Methods of Restorations and Reconstructions of Russian Architectural Heritage in Harbin

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Abstract. The study is devoted to the study of the current state of the historical environment of Harbin to restore it. Harbin was formed in 1898. It became a major metropolis in northern China for 120 years. But initially, the city was formed by builders of the Chinese Eastern Railway. A large number of significant buildings were created by Russian architects and engineers. They are listed in the list of architectural monuments at present and placed on the protection of the state. And if the monuments are in relatively satisfactory condition, then most of the historical buildings are in a ruined state. But still, continue to be exploited. Questions about the possibility of restoring historical objects are raised in the article.

1. Introduction

The relevance of the research is connected with the need for the restoration and reconstruction of historical objects, the improvement of their performance, adaptation to modern conditions.

The history of the formation and development of Harbin, the formation of stylistic features is reflected in the works of N. P. Kradin [1], N. E. Kozyrenko [2, 3], A. P. Ivanova [4], S. S. Levoshko [5], Works by A. S. Schenkov [6], A. A. Kedrinsky [7], E. M. Mikhailovsky [8], S. S. Podyapolsky, G. B. Bessonov, L. A. Belyaev, T. M. Postnikova [9], Yu. V. Raninsky [10], A. N. Asaul, Yu. N. Kazakov, V. I. Ipanov devoted to the reconstruction of historical sites and the historical urban environment. The works of A. Yu. Becker [11], B. E. Sotnikov [12] are devoted to the questions of the harmonious combination of the old and the new buildings. The possibility of adapting old buildings for new functions was examined in the research by G. Muller-Mennes [13], F. Astorg Bollak [14].

A large amount of work was carried out by Chinese experts: a survey of historical objects (technical condition, degree of preservation), their systematization and measurements, and historical and cultural value. The Code of Architectural Monuments (Segmag LLC, head Yang Hongwei, 2002, Harbin, PRC) [15, 16, 17] was made based on the results of this work. Heilongjiang Center for the Protection of Historical and Cultural Heritage (head historian Li Xiushao) and the faculty of the Polytechnic University (Harbin, China) do a lot of work [18].
The task of the study is to study the methods of restoration and reconstruction used in Harbin, the analysis of experience with the historical environment, field studies of old buildings, the development of projects for the restoration of the historical environment.

2. Analysis of the experience of restoration of monuments of architecture of Harbin

Working with historical objects and the historical environment in Harbin is done using methods that differ from traditional methods of restoration and reconstruction. The archaeological or analytical method is at the head of the modern science of restoration in Russia and Europe. He proclaims strict validity criteria. But empirical, compilation, synthetic methods [19] and updates are becoming more common among Chinese architects.

The empirical method [8] is one of the most common methods for restoring historical buildings in Harbin. It is presented here as a major overhaul. The historical image of the objects is preserved in general form as a result of using this method. But buildings, including architectural monuments, have lost a large number of decorative details. Restoration of the Trading house "Matsuura and Co." can be cited as an example (see Figure 1).

Renewal is a way in which the old building is rebuilt anew in a different style and on a different project [7]. "Trading rows on the Pristan" can be cited as an example (see Figure 2). The original image of the monument of architecture has changed dramatically and almost nothing remained of the genuine elements as a result of numerous rebuilding's.

Figure 1. Trading house "Matsuura and Co."
Old photo [16] and modern look (photo by D. A. Lava)

Figure 2. Trading rows on the Pristan. Old photo [17] and modern look (photo by D. A. Lava).
Reconstruction of many buildings in Harbin can be classified into examples of stylistic restorations [9]. The method involves the correction of the existing image of the historical object. Volumes and parts not previously owned by it are added to the building. Numerous reorganizations of the Railway Hotel are related to such restorations.

The reconstruction of the architectural monument of the restaurant “Tower for a Young Family” can be cited as an example of a method of compiling or attempting to restore a historic building based on theories and analogies [8]. The proportions and shape of the towers were severely distorted into the building.

The method of adapting old buildings to modern functions (the location of cafes and restaurants, shops in the lower floors of the building) [20] was widely used in the Harbin reconstruction. But the adaptation is not limited to changes in the planning decisions in the historic buildings of Harbin. Often, window and doorways are replaced by modern storefronts. Modern facing materials and designs, signs, and advertisements cover the decorative elements.

Chinese architects often use this method of the reconstruction as a superstructure to the historical buildings of the upper floors. The first Harbin post office can be given as an example. The restorers moved the decorative elements from the second level to the third, which changed the original image of the building and damaged the original details of the building.

Having considered the restoration methods that were used by Harbin restorers, we can conclude that they were wrong. Therefore, the authors proposed a series of restoration projects to correctly restore the preserved Russian heritage in Harbin. The developed project proposals relate to historical sites that have high architectural and artistic characteristics. But they were not assigned to the group of monuments for any reason.

3. Field survey of architectural objects
The historic building along the street through and its courtyard are the objects studied (see Figure 3). The building refers to the neoclassicism style by the stylistic features that are given in the monograph Kozyrenko N.Y., Hongwei Ya., Ivanova A.P [2].

![Figure 3. The appearance of the building. Main facade (photo by D. A. Lava).](image-url)

The courtyard façade (see Figure 2) of a historic building and buildings inside its courtyard have the characteristics of «brick» architecture.

The object under investigation has a rectangular plan and is distinguished by an archway. The courtyard is represented by two more buildings, which are located on the left and opposite the historic building. A high brick wall encloses the courtyard on the right. The ruins of a pre-existing structure are preserved there.

The physical state of the historical objects was analyzed. Damage to supporting structures, including through cracks and masonry delamination, were found. The depreciation rate of the main
building is 80%. It is classified as a dilapidated structure. The percentage of wear of the other two buildings is determined to be 60% and referred to the unsatisfactory condition.

The architectural and artistic condition of the main building is classified to a high degree of loss of architectural and artistic qualities. Fragmented destructions of decorative elements on the main facade (parapet, entablature, semi-columns, brackets, arch rusts, belts, frames of openings, balcony slabs, stucco moldings) are noted. There are no fillings on most openings. Damage to the eaves, belts, frames of openings from the courtyard on all studied buildings was revealed. Part of the first floor of the main building is closed with modern decoration, signs, and advertising. The courtyard facades (see Figure 4) of all objects are cluttered with outbuildings that spoil the historical appearance of the buildings.

![Figure 4. The appearance of the building. Courtyard facade (photo by D. A. Lava).](image)

4. Building restoration project

The authors proposed the use of the analytical method as the main method of restoration. It involves the disclosure of the monument (it is necessary to remove modern layers, which spoil the historical appearance of the building) and addition (repair of cracks, mechanical restoration of repetitive details).

Lost brackets that adorn the belts between the floors can be repaired by analogs of the details that have remained on the object.

Restoration of decorative elements of the first floor will be the most difficult stage of restoration. The recreation method can be applied here. The method was described by researcher A. A. Kedrinsky in his work: «Recreation includes all the tasks of ordinary restoration, but the ultimate goal is the complete restoration of the monument that has suffered greatly from time, alterations and destruction of the monument» [7]. The author writes that the rationale must be given for each restored part - the involvement of science-based analogs. Elements from preserved fragments of a historic building can act as such a counterpart.

Since the left side of the facade has two symmetrical parts relative to the central portal. Therefore, the entrance from the left side, richly decorated with stucco, can become an analog for the same entrance on the right side. The extreme window opening of the first floor can act as a counterpart for the restoration of three other stained-glass windows.

The nature of the division of rust, cornices, and facing of the basement can be traced to the right side of the building in the area of the arched opening.

Symmetrical windows on the right side of the central portal act as analog for restoring window fillings on the left side of the second floor.
Restoration of the courtyard facade of the building down the street. Through and two adjacent objects are proposed to be carried out in the same ways as the main one using disclosure and addition. Dismantling of all commercial buildings and repair of supporting structures must be made. Further, damage to parts of belts, square niches, crackers, cornices, framing openings must be eliminated using the method of mechanical restoration of duplicate parts. Repair of balconies and staircases adjacent to the corners of two restored buildings is required. Glass and doors restore at the end.

As a modern function, the project proposed to re-equip the object in the mini-hotel "Dreams about Harbin." The hotel chain with this name will be the Harbin brand, which will be reflected in the interiors, the decision of the courtyard, signage and corporate style.

The restoration results (see Figure 5, 6) are highlighted in the album of reconstruction of historical objects. Proposals are being reviewed by Chinese experts at this time.

![Figure 5. Restoration project. Main facade. Drawing by D. A. Lava.](image)

![Figure 6. Restoration project. Courtyard facade. Drawing by D. A. Lava.](image)

5. Conclusion
Thus, the analysis of the experience of restoration of monuments of the architecture of Harbin was carried out. The methods most commonly used by Chinese restorers - empirical (overhaul), synthetic, compilation, renovation, adaptation, were identified. Errors in the restoration of monuments: the loss of decorative elements, the distortion of proportions and the distortion of the original architectural appearance were discovered during the study.

Historical buildings in disrepair, but with high architectural and artistic characteristics, have been preserved in Harbin. The authors proposed a restoration project to protect them from demolition and distortion of the historical appearance. The project is based on the analytical method.
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