The Typology Analysis for the Historical Resources Utilization in Contemporary Architectural Design -- a case study of Xi’an City

Xueying Ma 1, Juelun Zhou 1 and Dingqing Zhang *1

1 Undergraduate, School of Human Settlements and Civil Engineering, Xi’an Jiaotong University, P.R. China
1 Undergraduate, School of Human Settlements and Civil Engineering, Xi’an Jiaotong University, P.R. China
1 Associate Professor, School of Human Settlements and Civil Engineering, Xi’an Jiaotong University, P.R. China

Abstract
Since the reform and opening up, the urban construction has increased in China, but most of these constructions ignored the cities’ background where the buildings were created. The constructions in historical and cultural cities lacked the cognition or characteristic exploration of the urban history and culture, and there is little guidance on operational theory and methods to inherit urban context, leading to the homogeneous city images. In order to improve this situation, the historical resources of the city should be fully excavated and rationally utilized to continue the city context and shape the features of the city.

Xi’an city, one of the famous historical and cultural cities of China, which is rich in historical and cultural heritage, has produced many excellent contemporary designs reflecting the city characteristics. It has typical and practical significance to research the methods of contemporary architectural design with the use of historical resources in the city of Xi’an. Based on the analysis of the contemporary architectural design with methods of city historical resources utilization, the historical and cultural background and architectural examples of Xi’an is studied, to explore the use of historical resources in contemporary architectural design in the term of typology. With the analysis of historical resources in city level, architecture level and detail level of Xi’an City, and drawing an iconic analogy, the application of these icons and metonymy in historical resources of architectural examples is analyzed, which can be the reference to the research and practice of contemporary architectural design.

Keywords: City characteristic; Historical Resources; Typology; Contemporary Architectural Design

1. Research Background
Since the 1970s reform and opening up, China has got a rapid development of city urbanization, and city construction has increased, while some problems gradually revealed: lack of architectural design thinking, blind imitation and loss of the cities’ characteristic and individuality.

It is one of the important ways to solve the problem by studying the utilization of historical resources in the...
contemporary architectural design and the full excavation of the city’s historical culture as the background of the contemporary architectural design. On the previous researches, researchers often expressed architectural design methods by direct narrative form, lacking methodological guidance. In this study, the method of typology is used to make a hierarchical analysis of the utilization of historical resources in architectural design. At the same time, it is combined the local characteristics with specific description.

Historical resources are the things that human beings produce in history and the spiritual elements attached to them. They are the presentation of cultural development and the source of historical elements in contemporary design [1].

In Chinese history, Xi’an was the ancient capital of 13 dynasties. It is rich in historical resources. Xi’an city in the Tang Dynasty was the international metropolis, and the relics such as the Great Wild Goose Pagoda and the Small Wild Goose Pagoda still remain; In Ming and Qing Dynasties, Xi’an is the center city of the Northwest China, and the Ming city wall and Bell Tower are well preserved. Historic districts such as Sanxue Street, Shuyuanmen Street, Beiyuanmen Street and Telford Lane are also preserved. In addition, Xi’an is located in the Guanzhong area, and the accumulation of the Guanzhong culture also has unique historical resources. Shaanxi opera and shadow play are typical intangible historical resources in Guanzhong Region; the vernacular dwellings in Guanzhong area are typical of Chinese folk houses, with the characteristics of simplicity and stability.

2. The Iconic Analogy Based on the Historical Resources Utilization in Xi’an

2.1 The Analogy

The contemporary architectural typology holds that architecture is a product of human lives, with memories of life, although the specific forms of the building change with the way of life, the types can be extracted from the building in history, the new building forms will be abstraction and reorganization of the special building, its contour or fragments. Rossi’s analogy method is a typical methodology to explore the relation between the old and new architectural types in architectural typology, including four steps: reference from existence building or its fragment, iconic analogy, metonymy and generation of homologous phenomena.

Chinese contemporary architectural design using the history resources can refer to Rossi’s analogy method. However, the reference dimension needs to be extended to the city level, the architecture level and detail level. Combining with the characteristics of Chinese historical resources, the utilization of historical resources by contemporary architecture includes the following four steps. First, reference from historical resources. The referenced objects should be urban elements, architectural elements and detail elements that are in existence or documented. They are the carriers of urban history. Second, iconic analogies. The elements are abstracted into icons that are psychologically linked to buildings or fragments, or even to the corresponding cities and history. Third, metonymy. In linguistics, the use of metonymy means that there must be an essential connection between the ontology and the metaphor. In terms of metonymy, the existing building or fragment is the noumenon, while the new building or its fragment is the metaphor. The new building or fragment should not only have the similarity as the ontology in the image, but also have essential connection with the ontology. Fourth, homology. Because of the essential relation between the metaphor and the noumenon, the final result of metonymy is to produce homologous phenomena. That is, the new forms and the old forms are derived from the same abstract archetype in people’s memory or psychology, and this archetype drives the creation of new architectural types.

2.2 The level of urban morphology
(1) Urban texture. Xi'an was the seat of the capital of Zhou, Qin, Han, Sui and Tang Dynasties in the history. The city pattern of Chang'an in Sui and Tang Dynasties had the greatest impact on contemporary Xi'an. Chang'an is the largest city in the ancient history the world. Except the imperial city and the palace city, the whole city is divided into 109 Lifang[2]. The layout of Chang'an has two main characteristics. The first one is the axial symmetry layout. The north-south axis leads to the nearly neat axisymmetric pattern. The second one is the network layout. In the Lifang unit system, road system is a neat grid type. In such a background, when designing a building in Xi'an, especially groups of buildings, the axis symmetry and grid layout can be used as one of the organizational ways. On the one hand, the square form is unified with the network form of Xi'an city; on the other hand, the symmetrical layout of the grid conforms to the memory of the city and can be better integrated with the site.

(2) The space of streets and lanes. Xi'an city has preserved lots of historic districts. There are some morphological elements that can be used for the contemporary architectural design. For example, the proportion and scale of the streets and lanes space will have the direct influence on the feelings of those who are in it. Similar street scale can also lead to collective memory. In the contemporary architectural design, both indoor and outdoor space can use the space scale and proportion of the local traditional street space and form a contemporary architectural space with traditional sense.

2.3 The level of buildings

(1) Spatial organization. Xi'an is the main distribution area of Guanzhong residential architecture, and the reference value of Guanzhong vernacular dwellings in contemporary architectural design is self-evident. These dwellings have a typical form of "narrow bay and deep depth" and take the courtyard as the main way of the spatial organization. The one-yard style is the simplest one. If more space is needed, the courtyards can be arranged longitudinally side by side or in parallel. In the design of contemporary architecture in Xi'an, the form of courtyard can help to keep the unique characteristics of the local space experience.

(2) Monomer architectural form. The culture of Tang dynasty has a great influence on Xi'an, and it is also an important part of the guidance of urban cultural construction in Xi'an. In the Tang Dynasty, the roof of the building slopes gently, and the eaves are picked out far and wide with a slight rise at both ends. The facade is divided into three sections which are respectively roof, main body and the base from top to bottom. In the contemporary architectural design, the roof form, eaves style and building body proportion can be used as design symbols. In addition, the monomer architectural form of Guanzhong dwelling buildings can be used as one of the reference of architectural design, too. The featheredged coping formation can be regarded as one of design symbols in contemporary architecture.

2.4 The level of details

Details of architecture include colors, patterns, structures and so on. The color reflecting the history and culture of Xi'an can be refined into three kinds: the ochre of Tang Dynasty woodwork, the gray of Qin bricks and Han tiles, and the soil yellow reflecting the geographical characteristics of Xi'an. The cultural patterns are often used in the traditional buildings at the pane, sculpture and other parts. Some patterns can be regarded as a symbol itself. Taking the "図" pattern as an example, it can produce a variety of changes because the basic unit is simple and symbolic characteristics is obvious. As for structure, wood frame is the main structure of Chinese traditional architectural styles. The wooden structure is a way to show the history and culture. For example, Dougong brackets can be used as a symbol.

3. The metonymy design case study of using historical resources
3.1 Tang West Market Museum [3]

Tang West Market Museum is located in the northern part of Tang West Market Commercial District in Xi'an featuring the culture of the world famous Silk Road.

(1) Urban level. On the texture, Tang West Market Museum used the composition of squares which is a kind of metonymy of the layout of Chang'an and Tang West Market. The Cross Street site of the Tang West Market is the center of the museum's plane, which is organized with two axes of the north-south and the east-west. Two main channels along the axes divide the plane into four parts (Fig.1). In addition, the museum's main channels take the width of the street. The channels are covered with the glass roof so that the visitors can feel the scale of the Tang Cross Street.

(2) Building level. The modeling design of the museum aims to reflect the characteristics of history and regional tradition. The roof of the museum has different height and changes a lot, but also has a sense of order. It is the metaphor of the featheredged coping form of Guanzhong dwelling buildings (Fig.2).

(3) Detail level. A kind of soil yellow stone imitation material is used in the façade of the museum, which shows a sense of nature and vicissitudes by its color and texture. It can reflect the long history of Xi'an and it is a kind of metonymy of the typical color of Guanzhong plain and the Xi'an City Wall which is built of rammed earth structure.

3.2 Xi'an Television Broadcast Center [4]

Xi'an Television Broadcast Center (Fig.3) is located in historical features protected areas of Qujiang New District in Xi'an. The project should not only maintain a unified style of architecture in Tang dynasty, but also have restrictions on the height of the buildings, which cannot be higher than the Great Wild Goose Pagoda.

(1) Urban level. Xi'an Television Broadcast Center kept the characteristics of buildings in Han and Tang culture. In the overall layout, it is organized as a whole and is centralized arranged. The outer solid wall interface is a metonymy of the City Wall in Xi'an.
(2) Detail level. The facade of Xi’an Television Broadcast Center is a metonymy of Qin bricks and Han tiles which are both traditional materials. There are two layers of skin. The outside layer is grey, which is also the tone of the City Wall in Xi’an. Horizontal lines are used to enhance the sense of stability brought by the color and texture. The window is made of clay blinds which are coincide with the texture of the facade.

3.3 Jinyuan Commercial Block [6]

Jinyuan Commercial Block is located in city wall protection zone in Xi’an. Considering its special location and the surrounding historical buildings protection requirements, Jinyuan Commercial Block used the new Chinese folk customs as its architectural style, which is harmonious and unified with historical sites.

(1) Urban level. The layout of Jinyuan Commercial Block is a metonymy of Guanzhong dwelling architecture. The overall layout is an "L" type layout. It forms several courtyard space as landscape nodes in the north-south and east-west two landscape sequences by drawing lessons from the courtyard pattern of Guanzhong dwelling. In the street space scale, the width-height ratio of pedestrian street refers to the common proportion of Guanzhong dwelling, which is approximately 1:2 ratio (Fig.5).

(2) Detail level. Jinyuan Commercial Block uses traditional brick veneer materials as a metonymy. It is simple and rustic, in coordination with the Guanzhong dwellings. In addition, it uses a lot of traditional architectural symbols in many details by a kind of abstract expression, so that the buildings can show the traditional sense of Guanzhong architecture (Fig.6).

4. Conclusion

Utilization of the historical resources in a reasonable and effective way can not only avoid the loss of architectural features, but also retain and inherit the city’s context. In this paper, the utilization of the history
resources based on typology is studied with the analysis of typical cases. The techniques of contemporary architectural design under the historical and cultural background of the city is also summarized. The contemporary architectural design can use the process of reference, iconic analogy and metonymy to utilize the historical resources at the city level, the architecture level and detail level.

(1) At the city level. On the one hand, historical buildings, historical sites, historic districts and other historical relics form a unique cultural landscape and historical atmosphere. On the other hand, the continuity of the urban texture and the streets and alleys is also a kind of the historical resources utilization. By respecting the original texture of the site, the architect may grasp the form and scale of the building to achieve coordination between the new building and the surrounding environment, and give the local people a familiar space experience. In the city texture intact area, the architect can extend the original texture of the overall layout; in the city texture disorder region, the texture need to be sorted out; in the texture damaged area, repair of texture can give a city characteristics of architectural space and reshape the city memory.

(2) At the architecture level. The use of historical resources in the architecture level is mainly through the reference of the traditional architectural design techniques. In the contemporary architectural design, drawing on the building forms, axis and spatial organization methods from the traditional architectural design is a common way. By the Reference to the forms of traditional architecture, we can study and refine it to make the iconic analogies, and eventually re-express it through the way of metonymy. In this way, we can create a distinctive architectural space for different expression purposes.

(3) At the detail level. Historical resources in the detail level mainly include the performance of traditional techniques and their products. For the modern utilization of traditional techniques, the expression methods can be made in two ways: one is the reproduction of traditional skills, and the other is abstract expression of the features of traditional techniques. The abstract expression of traditional techniques and techniques is accomplished by the process of reference, iconic analogy and metonymy.

The utilization of historical resources in contemporary architectural design should be based on traditional development and recreation. Only with the scientific attitude and the rational utilization of historical resources, can the culture of a city be inherited long-lasting.

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