

# *Research on the Exterior Decoration Performance of Harbin Russian-style Buildings Based on Architectural Language*

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**Abstract:** The most direct way to reflect the architectural style is the architectural appearance, which changes and improves the image and appearance of the city. The most important part of the building appearance is the building facade decoration. Harbin's Russian-style architecture not only has a strong Moscow architectural charm, but also organically combines with Chinese architectural elements in its development. Therefore, according to the architectural appearance of Russian-style buildings, this paper interprets the shape, materials and characteristics of functional components such as building facade features, colors, doors and windows, roofs, balconies, canopies, and columns through architectural language, showing the decorative performance of Russian-style buildings. The style provides a certain reference value for cultural and artistic research for the protection and transformation of Harbin Russian-style buildings.

## 1. Introduction

Architecture is the symbol and fixed frame of history. Harbin's Russian-style architecture dates back to the end of the 19th century, representing the century-old history of Harbin's modern development. Today, we can understand the origin, historical context and development process of the city from these legacy Russian-style buildings. The appearance of the building can not only directly reflect the architectural style and the image and appearance of the city, but also the architectural art displayed through the decoration of the building facade is the concentrated expression of its urban culture and symbols. Russian architecture not only has the characteristics of typical European style, but also has the characteristics of Russian architecture. At the same time, it has local characteristics after it was introduced into China. Through the interpretation of architectural language, the beauty of form, decoration and material of building exterior components not only has high artistic research value, but also provides a certain reference value for the protection and transformation of Russian-style buildings in Harbin.

## 2. Building Appearance

### 2.1. Structural Form

From an architectural point of view, a structure is a structure formed by using building materials according to certain mechanical principles and laws to form a spatial force system with skeleton action. Due to the different building materials used in the building structure, the visual effects of the performance are also different <sup>[1]</sup>. Many Russian-style buildings in Harbin are made of natural materials and the most natural and economical form of decoration, exposing the true colors of the materials and reflecting the ingenious structural design.

### 2.2. Functional Components

The functional components of the architectural appearance are mainly the components with the function of use. For example, windows solve lighting and ventilation, but they also occupy a large proportion on the exterior wall of the building. It is necessary to express both practicality and decorative beauty, so that the exterior of the building can show the overall charm. The door solves the entry and exit of people and the penetration of space. The shape and size of the door affect its use function, and it should also coordinate with the overall building.

### 2.3. Decorative Components

A building without decoration can only be simply said to be a house to meet the needs of living and living. Architecture has developed to today, it is not just architecture, but also art. The expression of architectural art is inseparable from the expression of decorative components, which are decorative objects attached to the appearance of the building. Such as: buttresses, mountain flowers, carvings, door edge decoration and so on. They are attached to the building structure and functional components while maintaining their own independence, showing the style and style of the building.

## 3. Russian Architectural Detail Decorative Language Expression

### 3.1. Dome

Two interpretations of the dome: the overhanging hemispherical space or area or the apex or top of a dome or dome surface (such as a street or bridge deck towards a central dome); specifically the height between the center of the road and its edge of the dome difference <sup>[2]</sup>. In the Russian architecture in Harbin, the dome is an important part of the appearance of the Russian architecture. There are two forms of domes in Harbin Russian architecture: one is a church building and the other is a public building <sup>[3]</sup>. Generally speaking, in public buildings, the domes are mostly placed at the corners of the buildings; in religious buildings, the domes are mostly located in the center of the roof.

#### 3.1.1. Dome Shape

The dome mainly refers to the raised part of the top of the building, which can be summarized as onion shape, semicircle, cone (tent roof), polygon, etc., as shown in Figure 1. Most of the domes in the Russian-style church buildings in Harbin are onion-shaped and tent-topped. This is formed by the improvement and evolution of the Byzantine dome in Russia combined with the characteristics

of the Russian nation. It is an important dome form of the Russian Orthodox church. The dome of the church is the center of the church from the inside, which expands the space and is very practical.

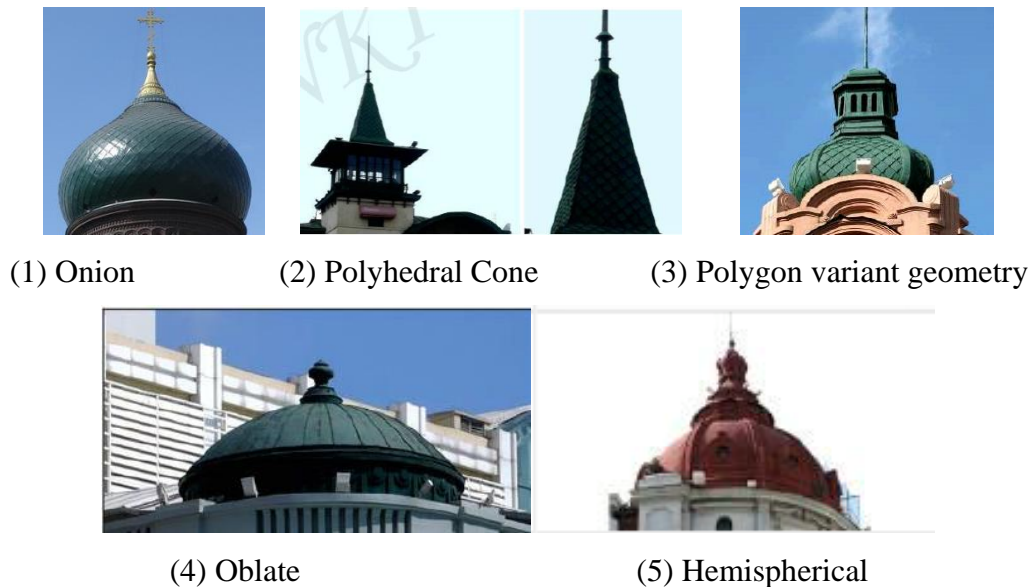


Figure 1: Dome shape

Most of the domes on the Russian-style public buildings in Harbin were redesigned by Russian designers under the fusion of European style and local style. Most of the domes of public buildings are placed on the roofs at the corners, and the decorative function is greater than the practical function. The partial rise makes the appearance of the building have a sense of hierarchy, enriches the facade composition of the building, and also enhances the momentum of the building.

### 3.1.2. Dome Color and Texture

Color can give people vitality and infect emotions. The colors of the domes of the Russian-style buildings in Harbin are mostly green, red, gold, and gray, showing the splendor of the colors of the Russian-style buildings. From the perspective of the Russian-style dome in Harbin, the dome mainly has several texture expressions such as fish scale, parallel line, quadrilateral grid, radial, longitude and latitude.

### 3.1.3. Formal Rules

The Russian-style architectural dome in Harbin, no matter whether the building facade is symmetrical or asymmetrical, is basically set in the center of the building to express the balance of the building. At the same time, for the appearance of the building, his unique shape makes it easy for you to find the focus of the building. Most of the vault shapes are set with virtual windows or arches, which form a virtual and solid contrast with the building and increase the appeal of the building.

## 3.2. Doors

The door is an important element of the entrance of the building and the connection between the inside and outside. The beauty of the form, shape and pattern it shows reflects the style and culture of the building.

### 3.2.1. The Shape and Type of the Door

The doors in Harbin Russian-style buildings can be divided into wooden doors and metal doors in terms of materials. Most wooden doors are common in wooden and brick-wood structures, and are most used in residential and religious buildings, as well as in public buildings; in terms of shape, they can be divided into rectangles and arches. Most of the doors in Russian-style religious buildings are arched, and most of them are rectangular in public buildings. The entrance to the building is double-leafed, with an absolutely symmetrical composition.

### 3.2.2. Door Trim

Doors in timber-framed homes combine functional functionality with decorative arts. Especially the typical "wood-cut corrugated" buildings perfectly combine decoration and functional components. The horizontal splicing of wooden boards on the building facade has a natural texture. The vertical vertical composition of the door contrasts with the building facade. The door leaves are mostly simple geometric patterns. The building façade produces convex and concave changes <sup>[4]</sup>, as shown in Figure 2. Exquisite carvings and building façades produce an artistic effect that is both refined and elegant, as well as rough and simple.



Figure 2: "Woodcut Leng" architectural door

The Russian-style religious buildings in Harbin are mostly brick and wood structures, so the entrance is decorated with various moldings, pointed coupons, round coupons, petal coupons and intricate and exquisite brick decorations. The decorative patterns on the doors are related to religion. Follow the strict form of the Russian Orthodox Church, as shown in Figure 3. Most of the doors in public buildings are rectangular, simple and elegant. In order to highlight the characteristics of the entrance, the sides of the doors are mostly decorated with columns or door faces, and some are equipped with canopies, cornices, and mountain flowers.



Figure 3: The door of the Hagia Sophia

### 3.2.3. Color

The entrance doors of Harbin Russian-style buildings are mostly dark green and dark brown. The entrances of other buildings maintain the color of the building materials themselves—the earth red of the clear-water bricks, which is in harmony with the clear-water red brick walls. The dark green and dark brown entrance doors contrast with the beige and white of the main body of the building, making the part active.

### 3.3. Windows

Window is an important manifestation of the force image inside and outside the building, and plays an important role in the appearance of the building. Affected by the cold climate in the north, the windows of the Russian-style buildings in Harbin are not large in size, and the windows decorated in the Russian-style make the building facade simple and vivid.

#### 3.3.1. The Shape and Type of the Window

According to the shape of the window, it can be divided into arched and rectangular. According to the structure, it can be divided into independent type, one-to-two type, two-in-one type, and triple type, as shown in Figure 4. Freestanding windows are the most basic form and the most common. Divided into two means that the window column is divided into two, showing a narrow and long shape. Such a window has a strong sense of decoration, because the columns separating the windows can adopt various styles <sup>[5]</sup>. The two-in-one type is a combination of two independent windows through decoration and the face on the window, which can be regarded as a whole or can be used as an independent window. In most of the Russian-style public buildings in Harbin, arched and rectangular windows appear on the façade of a building at the same time.

#### 3.3.2. Window Trim

The upper edges of the wooden windows in the Harbin Russian-style buildings have exquisite through-carving decorations, and the surrounding windows are decorated with wooden faces, which makes the wood-cut corrugated buildings more exquisite. This method basically follows the traditional Russian architecture, as shown in Figure 5-1.



(1) Single Arch



(2) Single Rectangle



(3) Bipartite Arch



(4) Bipartite rectangle



(5) Round forehead rectangl



(6) Triple arch

Figure 4: Form of building exterior window



(1) Window decoration of woodcut corrugated building



(2) Window decoration of masonry corrugated building

Figure 5: Window decoration of the building

Most of the windows of masonry buildings are made of stone, brick, artificial stone, or various cement products to make the window face, which is integrated with the outer wall, which is generally different from the color of the wall and stands out. It is generally three sides, or another artistic shape is made on the upper part of the window<sup>[6]</sup>. As shown in Figure 5-2; the building is simple in shape, three-stage, with a simple and balanced appearance. The characteristic is the face-to-face decoration of the second-story window, which stands out from the building facade. The window is also designed with an arched upper edge. It forms a straight and curved contrast with the rectangular windows on the third floor, and the columns between the windows enhance the three-dimensional effect of the building facade.

### 3.3.3. Color

There are no special restrictions on the window colors in the Russian-style buildings in Harbin. Most of them have a certain contrast with the architectural colors, highlighting the characteristics of the windows.

### 3.3.4. Formal Rules

The windows on the Russian-style buildings in Harbin are both changed and unified. In many buildings, arched windows and rectangular windows exist at the same time, and they are all arranged in a line, neat, repeated and orderly. At the same time, the changes of straight lines and curves make the appearance of the building more beautiful vivid. There are also some buildings that combine doors and windows, using unique shapes to highlight open spaces. As shown in Figure 6, the School of Architecture of Harbin Institute of Technology belongs to the Art Nouveau Russian-style architecture. The doors and windows are unified within the arc with a graceful arc, and echoes with the circle on the door leaf. The edge above the door the delicate piers contrast with the simple curves, adding life to the building's entrance.



Figure 6: Art Nouveau Russian-style architecture

### 3.4. Parapet

The parapet refers to the low wall with the outer wall of the house higher than the roof. In addition to maintaining safety, the main function of the parapet is to apply waterproof pressure bricks at the bottom to prevent the waterproof layer from seeping water or the roof rainwater overflowing. In addition to its practical functions, the parapet of the Russian-style buildings in Harbin enriches the appearance of the building and beautifies the building <sup>[7]</sup>.

From its form, the parapet is divided into a single type and a combined type. A single shape is a simple geometric shape, such as a triangle, a rectangle, and a curve. As shown in Figure 7, combination type is the form formed by the combination of two or more single shapes <sup>[8]</sup>.



(1) Curvilinear



(2) Combining triangles



(3) Triangle + Rectangle + Curve

Figure 7: Parapet shape

### 3.5. Balcony

The balcony is an extension of the interior of the building. It is an outdoor platform with guardrails, and there are auxiliary facilities of the house that are connected to the house and can be moved and used. It provides space for occupants to perform outdoor activities and dry clothes. As a component of the building, the balcony has both practical and decorative functions, and plays a very important role in the unity of the overall appearance of the building and the expression of the decorative style <sup>[9]</sup>.

### 3.5.1. Balcony Shape and Classification

Balconies are divided into closed balconies and non-closed balconies according to their closed conditions; according to the relationship between the balcony and the main wall, they are divided into convex balconies and concave balconies<sup>[10]</sup>; The cantilever slab is used as the ground of the balcony, and a semi-outdoor space is composed of three hoarding boards or fences. The concave balcony refers to the semi-open architectural space that occupies the interior area of the residence. Therefore, according to the balcony structure, it can be divided into three types: cantilever type, embedded type and corner type.

Most of the balconies in the Russian-style buildings in Harbin are non-closed balconies in terms of the closed situation. The structure is basically a cantilevered convex balcony, and concave balconies and closed balconies are rare. The basic construction of Russian-style buildings in Harbin In the early 20th century, we can see that the designers did not use large floor-to-ceiling windows and balconies when designing building windows and balconies. This design also has its humanized side, especially Most of the balconies protrude from the building facade to form external balconies. For the cold climate in the north, this can reduce the loss of indoor heat and beautify the building façade.

### 3.5.2. Material Properties

The fences of balconies in Russian-style buildings in Harbin are made of stone, wood, metal and masonry metal. Wooden balconies basically appear in Russian-style residential buildings, and the balconies in such wooden buildings should be more accurately defined as "corridors". Corridor: It is a covered passageway outside the building. With the help of the facade of the building, part of it is inside and part of it is exposed. The corridors in the upper part of the building are generally attached to the outer wall of the building, and most of them are supported by pillars to support the corridor table and ceiling. The facade of the building is picked out, and the upper part is equipped with a canopy, which is integrated with the building<sup>[11]</sup>. This kind of corridor-style balcony has strong permeability and conforms to the characteristics of traditional houses. It strengthens the permeability of the interior and exterior spaces of the building, and integrates well with the surrounding environment. It is integrated into the communicative activities between people around the building, which strongly supports the vitality of the external space of the building, as shown in Figure 8.



Figure 8: Corridor of a wooden building

Balconies with a combination of stone, metal, and masonry metal are most common in public buildings, as shown in Figure 9. Due to different architectural styles, its styles are different. Some building balconies are supported by corbels on the lower part, and the shape and carving patterns of the corbels are also different; some building balconies are not supported.





(1) Wooden



(2) Metal



(3) Masonry



(4) Masonry Metal Bonding

Figure 9: Balcony shape



Figure 10: Balcony of a Russian-style building



Figure 11: Columns between windows in Russian-style buildings

### 3.5.3. Form Performance

The balcony is an extension of the interior space of the building. Its form enhances the overall volume of the building exterior and enriches the building facade space. The Russian-style architectural balcony in Harbin presents a variety of changes in the performance of the building facade, making the building rich in layers and unique in shape, as shown in Figure 10. The facade of the building is completely symmetrical, and the balconies are of two different types: enclosed and non-enclosed, which echo left and right, making the building facade both unified and varied. The balconies at the corner entrance are made of masonry, and the balconies on both sides of the building are made of wrought iron, and have two forms of arc and rectangle. They are placed on both sides of the building according to the repeated form, forming both contrast and rhythm.

### 3.6. Columns

The column is the main component in the building, and the architectural styles represented by different columns are different. European architecture is inseparable from the performance of columns. At present, the most common column types are still the three types of columns created by ancient Greece before the 6th century AD, namely Doric, Ionic and Corinthian. Although with the development of history, the column is also constantly changing and innovating, but the basic form has not changed. In modern European architecture, the column type has changed the load-bearing role in classical architecture, and more of it plays a decorative role. Among the Russian-style

buildings in Harbin, neoclassical Russian-style buildings can be seen in the porch formed by load-bearing columns. The repeated linear arrangement of the columns has a sense of rhythm and highlights the entrance in the porch. Other Russian-style columns are mostly represented by buttresses and inter-columns, and are divided into columns and square columns. A buttress column is a column that is close to the wall and constructed at the same time as the wall in order to increase the strength or rigidity of the wall. It is also a reinforcement method for buildings to improve the bearing capacity and stability of brick walls <sup>[12]</sup>. The inter-columns are mainly the columns that separate the windows and doors, which enhance the sense of bulk of the building façade. Some of the carved designs on the capitals of Russian-style buildings in Harbin use traditional Chinese patterns. The column between the windows of the Chinese Baroque architecture is used, and the carving on the top of the column head adopts a Chinese pattern, as shown in Figure 11.

#### 4. Conclusion

The Russian-style buildings in Harbin are witnesses to the history of Harbin. After a hundred years of vicissitudes, they cannot be reproduced or copied. The value of protecting these historical buildings is immeasurable. The formation of Russian-style architecture in Harbin has its unique artistry. It was originally designed according to the blueprint of Moscow, and was influenced by French architecture. After it was introduced into China, it was combined with local architectural elements, resulting in the architecture not only featuring typical European style, but also with Russian architectural features, while showing the national fashion. Russian architecture is reflected in architectural details with its unique decorative art features such as domes, doors, windows, parapets, columns, etc. On the basis of summarizing the artistic characteristics of Russian architecture, the expression form of Russian architecture in Harbin is obtained. Different from the typical European style, the architectural language is used to interpret the beauty of the appearance of the building's exterior components, the beauty of decoration and the beauty of materials, and at the same time, it provides a certain reference value for the cultural and artistic research contained in it.

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