

Regional Study on the Design of University Building Skin in Tianjin Area

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Abstract

In the context of economic globalization, in the face of the development of modern technology and commerce, urban architecture has seen a scene of a thousand cities. The regional characteristics of urban architecture are lacking, and the use of building and building materials is increasingly standardized. Especially in today's era of widespread commercial culture and mass media, people's way of thinking has turned into a visual effect. Affected by this, the skin of the building is madly pursuing visual effects, which separates the harmony between architecture and the environment. Under such a background, university buildings have created huge problems in the maintenance, identification and use of university buildings. This paper cuts through the regional perspective and analyzes the design of university building skins in an attempt to find a bridge to communicate with the environment. And provide a practical guide for college building design.

Keywords

University buildings in Tianjin area, building skin, regional performance.

1. Introduction

Since 1993, China's higher education institutions have responded to policies and the call of the times, and higher education has begun to expand and upgrade. According to the Statistical Bulletin of the Education Development of the Ministry of Education of the Chinese Republic of China, the large-scale expansion and expansion of colleges and universities nationwide began in 1999. According to the statistics of the year, the number of colleges and universities enrolled in the country was 1.6 million, an increase of 520,000 compared with 1998, an increase of 48%. In 1998, there were 408 colleges and universities, and 446 colleges and universities in 1999. By 2001, the number of colleges and universities enrolled was 2.68 million, the admission rate reached 59%, and the number of ordinary higher education institutions was 1,225. The number of college admissions and the number of schools has increased significantly.

Since the 21st century, with the rapid development of science and technology, human society has entered the era of knowledge and information, and the rapid development of productivity has enabled a large number of enterprises to be born. The society's demand for talents has become more diversified, which has also established the orientation of talent training in colleges and universities, which has gradually turned the original elite education to mass education, and the number and types of talents trained and quality have been improved to meet the talents in the new era. High-quality, innovative demand. This kind of demand is reflected in the education of colleges and universities, which is more and more specialized in colleges and universities. The emerging professions are emerging year by year, the number of institutes is increasing, and the intersection of disciplines has gradually become the norm. Under the background of new education and the times, the architecture of colleges and universities will also undergo major changes along with the changes in educational concepts. The architectural design of colleges and universities pursues unique individuality, green energy conservation, new style requirements, humanized architectural space, and architectural structure. Gradually pursue the characteristics of multi-layer and high-density layout.

2. The current status of university building skin design

The relationship between the building and the location and the role of the building's materials are very clear. In the era before the industrial revolution, the building materials of the building can be obtained from the nature of the place where it is located, and the connection between the building and the region is very close. The building skin was integrated with the building at the beginning of its birth, and the building skin only served as a building and structure. Different buildings in this period differ only in material and form. However, with the advancement of production technology, mankind entered the industrial revolution period, which brought new industrial materials such as steel, concrete and glass, and was widely used in the subsequent architectural design. The characteristics of rationalism are well known. With the development of industry, the standardization of construction methods and building materials, the problem of insufficient internal space and shape flexibility of the building has exposed the homogenization of the world's metropolis. At the same time, however, the new construction of the modernist building provides the necessary protection for the building's skin to be independent of the structure. Therefore, the corresponding architectural skin shape offers a variety of possibilities.

In response to these phenomena, especially after entering the information age, people's lifestyles have changed, people's needs have become more diversified and personalized, and the world's energy shortage and deterioration of the ecological environment have forced designers to take corresponding Measures. With the emergence and development of postmodernism, green design and ergonomics, all aspects of architectural design have received attention. In this context, the influence of building skins on buildings is gradually being valued by architects. Through the architect's thinking on contemporary architectural issues, contemporary architectural skin representations have been greatly innovated, bringing new interpretations to architecture. Such as: the ecological building skin and the new epidermis with the characteristics of the times to spread information, which indicates that the design and performance of the skin has entered a new stage. However, in today's society, the commercial consumer culture and the prevalence of self-media, people's cognitive style has turned into a visual iconic cognitive model, which makes the building's epidermis excessively pursue the external form of visual effects during the design. To a large extent, the connection between the building and the local environment has been separated.

Based on this background, in the process of expansion and expansion of colleges and universities in China, although some high-quality school buildings have emerged, many university buildings are designed to have insufficient construction funds, short construction period, and compulsory school leaders. Requests and other issues, this has led to the monotonous appearance of the school building, the characteristics of the school building is not much different from the school buildings in other areas; or some school buildings in order to highlight their own personality, over-emphasis, and the pursuit of grandeur, Disregarding the surrounding environmental impacts; or some teaching buildings do not pay attention to the relationship between internal space and external space, ignoring the students' behavior and psychological needs; some school buildings are built regardless of the local regional climate environment, causing cold winters and hot summers, wasting energy and other issues. It is also the architectural skin that is valued by the architects. As an independent part of the design, the characteristics of the style, personality, green energy saving and humanization of the current university buildings in China have an impact on the skin shape. Therefore, only by linking the building skin to regional characteristics, it is of great significance to study the epidermis of college buildings.

3. Based on regional analysis of university building skin

Based on the above analysis, the meaning and status of the contemporary building skin is improved. The role of the building skin is not only the original decoration and maintenance of the facade, but also the role of dividing the interior and exterior space, and is also affected by the building environment and building materials. To study the regional performance of building skin materials in

colleges and universities, aiming to establish the relationship between material performance and the regional environment of colleges and universities. Understand the understanding of this relationship, I will try to influence the form of building skin through the geographical climate environment and university building materials. The regional culture and green energy-saving technologies show that the university buildings can create regional characteristics while satisfying their own styles and functions, and provide an excellent learning environment for the students' good development.

3.1 Impact of Tianjin's geographical and climatic environment on skin design

The regional climatic conditions in Tianjin are important regional manifestations. Here, the differences in the climatic conditions of Tianjin and the performance of the university buildings and buildings in the region are expressed. At present, the architectural appearance of colleges and universities is greatly affected by the building function. The basic function of college buildings is to resist people from the outside environment. Therefore, the climate of the university building's location will also have an impact on the form of the building's appearance. This view is based on the external environment of the building and is an important foundation for architectural design and is widely used by architects.

According to the geographical and climatic data of Tianjin, Tianjin is located on the eastern bank of the mid-latitude Eurasia. It is a region where the East Asian monsoon prevails and is a continental climate. The main characteristics of Tianjin climate are: spring, summer, autumn and winter are distinct, spring is windy and dry and rainy; summer is hot and rainy; autumn is warm and moderate; winter is windy and cold, and snowfall is scarce. The annual average temperature in Tianjin is 11.3~12.8°C. In the 12 months, the coldest in January is -5~-3°C; the hottest average temperature in July is 26~27°C. The average annual precipitation in Tianjin is 520-660 mm, and the number of precipitation days is 63-70 days. In terms of regional distribution, there are more mountains than plains and more coastal areas than the mainland. In the seasonal distribution, precipitation in the three months of June, July and August accounted for about 75% of the whole year. Tianjin has a long sunshine time, with an annual sunshine hours of 2,500 to 2,900 hours. [1]

According to the climate zone of building thermal engineering and the climatic environment of Tianjin, Tianjin is a cold area. For cold areas, winter insulation requirements should be met, and some areas take into account summer heat protection. In view of the climate characteristics of Tianjin, we want to provide users with a comfortable environment, with emphasis on ventilation, shading and heat insulation. This has also shaped the different forms of building skin in Tianjin. In the contemporary university building design process, this climate difference is also well reflected. The whole building is facing the south in the winter for heating, paying attention to the position and direction of the window opening, so as to achieve good ventilation and natural heating. The exterior wall of the building is regular and has a deep depth to reduce the heat dissipation area of the building surface. For example, the architecture department of Tianjin University, the building body is shaped like a large square box with a smooth surface and a regular plane shape to reduce the heat dissipation area. It is a good example of the climate characteristics of Tianjin. In general, college buildings as high-energy public buildings, in the era of environmentally friendly green, Tianjin University's university building skin is closed, thick and regular, reducing heat dissipation area, saving energy, and at the time of design, more Follow the instructions of relevant professionals such as thermal design.

3.2 Influence of building materials on the form of university building skins——Taking Tianjin Vocational and Technical Normal University as an example

3.2.1 Characteristics of common building skin materials

(1) Concrete

Concrete is a building material that is as hard and thick as stone, but without the texture of the stone surface. Concrete has superior styling capabilities, with steel and glass materials as a representative of modern industrial materials. Concrete materials do not have the permeability of glass, but the use

of the building gives a calm, serious feeling. The concrete itself has good tensile and compressive strength, and the material itself is easy to match with other building materials. It is easier to make the space transparent and bright with the combination of glass and light. Concrete materials come in a variety of colors and can be made to different colors depending on the needs.

(2) Glass

Glass is one of the most representative materials of modern industrial civilization. Glass, like metal materials and concrete, is the representative of advanced productivity and has the spirit of the times. Unlike other materials, glass has the characteristics of transparency, light transmission and light weight. The use of glass materials in buildings can refer to the outside light and scenery, which will not cause spatial obstruction in the visual, but will make the space more flexible. The addition of metal oxides to the glass itself produces a color change that also enriches the architectural color.

(3) Stone

Stone is a common building material in the field of materials. It has been used in churches, temples and modern buildings throughout the thousands of years of human history. The stone material is hard, has thermal insulation performance, good compression resistance, but poor tensile strength. The feeling that stone conveys is mysterious and solemn. Stone is durable and is widely used in iconic buildings. Today's stone, not only as a building load-bearing material, but also as a building skin decorative surface material, makes good use of the stone's solid, long-lasting and serious features, and is widely used in some modern large-scale public buildings.

(4) Metal

Metal has been used as a building material for thousands of years. With the large-scale use of iron in the 19th century, metal materials were used in large-scale construction. Metal materials have high hardness compared to other materials, good tensile and compressive properties, good durability, and good styling ability. The smooth and precise reaction of the surface of metal materials is the advancement of modern technology. The flexible and versatile metal materials can be used in the construction of the skin to express the flexibility of the large space span and give the building a variety of forms.

3.2.2 The influence of building materials on the form of the skin of college buildings

(1) Tianjin Vocational and Technical Normal University Gymnasium

Tianjin Vocational and Technical Normal University Gymnasium is located in the Eastern District of Tianjin Vocational and Technical Normal University, with a total construction area of 25,200 square meters, of which the stadium has a construction area of 16,900 square meters. It is designed as three floors above ground and one underground. The Gymnasium of Tianjin Vocational and Technical Normal University Gymnasium is an L-shaped layout, parallel to Datun South Road, and the corner is treated at the corner to echo the outer ring overpass. A reinforced concrete frame structure is used. The large-span partial roof adopts a space truss structure, and the general building roof adopts a full cast-in-place ordinary beam plate. The building's skin of the stadium is mainly made of modern industrial materials such as metal and glass. Through the analysis above, according to the characteristics of metal materials, the stadium uses metal materials to provide a possibility in the diversity of architectural appearance. As shown in the details of the gymnasium, the rectangular shape is used as the basic type on the facade of the building component, which produces a gradual effect. At the same time, the sunlight is transmitted through the rectangular room, which increases indoor lighting and also produces indoor light and shadow. A variety of changes.

(2) Teaching main building of Tianjin Vocational and Technical Normal University

The main teaching building of Tianjin Vocational and Technical Normal University is located in the West District of Tianjin Vocational and Technical Normal University. This building has 11 floors and is a comprehensive teaching building with multiple college students. As the architecture depicts, the main building style of the main building is a modernist style with European classical elements. The building skin material is mainly designed with metal, glass and stone façades for building facades.

The teaching building uses metal and glass materials, and the appearance of the building is rich in the form of the building skin due to the characteristics of the material. At the same time, the main building of teaching is located at the main entrance of the school, which can be said to represent the spirit of Tianjin Vocational and Technical Normal University to a certain extent. The building skin is laid on the facade of the building through the stone, giving full play to the solemn, solemn and elegant texture of the stone, which makes the building give a calm and solemn feeling. The use of steel and glass materials on the top of the building has increased the lighting rate of the top floor to a certain extent, and the combination of different building materials has also enriched the cultural connotation of the building.

(3) Tianjin Vocational and Technical College Office Building

The office building of Tianjin Vocational and Technical Normal University is located in the northwest corner of the main teaching and is the gathering place for the administrative office of the school. The office building's skin is mainly made of clear water concrete and glass. In the construction of fair-faced concrete buildings, it must be completed in one time. The characteristics of the doors and windows and various components connected to the wall must not be changed. It is necessary to accurately design and locate in advance before embedding. The concrete surface of the office building has no other decoration, and the paint is removed to protect the environment. The combination of fair-faced concrete and glass makes the space soft and transparent. The use of these two materials in the office building's skin conveys a calm, serious atmosphere that promotes school productivity.

(4) Tianjin Vocational and Technical Normal University Library

As the school's document information resource center, knowledge exchange center and cultural communication position, Tianjin Vocational and Technical Normal University Library is committed to serving the personnel training and scientific research of the school. The library building skin mainly uses stone pendants and glass materials. The stone has a large self-weight, a hard texture, good fire resistance and thermal insulation, and has strong pressure resistance, but the tensile performance is poor. The use of stone in the building skin makes the appearance of the library not have a clear curve. The appearance of the library building is large, looking from the side of the library to see the past, like a book on a shelf of books, in line with the architectural function library. The library is made of stone and glass. The interior space of the building has the characteristics of reducing energy consumption due to the thermal insulation performance of the stone and the transparent light transmission performance of the glass.

Through the above case analysis, the visual experience brought by college buildings not only comes from the overall structure of the building, but also the visual presentation of the building skin. Building materials are an important part of the overall feel of the building. As an architect, he should be good at understanding the characteristics of building materials, and make full use of the shape, color and texture of building materials to design services. The designed buildings can better satisfy people's aesthetics and express the authenticity of materials.

4. The influence of regional culture on the design of the skin - Taking Tianjin University as an example

“Many architects give the building a certain symbolic meaning to a certain culture, spirit or ideal, because the symbolic meaning of the form always causes the public to resonate and communicate.” [4] The building skin can be used when people appreciate the building. Intuitively, it acts as a medium of communication and also carries the spirit of the place.

Campus culture is a hidden function of education. Its purpose is to cultivate students' morality and ideals. University building is an important place for teachers and students to communicate and learn. It is the place where students stay in school for the longest time. The changing and interesting architectural skin promotes the learning and work of teachers and students. The building skin that is rich in campus spirit brings a sense of identity and belonging to students and teachers. When designing the epidermis of college buildings, we must pay attention to the connection with campus

culture, so that the culture of the campus can continue with the passage of time. It can be said that the university building skin is a transmission medium of cultural symbols. It is connected with the campus culture through certain art forms to form a unique place spirit of the school. Therefore, the building skin is also cultural. The campus culture of colleges and universities is formed through a long period of time. Each university also has its own culture, which reflects the different forms of architectural skin.

Beiyang Plaza on the campus of Tianjin University is a comprehensive garden construction project. When people passed through the noisy Weijin Road, crossed the Weijin River Bridge, and stepped into the gates of Tianjin University, they paid attention to the campus and their sights will be focused on the historic Beiyang Memorial Pavilion. The Beiyang Memorial Pavilion is in a square style with simple style. It is made of granite. The top is the relief of the double dragon play beads. Under the relief, there are several characters of "Beiyang University Hall 1895". Below is the door formed by the arches of two stone pillars. Next to Beiyang Pavilion is a statue of Zhang Tailei Martyrs. Over the years, the Beiyang Memorial Pavilion has become one of the school's landmarks. Every week, various events are held to attract people to pursue history and yearning for the future, and to understand the cultural spirit of Tianjin University.

In short, the building skin has a cultural attribute, and its place expresses the unique cultural spirit of the area. On the contrary, in the design of college buildings, we must pay attention to the connection between the cultural connotation of the building skin and the spirit of the place to achieve a harmonious and unified situation.

5. Conclusion

With the acceleration of urbanization in China, a large number of buildings have been built, and the appearance of each city has become homogeneous. In the process of construction, there are widespread problems of large scale, short construction period and tight capital. This kind of problem and the design of the building are also present in the architectural design of colleges and universities. The newly designed buildings built by universities in various regions have the same feeling. In order to solve this kind of rapid construction and neglect the multi-party needs of college teachers and students and the regional architectural characteristics of colleges and universities, this paper starts from the improvement of the building skin, guided by regional factors, this article from three major approaches: Tianjin climate environment, building skin materials and Associated with regional culture. Firstly, the design characteristics of university building skins are obtained from the analysis of climate environment data in Tianjin. Secondly, the influence of building materials on the shape of university buildings is analyzed. Finally, the building skins are related to regional culture through college campus culture. In short, the influence of building materials on the building skin is great. Whether it is from the color, shape and texture of the material, the change of building materials will have an impact on the building skin. When we face some bad problems in the current building skin, as a designer, we must fully understand the characteristics of building materials according to the climate of the local area, and combine the regional culture of the place to carry out creative expressions to create Regional architecture of college buildings.

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