

The Deconstructive Enlightenment of Daxing International Airport

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ABSTRACT

As a branch of postmodernism architectural thought, deconstructive architecture presents a series of artistic images that are against traditional architecture, bringing a huge impact to the visual art of architecture. To this day, deconstructive architecture is sparkling new vitality in China. As the latest completed deconstructive building in China, Daxing International Airport is also an unprecedented architectural form. It has many groundbreaking achievements, which also heralds the new trend of deconstructivism 40 years later, which is enlightening. This article takes Beijing Daxing International Airport as an example, and through the interpretation of Daxing International Airport, it explores the spatial characteristics of deconstructivism, summarizes the enlightenment, and explores the possibility of deconstructive architecture in the future.

Keywords: *Daxing International Airport, Deconstructionism, Spatial characteristics.*

1. INTRODUCTION

Daxing International Airport, completed in the suburb of Beijing, has attracted attention from the moment the plan was finalized. It was officially put into operation on stage in September 2019, and this peculiar building has immediately become a new tourist attraction in Beijing. The streamlined shape is eye-catching and breathtaking. In the design process, it broke the convention and adopted new technologies, new structures, new concepts and other innovations in many fields, making this new airport arouse heated discussion. The airport was designed by the French ADP Ingenierie Architecture Firm and Zaha Hadid Studio. The overall style comes down in one continuous line with the concept of Zaha's deconstructionism.

Since the 1970s, postmodernism has begun to draw nutrients from other fields to serve design. Many of these emerging concepts have created a fierce tide in the design community and aroused widespread discussion. At the time of China's reform and opening up, fresh ideas are needed, and deconstructive architecture is able to be gradually spread in China. As a representative of deconstructionism, Zaha's unique shape and topological geometric surface of the building doubled the difficulty of construction, and because

of this, she is also dubbed the title of "the architect on paper" [1]. But in China, strong actions and infrastructure capabilities make her architecture possible. Guangzhou Opera House, Galaxy SOHO, Meixi Lake Opera House and other buildings were completed. As one of the largest airports in the world, Daxing International Airport is also the largest deconstructive building complex so far. Its completion will bring people far-reaching enlightenment.

2. THE DEVELOPMENT OF DECONSTRUCTIVISM IN CHINA

After the deconstructive architectural thought entered China in the 1980s with the wave of reform and opening up, it attracted a large number of scholars to study its avant-garde concepts and subversive innovations. In such a period of great change, the most discussed in the industry is the relationship between "tradition and inheritance". Under the traditional Chinese view of the golden mean, scholars have not resisted the various new trends from the west, but have adopted an inclusive attitude. China has provided a fertile ground for western architectural thoughts. These architectural thoughts spread into China and developed rapidly, bringing rich and colorful changes to the Chinese

construction industry. With the introduction of a large number of foreign books, monographs and academic research on deconstructivism have also begun to be translated, providing a large amount of supporting materials for Chinese people. Subsequently, many architects have tried to put deconstructivism into practice. In the 1990s, deconstructive architecture began to be built in China. Although it was not as mature as western architecture, it still received extensive attention from the construction industry.

At the beginning of the 21st century, China's economic strength was greatly enhanced, and the infrastructure of major cities was unprecedentedly prosperous, attracting foreign architects to continuously swarm into China, and China became a testing ground for world architecture. Especially in Beijing, in order to create a new landmark of New China, many deconstructive buildings with obvious style characteristics have been constructed in China, which brings people a great shock. Most of the Seven Architectural Exhibitions have projects in China: such as Shenzhen Contemporary Art Museum and Planning Exhibition Hall designed by Coop Himmelblau Architecture Firm; Guangzhou Opera House and Meixi Lake International Culture and Art Center designed by Zaha; CCTV Building designed by Koolhaas, etc. At the same time, some Chinese architects have also begun to emerge in the field of deconstructivism, such as the architectural works designed by Tang Hua, Mo Bozhi, Zhao Bing, and Ma Yansong [2].

The emergence of deconstructivism has its historical inevitability. When the scientific and technological level develops to a certain level, it will break the old forms to form their own new ideas, which has repeatedly appeared in history. The forward thinking of the people who walk in the front is in contradiction with people's ideas at the moment, and the interaction between the two promotes the continuous development of deconstructionism. The Pompidou Art Center in Paris has gradually strengthened its sense of identity from being unacceptable at the beginning and become a landmark. Everything needs a process, and the change of aesthetic idea is the same. Modernism was once regarded as the golden rule, but now it has been replaced by the concept of postmodernism. Deconstructivism is at the forefront of design and it is destined to continue to develop. As the latest deconstructive building in China, Daxing International Airport has many places worthy of research.

3. DECONSTRUCTIONISM IN DAXING INTERNATIONAL AIRPORT

3.1 Zaha's Architectural Thought

Zaha Hadid never regarded architecture as a simple house to build. What she pursued was to use art to lead architecture. And architecture is a kind of art. This perceptual creation method is consistent with deconstructionism, expressing freedom and uncertainty. For a long time, Zaha didn't admit that she belonged to the style of deconstructionism. Compared with Gehry's "rebellion", Zaha's architecture always had her own rationale. In fact, this was brought about by her critical development of modernism and deconstructionism. She didn't completely deny the construction techniques of modernism, nor did she fully agree with the frankness of deconstructionism. Instead, she expressed her own creative ideas through her own thinking. First, the buildings she created belong to the future. The curve composition full of technological sense forms a sharp contrast with the surrounding buildings, which seems to indicate that Zaha's architecture doesn't belong to this era. When Daxing International Airport first entered people's field of vision, buildings that could only be seen in science fiction films appeared in front of people, giving people a sense of birth. Second, she pursued the weightlessness of architecture. She used the form language of twisting, bending, toppling and falling, wave shape, etc., to make the design produce a kind of unstable situation such as "weightlessness" and "imbalance", so that the building had a dreamlike, gravity-free floating feeling [3]. When you see Daxing International Airport, you won't think it's a very heavy building. The flexible curve shape blurs the concept of gravity and scale of the earth, and the entire airport seems to be able to float into the sky at any time. Third, she was good at the re-creation of flowing natural space. Getting inspiration from nature had always been Zaha's preferred method. There is room for re-creation in all the great rivers and every tree and bush. From nature, the architecture is better integrated into the urban context, so that there will be no separate or independent existence. At the same time, this also makes the connection of the space smoother, and the functional partitions are not isolated, forming an organic whole.

3.2 Architectural Characteristics of Daxing International Airport

Daxing International Airport has many titles: the world's only "double-inlet and double-outlet" airport terminal, the world's largest single airport terminal, the world's most technically difficult airport terminal, and the world's largest airport terminal with seismic isolation bearings, and the world's largest integrated airport terminal without structural joints [4]. Behind these titles all foreshadow the uniqueness of this airport, which fully embodies the strong color of deconstructionism.

"Shan Hai Jing" says: Seeing the phoenix, the world will be peaceful. The shape of the airport terminal of Beijing Daxing International Airport means "phoenix spreading its wings", and it forms a double-hub pattern of that "prosperity brought by the dragon and the phoenix" with the Capital Airport [5]. As early as 2016, in the "Seven Wonders of the New World" selected by the British "Guardian", Beijing Daxing International Airport ranked first [6]. Daxing International Airport has a large overall span and complex structure. The airport terminal area is about 1,753 meters long from north to south and 1,591 meters wide from east to west. The five airside concourses of airport terminal of Daxing International Airport are shaped like wings extending from the airport hinterland, the size is equivalent to 63 Tiananmen Square, covering an area of 1.4 million square meters, and the area of 25 football fields is only the projection area of the roof. The scale of the airport is so large to meet the planned huge passenger volume, which is planned to reach 45 million passengers, and it is expected to achieve 72 million passengers in five years. This scale is unprecedented. Behind these data, it fully demonstrates the uniqueness of this airport, breaking through the constraints of existing standards. ("Figure 1")



Figure 1 The exterior of Daxing International Airport.

There are peculiar octopus-shaped corridors around the center of the main airport terminal, and five airside concourses are arranged radially and successively. The five huge corridors are waiting areas where passengers wait to rest and finally board the plane after the security check. The purpose of this design is to shorten the walking time of passengers, and they can walk from the departing floor to the farthest departure gate in 8 minutes. At the end of the five airside concourses, there are five themed open-air courtyards, namely, the Silk Garden, Tea Garden, Porcelain Garden, Pastoral Garden, and Chinese Garden [7]. This fusion of tradition and modernity is a collision between deconstructionism and Chinese gardens.

This huge new airport terminal has the world's largest roof area of 180,000 square meters. The dome alone is welded by 63,400 steel structures, which is equivalent to half the amount of steel used for the Bird's Nest, reaching 55,000 tons. The huge central hall with almost no pillar is a heavy dome supported by 8 groups of C-shaped pillars, 12 groups of support tubes and the surrounding curtain wall structure. Such a huge dome support structure is also a major innovation, which not only meets the needs of the structure, but also makes the structure itself a part of the landscape. The total amount of glass used in the airport terminal reaches 12,800 pieces, of which there are more than 8,000 pieces of roof glass. Because the huge roof is a free-form surface, the three-dimensional coordinates become a unique position by locking the connection of each rod piece and the spherical node. This has caused the roof's 8,000 pieces of glass to be different from each other, which is very different from the same system of the previous glass curtain wall. It is a rebellion against the immutable and stable order, and the construction difficulty is the most difficult in the world.

3.3 The Indoor Space of Daxing International Airport

Walking into the airport terminal, the interior color is mainly white in order to let the sun fill the entire airport. There is almost no need for indoor lighting during the daytime, because the overall ceiling of the airport terminal uses 12,800 pieces of glass. This greatly reduces the consumption of electric energy, and makes the space as a whole not depressed and transparent. The irregularly cambered grid ceiling introduces a large amount of daylight and can also serve as a guide for passengers. The search for the departure gate is no

longer as rigid as before, and it is full of novel feelings and accidental effects. The reform of the airport layout breaks the shackles of the old model, and contingency is also a feature that deconstructivism cares about. The airport terminal under the span of more than 100 meters allows the airport to have enough spacious public space, and in the future use, it needs the support of a large volume of space, and it can also be adjusted flexibly.

The hexagonal skylight occupies the core position of the entire airport terminal, and it looks like a stage as a whole, emitting radiant sparkles in the sun. And there is a light band extending from the top of each corridor, which is a specially set aside sunlight guide, extending to the end of each "petal". The C-shaped pillar is the core support of the entire building, with the top and the ceiling softly transitioning. ("Figure 2") This kind of building structure itself is an innovation, weakening the sense of disharmony between support and space, and innovating the style of building components. The huge roof relies on 8 C-shaped pillars as the main support and 6 of them are surrounded as a whole by a concentric circle with a diameter of 180 meters. This huge space is large enough to put the Bird's Nest in. This kind of building volume is rarely seen in the history of airport design, and only some religious buildings will need such a large space. On the other hand, in the use function of Beijing Daxing International Airport, the design method of mixed flow is adopted for departure and arrival, so that there is no obvious division between areas, which greatly improves the efficiency of use and maximizes the utilization of resources. Secondly, the reduction in construction cost also benefits from mixed flow design, because such mixing can reduce the floors quantity.

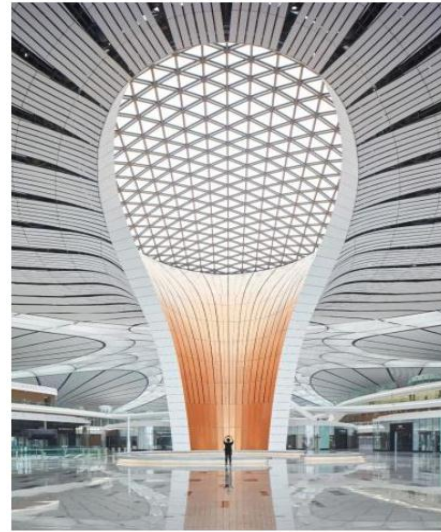


Figure 2 C-shaped pillar.

4. ENLIGHTENMENT FROM THE DECONSTRUCTION OF DAXING INTERNATIONAL AIRPORT

The design of Daxing International Airport is completely different from traditional airports in terms of form and function layout, reflecting a strong deconstructivism color. As the largest deconstructive building so far and a project completed in China, Daxing International Airport can bring inspiration to the development of Chinese architecture in many ways.

First of all, the layout of the architectural space needs to be adjusted according to the times. The spatial layout of Daxing International Airport breaks the shackles of previous airports and makes corresponding adjustments according to existing functional requirements. No layout can be said to be perfect. Layouts serve functionality, and functionality changes over time. Once the function of the Great Wall was to resist foreign enemies, but now it has become a tourist attraction, and its function has changed dramatically. The biggest factor that can affect the use is people. The space layout should be changed according to the existing needs to make it more in line with the space utility.

Secondly, there can be more breakthroughs in the building structure. In Daxing International Airport, the huge dome is constructed with a leaf-like structure, and the support of the entire roof relies on eight C-shaped pillars, which is different from the previous construction method. The use of the C-shaped pillar not only makes the connection of the components smoother, and makes the supporting pillar of the space itself a highly

ornamental object, and the central daylighting patio is also a function that the previous components didn't have. The reduction in the number of supporting structures greatly enhances the utilization of the entire space. The effect of this method on the construction of Daxing International Airport has already very large and significant. If it is extended to ordinary buildings, the effect is even more so.

Third, the symbolic abstract extraction of traditional elements is necessary. Landmark buildings completed in China must be integrated with the local area and integrated with Chinese traditional concepts. The intentional phoenix in the shape of Daxing International Airport is the result of abstract refinement. When others only copied the expression of Chinese classical elements, Zaha had already used her unique understanding to give new expressions of Chinese traditional elements. When the ice-cold architecture is endowed with humanistic feelings, the architecture and the region fit more harmoniously.

Finally, the diversified integration of art and architecture is needed. There is no distinction between architecture and art, and Daxing International Airport also takes this concept to the extreme. A total of more than 20 pieces (groups) of large-scale public art works add radiance and beauty to the whole airport, adding a lot of temperature and atmosphere of humanism to the ice-cold building. Architecture is considered to be frozen music. Architecture and art can be fully integrated and echo each other. The empty airport public space is full of artistic atmosphere and has high viewing value. For example, the International Departure is the most accessible place for people from all countries. They stay here for a short time and pass by. The dynamic installation "Flower of Time" is the public art exhibit in this area. It was created by artist Qiu Yu who was inspired by traditional Chinese folding fans. The time in 12 time zones around the world is re-displayed in Chinese poetic language. The 12 petals of the "Flower of Time" are two-layer folding fan blades. The fan blades rotate with the flow of time at the speed of the second hand and the minute hand, and they don't stop for 365 days, reminding people of the loss of time. Art intervention in space is already a very common phenomenon, and the combination of art and design will become the mainstream in the future.

5. CONCLUSION

As a deconstructionist building's challenge to traditional architectural models, Daxing International Airport provides new ideas and references for architectural innovation, expands the direction of architectural development, and also blows a breath of fresh air into the Chinese construction industry. In the continuous development and exploration, architects have used shocking expressions to become the focus of the public time and time again, promoting aesthetic changes and having a positive impact on the development of Chinese architecture. Through Daxing International Airport, how to combine new concepts with reality and shape irrational and counter-memory designs that are inclusive of Chinese culture is the future research direction of architects.

Nearly 40 years have passed since the development of deconstructivism. From the design works of Gehry and Tschumi, the first generation of deconstructionist masters, it can be clearly found that the deconstructionist architecture in China today is very different. The society and the industry's criticism of deconstructivism has led to its continuous development, and the continuous improvement of deconstructivism has been gradually recognized and accepted by society. The development of new things always requires a process. As the latest deconstructionist work, Daxing International Airport has interpreted many new development directions of deconstructivism for architects, and has instructive significance for Chinese architectural design.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Jiawei Mao.

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