

In 1932, a two-colour finishing of the planes of the walls of the facade was carried out from the side of the station square, and the planes of the walls of the facades were partitioned into the rustication joints. In the same year, a competition was held for the interior decoration of the concourse, restaurant, waiting rooms, passage, passenger and luggage rooms. In 1934, it was decided to change the colour of the plaster of the facades; for the texture of the Terrazite plaster, it was chosen chippings of 3, 5, 7 and 10mm. The colours of the plaster were chosen: light grey-sandy and light earthy red due to admixtures of marble chips for the brightness and durability of colours; cement and marble flour (mainly) became the principal binder of Terrazite plaster, which was an outstanding technological achievement of the 1930s. At the same time, additional decorative details in the shape of rods and cornices with Terrazite plaster of a different texture and shade were made. It was proposed to change the way of processing the lower part of the facades made of granite-labradorite: from hammering out with a boucharde notching under the general background of plaster for polishing for colour density. There were also proposals concerning roofs, and it was decided to add two wings on the left and right sides, reaching the length of the main facade of 400–500m.

The proposals for the interior decoration concerned the arrangement of a fountain with a bronze lion, sculptural friezes and sculptures in the concourse, finishing with caissons and rods of the surfaces of the concourse vaults. The halls and restaurant were to personify the synthesis of architecture, sculpture and painting through the use of ornaments, caissons with sculptural palmettes, monumental murals, sculptural bas-reliefs.

Thus, during 1913–1943, Kyiv railway station changed its appearance, and the project was repeatedly corrected. Subsequently, a clear restrained composition was embodied with a combination of motives of constructivism and stylized "Ukrainian style" – in the silhouette and solution of the central volume and interiors.

In 1943, German troops retreating from Kyiv burned down the station and partially destroyed it with explosives. The blast wave rolled the reinforcement rods in the reinforced concrete, but the structure did not fall.

A survey in 1944 determined that the building of Kyiv railway station suffered from an explosion and a fire: the main supporting structures were not deformed; however, the reinforced concrete floors of the left and the right halls on the first floor and the basement ceiling, a part of the reinforced concrete floors above the extension in the tambour were destroyed; explosion damaged and deformed the three-hinged arch of the concourse, it was held by its connection with the neighbouring arches through a reinforced concrete slab-vault and thanks to the reinforced concrete crossbar that connected the arches at the level of the first floor; the blown-up arch had a visually fixed subsidence, which indicated a shift between the slab and the arch; it was necessary to check the condition of the columns, the foundations of the columns and walls, the subsidence of the foundations and the crossbeams. All damaged structural elements had to be removed and replaced; slightly damaged – had to be restored. The damaged elements were removed by cutting concrete and reinforcement pneumatically and partially manually. The main focus was on strengthening the emergency hinge of the concourse arch. For the work, it was proposed to use hydraulic jacks, and to strengthen the bottom of the arch by putting a metal shoe of a welding structure on it and on top of the foundation with its subsequent concreting inside; to lift the arch to the metal shoe, metal wall brackets were welded for support.

In 1946, the station reconstruction continued with more monumental decoration with ceramics, marble and granite. H. Domashenko designed the decorative finishing of the halls in the style of the Ukrainian Baroque with tinted stucco ornaments. However, lively discussions on the decoration of facades and interiors continued, including with the participation of the author of the project, O. Verbytskyi. In the schematic design approved by O. Verbytskyi, for

sculptural and pictorial panels in halls No. 1 and No. 2, the following topics were proposed [16]:

- sculptured panel "The heroism of the Patriotic War and the liberation of Kyiv, the capital of Soviet Ukraine, from the invaders";
- above the columns – high reliefs of the images of a Soviet Army soldier, a scientist as the personification of the intellectuals, a miner-metallurgist, a woman-collective farmer;
- panel "The restoration and rise of the national economy of the Ukrainian SSR";
- above the columns – high reliefs of the images of a worker, a woman-collective farmer, a railway worker, a civil engineer as the personification of the intellectuals;
- panel "The January Uprising of 1918";
- panel "Kovpak's deep-penetration raid";
- panel "Ukraine in the Soviet Union";
- in the caissons of the ceiling, there were 14 panels based on the main themes of the Soviet Constitution.

However, these plots were repeatedly corrected.

In the restaurant hall, there was a landscape painting. In the 1960s, painting with the symbols of the railway was done between the cartouches.

The next period in the history of Kyiv railway station was associated with the "struggle against architectural extravagances" after 1955.

The reconstruction with the restoration of Kyiv central railway station in 2000–2001

Reconstruction and restoration of the Kyiv central railway station became the largest construction project in Ukraine in terms of the scope and cost. The reconstructed station was built by the famous architect O. Verbytskyi in 1932 in the place of the former small station in the neo-Gothic style. The scale of the new station was supposed to symbolize the advanced architecture of the Soviet era. The station building was blown up by the Germans during the Second World War; since then, it has been in emergency state. The conducted building structural survey proved the necessity to strengthen the structures and to restore the stucco decoration and paintings in the interiors, at the same time, turning the principal railway station of the country into the object of the contemporary level. The reconstruction and restoration works were preceded by the study of archival sources, which determined the interiors' concept. The original grey colour of the facades was retained, but the old plaster layers of the previous repairs had to be renovated. The station exterior was brought in line with the original design of O. Verbytskyi.

The project provided for the strengthening of the supporting structures of the basement, walls, columns and ceilings by taking them into a concrete "jacket"; replacing of the roof parapet and strengthening of the roof.

The main problem was related to the fact that the basement ceiling, as a result of the bombing of the station by the Germans, fell into the basement, and later, during the restoration of the station, they put the floor on top of it, and it reduced the height of the basement to 3 m. Besides, the destroyed ceiling lay on the bases of columns, and it led to corrosion of the reinforcement in the columns, a decrease in their loadbearing capacity and the emergency state of the columns in their lower part. It was necessary to dig out the basement, remove the destroyed ceiling and make two engineering collectors for plumbing and electrical communications. For this purpose, the basement ceiling marks were lowered by 2.5m by deepening the foundations, as a result of which the basement height increased to 4–5m. Digging out the columns proved almost complete corrosion of the reinforcement in their lower part and the loss of their loadbearing capacity (Fig. 1). Therefore, the works were carried out to strengthen the columns of the station using metal structures. In the lower supporting part of the columns, metal bases were welded to increase the bearing capacity of the columns; the body of the column itself was taken into metal straps, followed by reinforcement and concreting. They

made a new base of columns, which rest on the foundation, and transferred loads through the metal structures.



Fig. 1. Condition of the reinforced concrete column before renovation.
Photo from the funds of the Ukrrestavratsiia corporation, 2001

In the centre of the building, under the hall, a new basement ceiling made of metal structures with principal and secondary beams was installed under the old basement ceiling; the escalators were set up.

The roof covering was replaced with a copper one; the existing roof structures were strengthened.

In October – December 2000, a detailed survey of the facade cladding of the railway station building was carried out. A full-scale and laboratory analysis of plaster samples from different periods was carried out [17]. So, in 1928, the facades were decorated with stone decorative plaster in the style of constructivism. In 1935, as a result of reconstruction, the colours of the facades were changed. Due to destruction during the Second World War, the plaster was partially destroyed. For the third time, the plastering of the facades was changed during the renovation work of the 1950s. During the last repair in 1996, the damaged areas of plaster were removed and new plaster "like Terrazite" was added with finishing of rustication with fine-grained spray with cement mortar polymer and painting of rods with cement with PVAD were removed.

The problem was that in all historical notes the qualitative and quantitative compositions and colours of finishing plaster solutions of various periods were rather sparingly described, moreover, during the destruction of the building, the chemical properties and colour of the plaster changed under the influence of high temperatures. That is why full-scale examinations and laboratory analysis of samples of finishing of different periods were carried out:

- the period of construction of 1928–1932;
- reconstruction period in 1935;
- the period of post-war reconstruction in the 1950s.

The full-scale visual examination was carried out by tapping the surfaces of the facades, by ultrasound examination and by probing with the disclosure of plaster layers of all periods

(for the most part, from two to four layers of plaster of different times were preserved). 30 samples were taken from the probes for laboratory analysis. As a result, it was found that three main types of stone and Terrazite plasters were used, with different degrees of preservation due to the initial strength of the plaster, types of binders and aggregates, adhesion of layers to each other, and operating conditions. The plaster was additionally covered with cosmetic spray, painting and grouting with cement and lime compounds.

In particular, it was found that for the time of construction in 1928–1932, pebble plaster it was used of dark grey colour, fragmentarily saturated with "scallops" and textured by the method of processing by boucharde hammer. This plaster consisted of 2–3 layers (ground coating of a cement-sand-marble mixture with a cement binder to the aggregate ratio of 1:2 (grey Portland cement – 1 part, quartz sand aggregate with a fraction of 0.5–2mm – 1.5 parts, filler – marble chips with a fraction of 2–3mm – 0.5 parts); medium plaster layer for the total rough plastering with a fine-grained fraction of grey granite up to 1.0mm and a ratio of cement to granite chips of 1:1.5; and a final decorative finishing cover of pebble plaster with a thickness of 10–12mm of the medium-grained structure and dark grey, almost black, colour, with a cement: aggregate ratio of 1:1–1.2 (grey Portland cement – 1 part, filler – anthracite flour fraction 0.1mm and sand up to 2mm – 0.2 parts, aggregate – dark grey granite crumb fraction 1.5–5mm – 0.8 parts, aggregate – an admixture of pigment – yellow ochre – 0.05 parts, filler – a grey admixture of marble chips fraction 2–3mm – 0.1 part).

A laboratory study of plaster samples of the left facade proved its somewhat different chemical composition (cement-sand-marble mixture, compositionally identical to the composition of the ground coating – the first layer with the addition of granite dark grey crumbs with a fraction of 5–10mm).

This original plaster of 1928–1932 survived on a significant part of the facades. It was noted for its strength, good adhesion to the masonry of the walls. It suffered destruction as a result of an explosion and fire, fragmentary fracturing was recorded in the probe without destruction of the solution or layering of layers. This plaster could be used as a primer for modern restoration plaster.

In 1935, Terrazite plaster was applied to the original plaster, which was used as the ground coating, the front surface was textured with a boucharde hammer, revealing mica and marble grains, the thickness of the plaster was 10–15mm. It was used a decorative Terrazite plaster of light pinkish-ochre, less durable in quality than the original layer (composition: lime-fluff – 1 part, white cement – 0.1–0.2 parts, filler – quartz sand with a fraction of 0.1–1.0mm – 1.3 parts, aggregate granite crumbs of light grey and grey colours with a fraction of 2–4mm – 0.3 parts, filler – marble crumb with fraction 3–4mm – 0.6 parts, filler – mica with fraction 3–7 mm – 0.1 part, filler pigment – red ochre – 0.05–0.1 parts) and greyish-cream colour; for light grey rods – lime-cement mortar with filler – fine-grained quartz sand with finely milled mica with compaction and smoothing of the surface to a shine "like polished marble" to contrast with the textured Terrazite plaster. The composition of the solutions for rods: a mixture of lime with white cement – 1 part, fine-grained quartz flour with a fraction of 0.1–0.2 mm – 1 part, mica with a fraction of up to 1mm – 0.05 parts. Since this plaster was less durable, it was poorly preserved; it was noted its detachment from the ground coating, destructiveness, and contamination with soot from a fire. The next renovation of the 1950s had a negative impact, causing additional detachment of the plaster from the ground. The rods covered through transverse thin and hairy cracks, the grouting of which with finishing coat and painting did not bring any effect. Facade plastering in the 1950s "under the boucharde" was carried out with light grey stone plaster with marble chips and mica; in terms of chemical structure, it was a coarse-grained mortar with a large fraction of marble and mica up to several centimetres, with boucharde hammered surface textured (white cement – 1 part, lime dough – 0.1 parts, filler quartz sand of fraction 0.5–1.0mm – 1 part, filler marble crumb of fractions 1–3, 4–5cm and

mica with fraction 2–5cm – 6–7 parts). The rods were treated by applying a smooth cover over the old rods with cement: sand ratio of 1:2.

The surfaces were dirty. The plaster was in an unsatisfactory state, peeled off from the previous plaster of 1935; it was covered with cracks, especially on the rods. The original look was spoiled by the paint and splashes of later renovations.

In 1996, emergency measures were taken to remove emergency areas of the facade plaster and they were replaced with new plaster, which was discordant in texture, then the facades were painted with polymer cement mortar.

The basement was in an unsatisfactory condition and was lined with labradorite due to pollution, chips, slabs delamination from the wall, depressurization of the joints between the slabs.

Based on the results of a survey of the technical condition of the facade plaster finishing of the railway station, it was assessed as unequal on different facades.

The following evidences of emergency state were recorded on all facades:

- peeling of plaster from the wall and delamination of stone and Terrazite plaster between each other (on the main facade on the right risalit, peeling of plaster up to 70%, on the east side facade – 80%)
- cracks in the plaster, mostly along the downpipe line;
- unaesthetic state of the texture of surfaces;
- cracks in the rods and smoothing of their edges;
- the appearance of textured "patches" as a result of repairs to the plaster of the facades;
- wetting of plaster and masonry along the drainpipes;

The main reason for the unsatisfactory condition of the facade plaster was the loss of mechanical strength due to the action of fire in the intermediate plaster of 1935, which led to a loss of adhesion between the plaster layers. The plinth cladding was also in an unsatisfactory condition.

The Schematic Design of the restoration work on the facades was supposed to:

- perform 100% replacement of the Terrazite plaster coating to stone plaster of 1928-1932 years;
- dismantle all drainpipes, replace them with new copper ones and paint them with oil paint to match the colour of the walls;
- to reveal, by tapping and ultrasound examination, areas of plaster delamination on the facades, remove the exfoliated plaster and replace it with a cement-sand mortar of the composition 1:3;
- dismantle the existing plinth cladding and replace it with a new one made of labradorite;
- to carry out repairs and, if necessary, partial replacement of metal and wooden roof structures;
- to carry out fire-retardant and bioprotective measures of wooden structures with "Uniterm" mastic solution, and treat metal structures with K-9 anti-corrosion compound, followed by coating with Endotherm fire-retardant mastic;
- dismantle two layers of metal roof covering and replace the roof lathing, make a new roof covering of 0.55mm thick sheet copper;
- complete replacement of door and window openings;
- apply a new layer of decorative plaster and architectural rods, after cleaning the surfaces from dirt, apply the plaster on a stainless-steel metal mesh;
- to carry out all work on the facades following the chemical and technological recommendations [15].

The volumes of repair of the masonry of the walls of the facades were determined after the removal of the plaster and these works took place in the following sequence:

– the dismantling of deformed sections of masonry with deep destruction of brick and mortar due to mechanical influences and soaking and their re-laying and additions with new M100 brick on M50, Mrz35 mortar. To connect the augmented masonry with the main massif, the old brick was moistened with water and primed with an aqueous solution "Acryl", "Acryl" was also added into the water of the mixed masonry mortar.

– replacement of destructed crown cornices with new ones made of bricks or moulded profiled blocks made of lightweight concrete;

– strengthening the masonry by injecting through cracks in the following sequence of actions: preparatory stage (marking the places of installation of injection pipes, surface filling of cracks with a mortar to a depth of 1–2cm, drilling wells with a crack opening width of less than 20mm, installing injection pipes into wells using gypsum mortar, washing the cracks and moistening the masonry), the main stage (preparation of the injection solution, injection works by blowing of the solution), the final stage (removal of the injection pipes, clearing the masonry from the gypsum solution, filling the left depressions with the solution);

– strengthening of wall masonry by the method of F. Lizzie "Raticolo cementato" (reinforcement of brickwork) [4];

– the walls around the perimeter were taken into concrete shirts with subsequent waterproofing.

The technological scheme of finishing facades with Terrazite plaster by analogy with the period of reconstruction in 1935 was as follows. It was decided to use a pink-ochre Terrazite plaster coating with a medium-grained texture.

First, the loss of stone plaster was supplemented with a cement-sand mortar of the composition 1:4. To enhance the plastification and adhesion of the mortar to the walls, 5% "Acryl 60" was added to the water. The hardening layer of the supplements is grooved horizontally with wavy grooves.

After levelling the surfaces, a ground coating is applied under the finishing Terrazite plaster coat (Portland grey M400 cement – 1 part, lime dough – 0.2 parts, sand sifted from the coarse fraction – 4 parts, "Acryl 60" admixture (before mixing water) – 0.1 part). A mortar for the ground coating is of constant composition and consistency. After application to the surface and levelling, the ground coating is cut into wavy grooves with a depth of 3mm at a distance of 30–40mm. The ground coating is kept until the surface dries evenly (usually after 7–12 days). The standard thickness of the ground coating is 20 mm, this layer should be stronger than the finishing Terrazite plaster coat, therefore the grade of the ground coating mortar should be at least 10MPa.

The thickness of the Terrazite plaster coat is 10–12mm, the decorative Terrazite mortar is prepared from dry mixtures followed by mechanized mixing of the components. The materials are mixed in the mortar-mixing machine in the following sequence: cement with dry pigments, then alternately – sand, stone flour, stone crumb, mica, at the end – milk of lime, water with acrylic. It is better to apply the pigment in the form of a ready-made aqueous paste and add it to the mortar together with the lime dough. The mortar is kept for 25–30 minutes, mixed again and then applied to the wall.

The decorative layer is applied once on a certain part, a layer of spraying of the decorative solution is applied to the ground coating, and after it has set, the main layer is applied, which forms the thickness of the decorative cover. It is evenly levelled and compacted with a floater while removing shrinkage cracks.

The finishing Terrazite plaster layer cannot be repaired due to the formation of coloured and textured spots.

A separate technology has been developed for the textured finish of the Terrazite plaster layer. The medium-grained texture is obtained by scraping the plaster surfaces with a scraping tool with small teeth. In the process of scraping, a thin film of the covering layer is removed from the applied plaster, the surface of the plaster becomes grainy and resembles the chipping of sandstone

with mica [18]. The surfaces are scraped in 0.5–1 hours after the mortar has set, after checking the surface condition. The scraping time for one capture in warm weather is 3–4 hours, in cold weather – 6 hours. The solution film removed in scraping is 1 mm. After processing, the surface is swept, then moistened with water with a brush 3–6 times a day for 3–5 days. It should be noted that a uniformly granular texture can be obtained by sandblasting with a strong solution, textured surface finishing can be performed with a boucharde hammer if the strength of Terrazite plaster is close to stone plaster. The Terrazite layer can be obtained by spraying; in such a case, the ground coat should be the same colour as the Terrazite and at least 5 mm thick. After applying and levelling the solution, the beacons are cut down to a depth of at least 5 mm and earn a colour solution of the soil. On the freshly applied colour ground coating, spray Terrazite mortar with a broom with a thickness of at least 5 mm. When the Terrazite plaster layer dries, its surface is smoothed with an edge using a floater or a levelling board that reflects protruding and weak aggregate grains. After that, weak aggregate grains are swept away with a broom, as a result, a surface is formed like a cyclized one.

Architectural rods are made of cement-lime mortar with a decorative covering layer, and the surfaces of the rods must be smoothly smoothed. When performing plastering works on the eaves, a stainless-steel mesh with a plaster layer thickness of more than 3 cm is used.

Since the facades of the Railway Station are in the extremely unfavourable conditions of a highly gas-laden and polluted atmosphere, for dust and water repellence and easy flushing with water, a hydrophobic treatment of the restored surfaces with hydrophobic compounds was provided immediately after the completion of the restoration finishing work.

Since the drainpipes are located in the wall channels and, due to the leakage of the joints of the pipe elements, the masonry and the plaster of the channels are constantly moistened and destroy building materials, to prevent moisture penetration into the walls after the restoration of the facades, before applying the Terrazite plaster layer, waterproofing protection of the channel surfaces was performed after their repair and plastering, as well as horizontal and inclined surfaces of cornices, window sills, decor. CERINOL DS capillary cement-based coating was used.

After the injection and strengthening of the walls with the "raticolo cementato" method, an antiseptic treatment was conducted. Fragments of masonry walls with old stains of wetting and salt efflorescence and visual evidence of biological damage (on the cornices, abutments to the walls of the canopies, the walls of the basement under the cladding) were subject to antiseptic treatment. Antiseptic treatment was carried out with domestic biocides of a wide spectrum of action (a mixture of dithiocarbamic acid derivatives of sodium hydroxide and urotropine in water in the form of a 1–5% water solution of the drug to protect against mould fungi). Protisol's treatment was carried out in two stages with intermediate drying and removal of salts from the treated surface with CAPAROL Olafir fluosilicate, after which plaster was applied or it was painted over the plastering.

They also carried out anti-corrosion protection and painting of metal elements; protection and painting of elements made of galvanized metal and copper; waterproofing of terraces and balconies; restoration of a labradorite base, where cement-polymer mixtures of a special purpose such as "Cerinol DS" from "Deuterman" and mechanical fastening on stainless steel anchors were used for gluing the plates. Large losses were filled by inserts of granite of a similar composition [18]. For adhesion of stone inserts to a brick base, cement mortar M100 was used (Portland cement M400 – 1 part, fine-grained sand – 3 parts, acrylic dispersion – 10% by weight of the binder), often with inserts fixing on stainless anchors. Modern synthetic adhesives and resins were used for gluing the inserts to the place of loss to the face of the stone, which was especially useful for gluing small inserts with narrow seams, after which the seams were putted with a material imitating the face of the stone blocks.

Small losses of stone material of the blocks were supplemented by masses based on natural or synthetic binders using aggregate made of flour and granite crumbs and a pigment

similar in composition to granite facing [18]. A separate section of the project concerned the architectural solution of interiors, where the decorative finish was determined by a system of ceilings: the ceiling above the ground floor in the left and right halls were flat reinforced concrete; the ceilings above the first floor in two halls and the ceiling of the concourse were vaulted with reinforcement ribs.

The documentation of previous renovations in 1979 was preserved. The technology of carrying out work on the preparation of surfaces in interiors in 1979 provided for the following stages: repair of plastering (jointing, cleaning and filling cracks with a lime-cement-polymer composition, and small cracks 1–2mm circle – grouting with a plaster compound, for greasing individual places and filling the surface of application of styrene-butadiene putty), painting surfaces with ready-made water-based paint on a completely dry basis [19].

In the hall, the walls and vaults were covered with cement plaster; the stucco decoration was made of the alabaster overlay. The finishing was done with oil paint on an oil primer without preliminary covering with drying oil. No traces of repairs from 1956 to 1979 have survived on the walls and arches of the hall. The colourful layers were very dirty; all the protruding parts were covered with a thick layer of dust, which was difficult to remove. As a result of painting the stucco decoration, its relief and outlines were changed, with the loss of detail. On the vaults, blistering of the paint layer and peeling off paint were observed, the colour of the walls faded. In the course of field examinations, it was revealed that on the walls, vaults, stucco decoration, the paint layer was applied without preliminary surface preparation or preliminary covering with drying oil. The 1979 project provided for painting with modern paints, in colour as close to the original as possible. The use of lightfast pigments was envisaged. The preparation of the surfaces included the complete removal of the paint layers from the walls and arches, cleaning the stucco decoration, grouting the surface of the plaster, covering all surfaces with drying oil and painting in two stages with a paint composition based on a water-based paint. Repair and restoration work in 1979 was carried out by specialists from Kyiv workshop of the Ukrainian Special Scientific and Restoration Production Department [19].

At the time of the survey in 2000, the walls of the hall and four halls were plastered (many layers of glue and oil paints were recorded), the friezes of the walls and ceilings had a moulded decorative finish.

The plastering of the walls of the halls was in an unsatisfactory condition. The plaster of the ceilings of the halls and the hall was strong, thin layered, made of gypsum, lime and sand.

The decoration of the panels of the walls of the hall and halls was made of ochre-pink marble slabs, the repair inserts were made of light grey marble, however, during the operation of the building, the marble of low quality underwent changes, rusty and dark spots appeared on it, and pollution penetrated deep into the pores of the marble. All that together led to damage of stone and its nonaesthetic appearance.

The granite floor of the hall was in satisfactory condition; cracks, repairs, a change in the colour of the stone due to the penetration of pollution deep into the pores were recorded in the artificial stone mosaic floors of all halls.

The Schematic Design of the restoration work on the interiors of all the halls included:

- clearing plaster from dirt and removing paint layers and degraded plaster;
- to repair plaster walls and ceilings and paint them with modern paints;
- clearing the surface of stucco decoration from dirt, removing peeling paint, adding stucco plaster decoration and removing ideological Soviet symbols and colouring;
- restoration and painting of metal window fillings;
- replacement of marble cladding of panels and portals;
- replacement of mosaic floors in the halls with granite ones;
- partial restoration of the granite floors of the lobby and replacement of granite stairs in connection with the construction of the escalator;
- restoration of paintings and mosaics in the halls and the hall;

- restoration of chandeliers in halls with replacement of shades and gilding with previous cleaning and restoration of the hall chandeliers;
- installation of new chandeliers, wall lamps, decorative partitions;
- to provide for the accounting of the modern architectural image [15].

The painting in interiors was in an unsatisfactory state (monumental art was an integral part of the Soviet period), therefore, during the restoration process, it was restored and supplemented with new mosaic cartouches in the lobby according to Verbytskyi's unrealized plan. According to the architect's idea, it was decided to decorate the interiors with light marble panels, dark granite and labradorite columns, mosaic floors of waiting rooms, massive, gilded chandeliers, stucco decoration and monumental art. It also had to solve the difficult task of hiding modern engineering communications in the interiors. The sketch proposals were developed by the artist V. Totskyi and N. Kosenko, who proposed mosaic panels in the lobby against the background of landscapes, images of outstanding sights of Kyiv – St. Sophia Cathedral, the Dormition Cathedral of Kyiv-Pechersk Lavra, the Column of Magdeburg Law, the of Ukrainian steppes and in the halls – oil painting on the theme of Ukrainian landscapes, T. Shevchenko among the people, Ukrainian dance, etc. This concept also caused a lively controversy, in particular, either it is necessary to completely change the theme of monumental art in the interiors, or it is worth trying to restore the old mural painting.

As a result, it was decided that the style of the Kyiv railway station had changed several times, so it is necessary to separately develop the style of the interior of each hall. In hall No. 1 of the former restaurant, it is required to fix the old painting and, if necessary, after additional examination, to restore. It was decided to remove the symbolic ideological images, and in their places to make picturesque landscapes in the style of existing ones. In hall No. 2, in cartouches, it was agreed to place landscape paintings, in the cartouches of the main hall – mosaics that represent Kyiv as fully as possible [15] (Fig. 2).

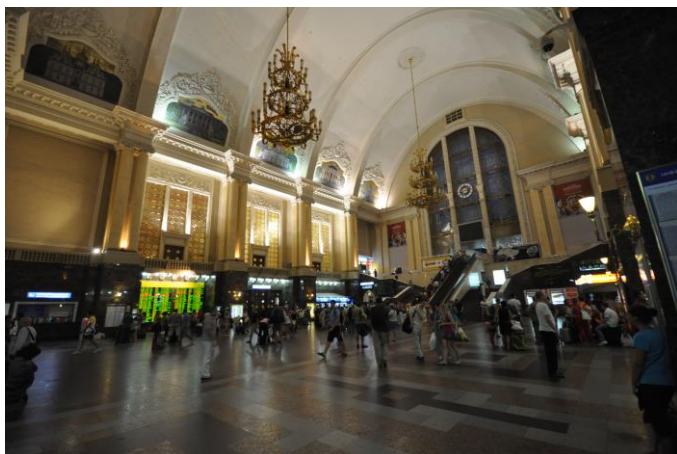


Fig. 2. Interior of the station building main hall after restoration.
Photo from the funds of the Ukrrestavratsiia corporation, 2020

The main problem was to carry out work under the conditions of an operating station.

The station building was renovated in 2001 during seven months and equipped with modern technical equipment (Fig. 3). Escalators with access to the passage and underground storage rooms were installed in four halls.

The platforms were paved with figured tiles, metal structures and canopy coverings were replaced, turnstile fences were installed.



Fig. 3. Main facade of the station building after restoration.
Photo from the funds of the Ukrrestavratsiia corporation, 2020

The renovation of the Warszawa Powiśle railway station ***The Warszawa Powiśle railway station project***

This part of the article presents the Warszawa Powiśle railway station. The main architects of the station were Arseniusz Romanowicz and Piotr Szymaniak who started their carrier in the 1930s. They soon became part of the team working on the project of the Main Railway Station in Warsaw (Warszawa Główna), which was at that time under construction. They continued to work on the project of this station during the Second World War under German Occupation. The not fully completed Warsaw Main Station was destroyed at the end of the Second World War. In 1946 Arseniusz Romanowicz and Piotr Szymaniak won the competition for the new main railway station in Warsaw: Warszawa Centralna. In order to continue the work on that station in 1950, Romanowicz and Szymaniak were employed as the general designers at the Central Office for Railroad Studies and Designs in Warsaw. The work on that project was many times interrupted. At those times of interruptions, Romanowicz and Szymaniak were directed to work on the projects of the other railway stations and stops. This included the row of the stations and stops on the cross-city line. Warszawa Wschodnia was a reconstruction of the big station, while Warszawa Stadion, Warszawa Powiśle, Warszawa Śródmieście, Warszawa Śródmieście WKD and Warszawa Ochota were newly built railway stops dedicated for suburban and regional traffic. Some of the stations on the Warsaw cross-city line were listed as historical monuments.

Arseniusz Romanowicz and Piotr Szymaniak worked in the bigger teams and cooperated also with other specialists. The architectural form in many cases was in much extend following the ideas of structural engineers. The structural engineer Ludomir Suwalski arranged the meeting of Arseniusz Romanowicz and Piotr Szymaniak with later world known, structural engineer Waław Zalewski who proposed them the forms of thin shell structures used on Warszawa Ochota and Warszawa Powiśle stations. Thus, Waław Zalewski should be mentioned among the architects. The architects of the Warszawa Powiśle station were Arseniusz Romanowicz, Piotr Szymaniak, Waław Zalewski, Bożena Gumińska, Jan Viličič, Waława Nasierowska, and Barbara Stypułkowska; the structural engineers: Ludomir Suwalski, Waław Zalewski, Stanisław Błachnio, Wiesław Bronowski, Mieczysław Gołąb, and Henryk Wolski; the visual information was designed by Wiktor Gessler; the neon signs and inscriptions designers were Bronisław Wycech, Jacek Wyczółkowski, Mieczysław Zasadzień, and R. Świderski. The project was developed from around the half of the 1950s. The station was opened for use in 1963 [20].

The Warszawa Powiśle railway station was expected to be called Warszawa Skarpa (Warsaw Escarpment) due to the location right at the escarpment, where the exit from the tunnel leading to the Warszawa Centralna station was located. The location directly at the exit of the tunnel has led to the use of a dual side platform system, which was found by designers less advantageous due to the lack of flexibility in the use of platform space. The spatial arrangement

of the station remained unchanged throughout the design work. On the other hand, the architects developed several variants of roofing over the platforms and station pavilions.

The topography of the area determined the design of the station that consisted of two pavilions – the upper one (in the upper part of the slope, Fig. 4) and the lower one (under the slope, Fig. 5). The architectural expression of the upper pavilion resembles the pavilion of the Warszawa Ochota railway station (also designed by the team of Romanowicz and Szymaniak following the proposal of Zalewski). However, there are many differences between the two pavilions, since the plan of the upper pavilion in Powiśle is in the shape of a parallelogram, not a rectangle. The double-conoid roof, further sloping down the stairs, flows smoothly from a downward curve to an upward curve. The lower pavilion has a roof in the shape of an inverted dome. Its glass walls run partly along the perimeter and partly along the chord of the roof. The authors' assumption was to contrast the pavilions with the historical form of the neighbouring Prince Józef Poniatowski Bridge [21].



Fig. 4. The upper pavilion



Fig. 5. The lower pavilion

The platforms have four evenly spaced pairs of roofs, which are reinforced concrete shells supported by reinforced concrete V-shaped pillars. They are connected above the tracks by steel joints, which are also the supporting structure of the electric traction network. The descent from the platforms to the Powiśle district was also carefully designed. The exits from the platforms were covered with reinforced concrete arched roofs. Above the underpass under the tracks on the sides of the tracks, the reinforced concrete slab was applied. Its edges were turned upwards. A composition of glazed openings of various shapes was created between the walls and roofs. The stairs down were covered with the light asbestos roof over the steel structure. Under the roof, the ceiling cladding was made of perforated melamine fibreboard with the strip of lights on the axis. The pillars supporting the roof were built on the low reinforced concrete wall. Originally, there were glazing behind them.

Inside both pavilions of the Warszawa Powiśle station, mosaics were made of black and white glazed tiles of 2x2cm size. The tiles were arranged in alternating white and black stripes. The descent from the platforms was also finished in an artistic way. The unevenly spaced black glass squares were embedded in the plaster of its walls. In the visual information at the station, Wiktor Gessler used inscriptions made of raised black letters.

Conditions of the construction and temporary conversions of the Warszawa Powiśle railway station

The Warszawa Powiśle railway station, thanks to its direct connection with the surrounding landscape and greenery, did not degrade to the same extent as other stations of the Warsaw cross-city line. Partial degradation was mainly caused by contamination with excrements and garbage. This problem mainly concerned the passage under the viaduct of the Prince Józef Poniatowski Bridge, directly adjacent to the station and connected to one of its platforms. In the late 1980s, the station's maintenance was quite good. At the turn of the 1980s and 1990s, however, a significant problem emerged. It resulted from acts of vandalism in the form of spontaneous graffiti on the walls, which often happened after football matches.

Over the years of using the station, many repairs were carried out, most often ad hoc and disordered. Due to frequent devastation, the people responsible for the station decided to dismantle the most vulnerable elements. In 1996, the staircase glazing was removed, as well as the roof covering made of perforated laminated fibreboard. For the rest of the glazing, the reinforced glass began to be used. After the asbestos roof covering was damaged, it was replaced with the profiled sheet.

In the period between 2003 and 2005, the concrete roofs of the platforms, which are also the load-bearing structure of the traction network, were plastered and painted yellow. This was a detrimental effect as these elements originally exposed the raw texture of the concrete. Such brutalist textures were rarely found in Polish architecture [22]. The lower pavilion of the station ceased to function as the ticket office. Around 2005, it was rented by a glass company.

In 2006–2007, in connection with the renovation of the tunnel of the cross-city line, the platforms of the Warszawa Powiśle station were also renovated. The surface of the platforms was changed from asphalt to red-coloured concrete. Concrete slabs were used along the edges of the platforms, and the concrete pavement was laid behind them. The previously plastered roofs of the platforms were painted cream colour and the walls of the exit from the platforms towards Kruczkowskiego Street were painted pale yellow. At the same time, the front glass wall of the upper pavilion was replaced. The new glass curtain had much wider muntins than before. Unfortunately, the glazing in the upper part was dismantled. The former neon inscription "Warszawa Powiśle" was replaced with bright yellow coffered letters illuminated from the inside.

During the use the facilities of the Warszawa Powiśle railway station, roofing and wall surfaces were damaged many times – contamination, cracks and graffiti. The stone cladding of the platform side walls was also degraded. In the case of mosaics, the damage was mainly due to the detachment of individual tiles, as well as spray painting.

Renovation and conservation works

During the last 15 years, the facilities of the Warszawa Powiśle railway station have undergone two significant renovations. The first one was related to the upper pavilion (2008-2009) and the second to the lower pavilion (2009). Renovations of a lesser extent were also carried out. They were related to two events: "Wystawa średnicowa" ("Cross-town line exhibition", 2010) and the European football championship (2012).

In 2008–2009, the upper pavilion was renovated according to the project of the architectural studio MAAS (architects: Henryk Łaguna, Dariusz Hyc, Anna Drozdowska, Przemysław Zalewski). As a result of these works, the original forms and elements were restored. Black and white mosaic tiles of the same size as originally (2x2cm) were used. Most of the surface was decorated in the same way – alternating horizontal stripes of black and white tiles (Fig. 3). There were also some differences. Instead of the original tiles with sharp edges, tiles with rounded edges were used. The original placement of mosaic tiles on larger panels, which were fixed to the walls and other elements, was abandoned. In the case of kiosks, instead of the original arrangement with walls at the bottom and glazing above, entire openings were used, closed by shutters.

The original design of glass partitions in the outer walls of the pavilion was restored. Besides, double glazing was used instead of single glazing. The stone floor and the back wall made of glass blocks were replaced with new ones [23]. In the summer of 2009, at the front wall of the pavilion, the inscription "Warszawa Powiśle" and the PKP (Polskie Koleje Państwowe – Polish National Railways) logo in navy blue, made of illuminated coffered letters and lines, was placed on the steel structure supported by three pillars. This solution was not included in the renovation project and was not agreed with the renovation architects. The stairs leading to the platforms from the sides of the upper pavilion were equipped with lifts moving along them for transporting disabled people in wheelchairs.



Fig. 6. Mosaics in the upper pavilion

During the second renovation in 2009, the lower pavilion of the Warszawa Powiśle station was adapted for the cafe-club. The renovation works were carried out according to the

project of the Centrala architectural office (Małgorzata Kuciewicz, Tomasz Gancarczyk, Krzysztof Syruć, Jakub Szczęśny, Krzysztof Banaszewski).

The external glass curtain walls were replaced. In the interior, the existing floor was preserved as well as white and black 2x2 cm mosaic tiles arranged on the walls in horizontal stripes, one tile wide. The tiles removed from the disassembled elements were used to fill the defects in the remaining mosaics. The inscription "Warszawa Powiśle" on the roof was preserved and renovated. The name of the station was used as the name of the cafe-club.

During the renovation, the internal functional structure was changed. In place of the glass ticket offices, restrooms and toilets (for staff and guests) closed with a full wall were built. The central part of the interior was dedicated to the kitchen and sales space with the large counter made of concrete. The counter was painted in black and white square pixels with a size of 2x2cm. It was a variation on the mosaics used at the station. The composition was designed by Krzysztof Syruć. Ceiling lamps for the cafe were also individually designed [24]. Mechanical ventilation devices were installed on the roof. They were enclosed in rectangular cages, which are unfortunately visible from the outside.

The Warszawa Powiśle cafe-club has become a very popular meeting place. It functions also using the external space. As a result, the open character of the architecture of the lower pavilion of the station and the gradual transition of its interior into the surroundings are emphasized.

It is also worth mentioning other reconstruction and restoration works. In September 2010, in connection with the "Cross-town line exhibition" held at the railway station, the descent from the station platforms to Kruczkowskiego Street was renovated. Its walls were painted white, and glass squares were exposed in the repaired plaster (Fig. 4). On a fragment of the wall, a sketch of the project of the Warsaw Central Station was drawn. The raised letters defining the downward exit direction were painted black. Pretty soon, all these elements were covered with new layers of graffiti, which is still a problem.

In 2012, in connection with the preparations for the European football championship, the roofs of the platforms and platform descents were repainted. The yellow colour given these elements a few years later was replaced by the grey. Unfortunately, for incomprehensible reasons, their glazing was also painted grey. In the Warszawa Powiśle cafe-club, the counter was changed again. It was finished with vertical wooden strips painted black. The concrete part of the walls in the interior was finished in the same way. Later, the counter was replaced with a new one – higher and slightly moved to increase the space for service. It was covered with a new painting composition based on the motif of white and black squares, which, just like the previous one, was made by architect Krzysztof Syruć according to his design.

It should be emphasized that on July 24, 2012, the Warszawa Powiśle railway station was included in the municipal register of monuments of the Capital City of Warsaw [25].

Its inclusion in the register was the result of the initiative of Henryk Łaguna, the author of the renovation of the upper pavilion. The station is still used with great intensity. Thanks to the changes made, its space can meet the latest requirements, although in the case of stations from the socialist period it is difficult [12, 13].

Monumental art in the architecture of socialist period, the construction techniques and preservation

Monumental art played a significant role in public buildings during the socialist period, especially after the 1960s, often it was ideological role. In the Soviet Union, monumental art in public buildings had more ideological features in comparison with Poland, where mosaic panels did not have such a pronounced mass ideological message and were viewed primarily as a means of "humanizing the workplace" and "humanizing public space", which was the result of the cultural policy of the state. Their spreading was directly influenced by the idea of "educating society through art". Unfortunately, the topic of monumental art on the public building facades in the cities of Poland after World War II, remained insufficiently covered up

to the present; that's why the study was carried out based on the publications of T. Dobrowolski, Olszewski, Irena Huml and in the old press issues "Dziennik Polski", "Gazeta Krakowska" or "Echo Krakowa". The interest in this topic in scientific circles in Poland has arisen relatively recently.

Mosaics became the key form of monumental art of the post-war period. And here, we must pay attention to the fundamental differences between the themes in the Soviet Union and Poland: in the cities of the Soviet Union, mosaics of images of party symbols, Lenin, workers and peasants, pioneers and Komsomol members dominated, later, closer to the 1970s, mosaics with city landscapes and folk dances appeared. In Poland, at this time, the themes of mosaics were deprived of ideology, events from people's lives, and in general, among the created compositions, they were characterized by decorativeness, the forms were closer to the works of surrealists or metamorphic abstraction. Artists experimented with modularity, rhythmic repetition of the constituent elements, with the material, and the substrate, combining baked glass with stones, which provided texture effects. So, the mosaic effect depended on many components – the nature of the surface and the material used, colour, texture and shape, as well as the author's style of the artist. It can be safely argued that mosaics from the post-war period in Poland may constitute the image of Polish art in the post-war period since they were created by artists who also worked in other fields of art.

Concerning the state of preservation of works of monumental art of the socialist years in Ukraine and Poland, it should be noted, that many artworks were either destroyed or closed during the reconstruction or modernization of buildings. In Ukraine, this process also continued under the slogan of decommunization. Such works mostly do not have any official and legal status that would allow them to be preserved, and they are not recorded in the register of monuments. The issue of preserving the monumental art of the post-war period is associated with the study of types of ceramics and methods of making ceramic mosaics.

The types of ceramics and techniques in the post-war architecture of Krakow and Malopolski remain poorly covered in scientific sources. The original Polish technique *piropiktura* (Greek *Πυρ* (*pyr*) – fire, Latin *Pictura* – picture) was used, or, as it is also called, "painting with fire". "Piropiktura" consisted of spraying ceramic glaze in liquid form on a surface heated by gas or electric burners. As a result, the glaze was melted into the base, and the surface was covered with a durable decorative glaze. Depending on the chemical composition of the glaze, temperature and atmosphere in which the spraying process was made, it was possible to obtain several colours and shades from one type of base glaze" [27]. In this technique, the type and structure of the surface that the piropiktura had to cover was significant: concrete, rubble, stone or another surface. Piropiktura was also designed and suitable for large, monumental compositions that should be installed on buildings or in their interiors. In this case, a composition was created on separate slabs, which were then fastened to the wall and formed a complete pattern. A very relevant fact is that this technique did not require a burning kiln.

Mosaic compositions were also widespread. Often, for a specific task, they were transferred in separate fragments and were also enclosed on slabs that were attached to the wall as cladding. To create the mosaics in Krakow and Malopolski, the artists used prefabricated ceramic tiles, which could be standard or cut to suit the pattern. To enrich artistic or textured effects, they combined mosaics with other techniques or materials. For example, glass, stone or bas-relief elements were included in mosaics; mosaics were arranged on equal and specially formed surfaces [26, 27].

Facing ceramic tiles, which covered walls, partitions and pillars were widely used, and various decorative elements were also made from them. The advantage of this material was its thickness, which facilitated the creation of its surface relief through engraving, embossing and enabled using a wide range of glossy or matte colours. Most of the mosaics made from facing ceramic tiles are abstract compositions, although there are also decorations with images of human figures, animals and plant motifs. The production of such tiles was carried out by the

Kamionka cooperative in Lysye-Guri, the factory in Mielec (the cladding of the concert hall in the pumping room Novaya in Krinitsa), tiled houses in Krzeszowice and Bolechowice. In addition to the rectangular tiles, ceramic tiles of non-standard size and shape were made, but each time, proceeding from the main rectangular module. The tiles were attached to the wall with cement mortar, sometimes additionally attached to hooks. Often the spread of mosaics was caused by the activities of specialized factories, as was the case in the city of Oświęcim, where the Oświęcim Chemical Plant operated. In the town of Oświęcim, you can find examples of both ceramic and glass mosaics.

Since the main topic of the research concerns the restoration of railway stations of the socialist period, let us give an example of the contemporary railway station in Oświęcim. A new modern minimalist building was erected during 2019–2020 on the site of the demolished old train station of 1965. Originally, in the hall of the old station, above the entrances to the platforms and ticket offices, there was a long abstract mosaic created in 1964–65 by Kazimierz Gąsiorowski. He was a painter and the author of several mosaics in other regions of Poland, e.g. in Warsaw (the Pharmacy Building of the Warsaw Medical University, the Library of the Polish Association of the Blind, in the Old Town – mosaic clock), in Tarnów (Tarnovia Hotel) [26], in Lublin (the complex of the Rectorate, the Economics, the Law and Administration Faculties of UMCS).

The mosaic in Oświęcim is 24 metres wide and 4.6 metres high. It weighs 100 tonnes [28]. The mosaic consists of two parts: on the left side red and ochre colours with brown accents dominate; on the longer right-side beige and white with small black accents were used. Mosaic elements were mounted directly on a brick wall with the use of cement mortar. After the demolition of the old station, the mosaic, which is of historical and artistic value, was preserved and transferred to the main facade of the station, becoming its main focus (Fig.7).



Fig. 7. The mosaic on the main facade of the Oświęcim station building

An additional "flower mosaic" was created in front of the mosaic wall – a decorative flower bed with 2500 plants. This project also honours the memory of the victims of the Auschwitz-Birkenau camp.

The transfer of the mosaic was very difficult and required high precision. It began by preparing detailed documentation of the mosaic using a 3D scan of the surface. The next stage involved carrying out conservation analyses. They showed that the mosaic could only be transferred using the “stacco a massello” method (with the entire base). The mosaic was divided into four sections. Each section, six metres wide, was well protected before it was mounted anew on the elevation of the new railway station. The wall with the mosaic had to be set up on a new foundation (the wall was added to the south elevation of the new railway station), and specialist conservation treatment had to be applied, as a result of which the mosaic regained its original colouring [28].

Conclusions

The comparative analysis of the construction materials, building structures and the problems of restoration of transport structures – station buildings, has confirmed that local architectural and construction traditions were of decisive importance, and they influenced the general image of the station. Using the example of Kyiv railway station, it has been determined how the change in stylistic preferences in the Soviet Union caused changes in the proposals, image and technologies of decorative finishing. In the initial period, the image of Kyiv railway station was determined by the expressive features of constructivism; later, it was superimposed with the stylistic preferences of the Stalinist and Khrushchov periods, and the like. The operation period of the station and the destruction during the Second World War has proved that the strength of the original decorative plaster of facades significantly surpassed the methods of decorative finishing of the facades of the pre-war and post-war years. By describing the various periods of the station's existence, the influence of ideology on the stylistic design of interiors is demonstrated.

It is interesting to compare the image of the Warszawa Powiśle station with Kyiv railway station, as this comparison has proved the gradual changes in the approach to the designing of transport structures – from the constructivism period to the period of "struggle with excessiveness" of the 1960s – which were also distinct in Poland.

Monumental art occupied a significant place in transport facilities – railway stations. In different periods of the functioning of Kyiv railway station, the concept of using monumental art in interiors, which mainly had ideological significance, has repeatedly changed. The comparison of the concepts of monumental art in Kyiv with monumental art in the form of mosaics of Warszawa Powiśle and Oświęcim stations has confirmed that in the 1960s the ideological plots were replaced with abstract-coloured compositions with a limited number of colours in Poland. The scientific novelty of the presented research lies in the polyphonic nature of the analysis of the topic of restoration of monuments of transport infrastructure: since the authors used a time section analysis within one structure, showing its existence in time, and a geographical section analysis, showing several transport structures in Ukraine and Poland. They demonstrated the specificity of trends in the construction of railway stations in different countries. The topic of research of railway stations – architectural monuments is open for further study: though these objects are visiting cards and "transport gates" of cities working systematically under a load of human flows, unfortunately, are poorly covered in scientific sources.

References

- [1] P. Spiridon, I. Sandu, L. Stratulat, *The conscious deterioration and degradation of the cultural heritage*, **International Journal of Conservation Science**, **8(1)**, 2017, pp. 81-88.

- [2] L. Pujia, *Cultural heritage and territory. Architectural tools for a sustainable conservation of cultural landscape*, **International Journal of Conservation Science**, **7(1)**, 2016, pp. 213-218.
- [3] P. Spiridon, I. Sandu, *Muselife of the life of public*, **International Journal of Conservation Science**, **7 (1)**, 2016, pp. 87-92.
- [4] M. Orlenko, *The system approach as a means of restoration activity effectiveness*, **Wiadoomości Konserwatorskie – Journal of Heritage Conservation**, **57**, 2019, pp. 96 - 105.
- [5] M. Dyomin, A. Dmytrenko, D. Chernyshev, O. Ivashko, *Big Cities Industrial Territories Revitalization Problems and Ways of Their Solution*, **Proceedings of the 2nd International Conference on Building Innovations, ICBI 2019, Lecture Notes in Civil Engineering**, vol. **73**, 2020, Springer, Cham, pp. 365-373.
- [6] I.C.A. Sandu, P. Spiridon, I. Sandu, *current studies and approaches in the field of cultural heritage conservation science. harmonising the terminology in an interdisciplinary context*, **International Journal of Conservation Science**, **7(3)**, 2016 , pp. 591-606.
- [7] O. Florescu, I.C.A. Sandu, P. Spiridon-Ursu, I. Sandu, *Integrative Participatory Conservation of Museum Artefacts. Theoretical and Practical Aspects*, **International Journal of Conservation Science**, **11(1)**, 2020, pp. 109-116.
- [8] L. Luvidi, A.M. Mecchi, M. Ferretti, G. Sidoti, *Treatments with self-cleaning products for the maintenance and conservation of stone surfaces*, **International Journal of Conservation Science**, **7(1)**, 2016, pp.311-322.
- [9] K. Stefański, P. Gryglewski, Y. Ivashko, A. Dmytrenko, O. Ivashko, *Revitalization specifics of industrial enterprises made of brick and concrete. Examples of Lodz, Kyiv and Poltava*. **International Journal of Conservation Science**, **11(3)**, 2020, pp.715-730.
- [10] P. Kulikov, M. Dyomin, D. Chernyshev, D. Kuśnierz-Krupa, M. Krupa, *The issues of preservation and revitalization of residential, public and industrial buildings from the second half of the 19th and early 20th centuries in Kyiv and Krakow*, **Wiadoomości Konserwatorskie – Journal of Heritage Conservation**, **60**, 2019, pp. 140-146.
- [11] M. Furtak, J. Kobylarczyk, D. Kuśnierz-Krupa, *Concrete in adaptations and extensions of historic objects (on selected examples from Porto)*, **Wiadoomości Konserwatorskie – Journal of Heritage Conservation**, **58**, 2019, pp. 15-22.
- [12] 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**, **XXI**, 2019, pp. 171-190.
- [13] S. Rzepnicka, D. Załuski, *Innovative Railway Stations*, **Proceedings of World Multidisciplinary Civil Engineering-Architecture-Urban Planning Symposium 2017, WMCAUS 2017**, 4 November 2017, Prague, **IOP Conference Series: Materials Science and Engineering**, **245(8)**, 2017, Article number 082009.
- [14] A. Kulakov, Y. Krakovtseva, *Problems of transit area interior space of railway stations including those referred to monuments of architectural heritage*, **Proceedings of International Conference on Construction, Architecture and Technosphere Safety 2019, ICCATS 2019**; Chelyabinsk, **IOP Conference Series: Materials Science and Engineering**, **687(5)**, 2019, Article number 05505.
- [15] ***, **Reconstruction of Kyiv-Passenger Station complex on the Southwestern Railway. Schematic Design. Main station. Restoration work. Explanatory note**. Kyiv, 2001. (Original language: Реконструкція комплексу станції Київ-пасажирський Південно-Західної залізниці. Ескізний проект. Головний вокзал. Реставраційні роботи. Пояснювальна записка. Київ, 2001).
- [16] ***, **Historical Note. Railway station (1927–1937)**. Kyiv, Vokzalna Sq. **Architectural monument. Protection No. 8-H, order of the State Committee for Construction, Architecture and Housing Policy dated: June 2, 1999, No. 128**, Kyiv, 2000. (Original language: ***, **Історична довідка. Вокзал залізничний (1927-1937 рр.)**). м. Київ,

- Вокзальна пл. Пам'ятка архітектури. Охоронний № 8-Н, наказ Державного комітету будівництва, архітектури та житлової політики від: 2.06.1999 р. №128, Київ, 2000).
- [17] ***, **Passport for repair and painting of the facade. Reconstruction of the complex of Kyiv-Passenger station of the Southwestern Railway**, Kyiv, 2001. (Original language: ***, **Паспорт на ремонт та пофарбування фасаду. Реконструкція комплексу станції Київ-Пасажирський Південно-Західної залізниці**, 2001, с. 18).
- [18] ***, **Architectural monument of the 30s of the 20th centuries. Railway Station in Kyiv. Recommendations for the technology of repair and restoration facade finishing works**, Kyiv, 2001. (Original language: ***, **Пам'ятка архітектури 30-х р.ХХ ст. Залізничний вокзал у м. Києві. Рекомендації з технології ремонтно-реставраційних фасадних оздоблювальних робіт**, Київ, 2001).
- [19] ***, **Railway Station in Kyiv. Book No. 1. Colour passports for the central hall**, Kyiv, 1979. (original language: ***, **Вокзал в г. Києве. Книга №1. Паспорта окраски центрального вестибюля**, Київ, 1979).
- [20] H. Trammer, *Timeline of Professional Career and Creative Practice of Arseniusz Romanowicz and Piotr Szymaniak* [in:] **ARPS. The Architecture of Arseniusz Romanowicz and Piotr Szymaniak**, Fundacja Centrum Architektury, Warszawa, 2012, p. 303.
- [21] A. Romanowicz, *Przystanki ruchu podmiejskiego w Warszawie: Ochota, Śródmieście, Powiśle/Suburban traffic stations in Warsaw: Ochota, Śródmieście, Powiśle*, **Architektura**, 1, 1964, p. 9.
- [22] W. Niebrzydowski, „As Found” to bush-hammered concrete – material and texture in brutalist architecture, **IOP Conference Series: Materials Science and Engineering**, Vol. 471 (7), Article number 72016, IOP Publishing, Prague, 2018.
- [23] J.S. Majewski, *Pawilony stacji Ochota i Powiśle w Warszawie / Pavilions of Ochota and Powiśle stations in Warsaw*, **Architektura-Murator**, 7, 2009, pp. 44-49.
- [24] T. Fudala, *Modernized. Conversations with the authors of renovation designs for Warsaw's Cross City Line Stations*, **ARPS. The Architecture of Arseniusz Romanowicz and Piotr Szymaniak**, Fundacja Centrum Architektury, Warszawa, 2012, pp. 259-263.
- [25]* * * , https://zabytki.um.warszawa.pl/sites/zabytki.um.warszawa.pl/files/GEZ_Aktualny_wykaz_zabytk%C3%B3w_2016.08.pdf .
- [26] B. Kostuch, **Kolor i blask: ceramika architektoniczna oraz mozaiki w Krakowie i Małopolsce po 1945 roku** (Colour and shine: Architectural ceramics and mosaics in Krakow and Małopolska after 1945), Muzeum Narodowe, Kraków, 2015..
- [27] B. Kostuch, **Czarodziej z Łysej Góry. Opowieść o Bolesławie Książku** (The wizard from Łysa Góra. The story about Bolesław Książek). Wydawnictwo Marginesy, Warszawa, 2020, pp. 40-41.
- [28] K. Białas, **Mozaika ze starego dworca w Oświęcimiu uratowana**, 03.2020, <https://www.whitemad.pl/mozaika-ze-starego-dworca-w-oswiecimiu-uratowana-ozdobionowy-dworzec/>.

Received: March 12, 2021

Accepted: October 25, 2021