

Research On the Development From Architecture To Architectural Heritage: Take Industrial Architecture Heritage as an Example

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Abstract

As a very representative type of historical architecture, industrial architecture heritage plays an irreplaceable role in spreading human civilization and displaying scientific and technological progress. Starting from the first Industrial Revolution and the spread of cultural globalization, this paper divides the development from industrial architecture to industrial architecture heritage into three important historical stages: “modernization” period, “artisticization” period and “becoming heritage” period, in order to explain the industrial architecture’s value in the communication and spread of sciences, arts and technology in the course of human civilization.

As an important interruption node in the history of technology (Singer, Charles Joseph, Holmyard, Eric John; Hall, 1982), Industrial Revolution started a period of rapid development in many aspects such as science, technology, economy, and urban construction around the world. Especially in the 18th century, the technology of cast iron gradually matured, which had a revolutionary impact on architectures. Compared to traditional building materials, cast iron in addition to good resistance to stress outside, but also has outstanding tensile strength, and the engineers were first used in the construction of the bridge. In 1775, the world’s first cast iron arch bridge was built on the Severn River, which the span reaches 30 meters long, since then, a new type of cast iron material has been widely used in the field of engineering (Jurgen Adam, Katharina Hausmann, Frank Juttner, 2004). On the basis of bridge-building experience, cast iron is widely

used in the early textile factory and warehouse buildings. In 19th centuries early, cast iron was regarded as a structural building components in cotton mills in many regions in Britain, such as Glasgow, Manchester, which not only makes the internal space obtain a larger span, but also meets the needs of fire prevention (Mathew Aitchison, 2014). At the same time, the cast iron structure greatly reduces the self-weight of the building structure and forms a new type of multi-layer frame structure, which better meets the requirements of the textile plant for the space of water conservancy driving equipment. Although the cast iron components improved the interior space of early industrial buildings, the facade of the buildings was still in classical form. Until the appearance of Crystal Palace in 1851, new building materials such as cast iron and glass began to be widely used.

“Modernization” period of industrial architecture

The “Crystal Palace” is the first building dedicated to the exhibit, disseminate and flaunt industrial revolution technology and its products (Christopher Hobhouse, 1952). Joseph Paxton, a British horticulturist, designed the prototype of Crystal Palace which based on the formal characteristics of plant greenhouse, replacing the original classical architectural scheme. Without any decoration, the Crystal Palace is a architecture which reflecting the principle of Realism. The production and use of new materials such as cast iron and glass have gradually spread from Europe to the United States and Asia. New construction technologies have liberated building structural forms, and large-span buildings have appeared widely. The principles of practicability and high efficiency became the early prototype of modern industrial architecture.

The World War hit the industrial base in Europe in early 20 centuries, in order to restore production and life, a large number of modern factories, industrial districts and industrial cities emerged one after another. In this period, the design and construction principles of industrial architecture started from the practical point of view, with the goal of function first, high efficiency and few decorative languages, which break through lots of traditional design constraints. A large number of new materials and new processes, such as the use of prefabricated and standardized components are used, leads to the innovation of architectural design and construction, makes the function and form self-consistent, and produces a set of "industrial aesthetics" based on practicality, simplicity, clarity and rationality.

1900 to 1920, is the birth of modern industrial architecture. Albert Kahn, a German-American architect known as the "father of modern factory design" and "inventor of Automobile Workshop", designed the Ford Assembly Line in 1909, greatly improving the efficiency of automobile production. This four story frame structure factory building is regarded as the pioneering work of modern multi-stores factory, representing the main image of American industrial architecture. In addition, the Ford Assembly Line also had an important impact on Walter Gropius, and even became the inspiration source for the design of the Fagus Plant. At the same time, Peter Berens designed and completed the AEG Turbine workshop in Berlin, which also brought the design and construction level of modern industrial architecture to a new height in Europe.

The first half of the 20th century is the "modernization" period of industrial buildings. The wide application of modern materials such as steel, reinforced concrete and glass has completely changed the construction logic and spatial form of industrial buildings: standardization, prefabrication, unity of function and form have become the important features of modern industrial architecture. Practicability, high efficiency and meeting the needs of production have become the main purpose of modern industrial architecture, the "modernization" of industrial buildings greatly affects the development of other types of architecture and modern cities.

“Artisticization” period of industrial architecture

Although engineers and architects created modern industrial architecture, the promotion and extension of their aesthetic values are closely related to artists. From 1930 to 1960, Charles Sheeler, a famous American precision painter, concentrated on the creation of oil paintings about American industrial architecture and named them "American industrial landscape", which reflected the factories, plants, facilities and equipment in the booming period at that time. Scheeler's work style changes from early realism to later abstract creation reflects that industrial architecture, as a cultural landscape of universal significance, has become the object of "recreation" by artists.

In the 1960s, Bernd and Hilla Becher, famous German photographers, tracked and photographed a series of industrial buildings and facilities in Ruhr district, such as factories, elevators, water towers, blast furnaces and so on, and then published the world's first industrial building photography monograph: *Anonymous Sculpture: Anonyme Skulpturen Eine Typologie Technischer Bauten*. They recorded the images and characteristics of industrial buildings, facilities and equipment, and classified them according to industrial use, showing the wide adaptability and reproducibility of industrial buildings. In terms of shooting methods, they chose to shoot the facade of industrial buildings, facilities and equipment, and translate the three-dimensional building shape into two-dimensional images, and make the industrial building sprout a hazy memorial (Philip. Jodidio, 2005), thus opening a new branch of Photography-"industrial composition photography". Industrial composition photography arouses people's attention to abandoned industrial buildings through artistic means, which makes the public gradually understand that those common and widespread industrial buildings have pragmatic aesthetic characteristics, and industrial architecture can become "spiritual symbols of the times". Although Bernd and Hilla Becher did not explain the value of industrial architectural remains from the theoretical level, they caused the European countries to pay attention to industrial architectural remains objectively. Until the late 20 centuries, modern industrial architecture began to be concerned by artists. The core function of industrial architecture has gradually changed from productive space to artwork or monuments, which laid a cognitive foundation for the "becoming heritage" period.

The “Becoming heritage” period of industrial architecture

The period of "archaeology" and "value identification" are two stages in the process of becoming industrial heritage, which is the concept of time with progressive relationship. "Becoming heritage" is not a simple and isolated process, it cannot be separated from the social, political, and economic matrix, but also from the involvement of individuals, groups, countries and local culture. Industrial architecture, from being built to being used, from abandoned to historical heritage, are not only more likely to have disputes on value judgment and orientation, but also a long-term and complex systematic process, along with many issues such as land and property rights, historical interpretation and environmental pollution. The ontological objectivity of industrial architecture is that they serve production activities. After being translated into "heritage", their objective values are replaced by subjective values. The evaluation of their values is completed in a new current context. Therefore, the selection and expression of industrial architectural heritage cannot avoid its subjectivity. It is also reflected in the diversity of the process of selecting and evaluating their industrial architecture heritage in different countries (Stubbs, John H.; Makas, Emily G.; Bouchenaki, Mounir, 2014). For example, United Kingdom adopts the "Listed Building" evaluation system, Netherlands and Belgium adopt the "Rijks Monument" evaluation system, and United States adopts different levels of "Historical Landmarks" evaluation system, while China adopts different levels of "Cultural Protection Units" evaluation system.

It is necessary to address how to "explain" the value to the public when industrial architectural heritage has been widely recognized as a type of cultural heritage. The two important characteristics of value interpretation are "drawing historical stories" and "creating place memories", the purpose of which is to "flatten" and "popularize" the value of industrial architecture and project it onto the public's sensory experience. Walter Pickles pointed out in *Our Dirty Legacy* that chimneys, as architectural symbols of the Industrial Revolution, were once used by entrepreneurs to show off their means of production and identity (Walter. Pickles, 1971), people are scrambling to compare the height of the chimney to reflect the economic strength and status of the

entrepreneur, which has caused the chimney to become higher and higher. This historical story about the chimney can be an interesting clue in the value interpretation, and then bridge the difference between the public imagination and the objective image of industrial heritage, so as to create the spirit of place of heritage, and the new place promotes the industrial architecture to acquire "the second life of heritage", that is, with the "added value" of cultural capital and economic capital, it also has the value of cultural exchange and display.

Conclusion

For industrial architecture, the three development periods of modernization, artisticization and becoming heritage are not long, but they have played an inestimable role in promoting social, economic, cultural, technical and artistic aspects. Different from the traditional architecture heritages, such as palaces, temples and churches, which pursue commemoration and eternity, industrial building is a type of architecture aiming at practicability and production satisfaction, which carries a unique regional cultural context and economic demands, which is an important sign of the communication and interaction of science, technology and culture in the global scope. From this point of view, industrial architectural heritage is not only a significance symbol of a city or a country's memory, but also an important carrier of cultural self-confidence and cultural interaction.

Endnotes

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