

The Coordination Analysis of Architectural Structure Design and Art Design

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Abstract: Excellent Architectural Design Works Are the Result of the Architect's Coordination of the Relationship between Structural Design and Artistic Design. Architectural Engineering Design Should Be Clear about the Design Focus. Some Buildings Focus on the Pursuit of Aesthetic Appearance and Artistry While Some Buildings Focus on the Use of Function. However, There Are Many Problems in the Process of Coordinating the Relationship between Art Design and Structural Design. Based on the Elaboration of Relevant Theories, This Paper Takes the Design of Processing Factory as a Case, Analyzes the Problems Existing in the Coordination Process of Architectural Structure Design and Art Design, and Then Puts Forward Targeted Countermeasures and Suggestions, in Order to Provide Some Reference for Coordinating the Relationship between Architectural Art Design and Structure Design.

1. Introduction

1.1 Literature Review

Yuan Ye elaborated the importance of strengthening the safety design of building structure, analyzed the current situation of the safety design of building structure, and put forward relevant optimization measures to improve the safety of building structure design from the aspects of improving the stability of building structure, innovating the design mode of building structure, etc. (yuan, 2018). Wang Haoyun focuses on the relationship and combination between art design and structural design. He believes that architectural art not only originates from life, but also will be applied to life to create a space with aesthetic value for people. However, its aesthetic value should be reflected through the mutual confirmation between the architectural image and the main body of the building, that is, to integrate the architectural art into the structural design (Wang, 2012). Shi Xiang first briefly discusses the relevant optimization methods of architectural structure design, then expounds the significance of design optimization, and discusses the specific application of architectural structure design optimization (Shi, 2018). Sun Lingling and Li Zhigang pointed out a series of problems existing in the design of some architectural structures, and put forward some corresponding solutions (sun and Li, 2011). Chen Xuetong pointed out that there are some problems in the design of the building structure, such as the low attention to the implementation of the building structure, the unreasonable arrangement of the building structure and the unreasonable design of the foundation, and proposed that the relevant contents and principles of the building structure design should be clarified, so as to continuously improve the design quality of the building structure (Chen, 2017). On the basis of expounding the importance of optimization method of architectural structure design, He Wenjie puts forward relevant principles of architectural optimization structure such as safety principle and functional principle, and discusses a series of strategies for optimizing architectural structure design from the aspects of foundation design optimization, drainage system optimization and electrical optimization (he, 2018). Bai Weimin discusses the principles of architectural structure optimization design, points out that traditional architectural structure design has been difficult to meet the current social development needs, emphasizes that construction personnel should continue to improve their cognition and understanding of architectural structure design, and puts forward a series of architectural structure design from the aspects of optimizing overall architectural design scheme, optimizing architectural plane design scheme and optimizing building materials. (Bai, 2017).

1.2 Purpose of Research

As an important basic industry of national economic construction, construction industry not only plays an extremely important role in promoting the rapid development of economy and society, but also has important practical significance in improving the quality of people's life. With the rapid development of China's economy and society, people's requirements for architectural design are also increasing. However, in the process of architectural design, there are still some problems in the coordination between architectural art design and structural design. In view of this, this paper attempts to analyze the problems existing in the process of coordination between architectural art design and structural design, and then puts forward countermeasures and suggestions, hoping to provide reference for strengthening the coordination between architectural art design and structural design, so as to design more successful buildings.

2. Overview of Relevant Theories

Only by combining structural design with artistic design can architectural design achieve better results. With the continuous development of science and technology in China, architectural engineering design is becoming more and more professional and standardized, and the importance of coordination between architectural art design and structural design is increasingly prominent. Successful buildings generally have a reasonable and practical structure. The architectural design of the earthquake zone needs to focus on strengthening the seismic performance of the building, followed by the continuous improvement of the architectural art function. Therefore, there are different design priorities for buildings in different regions. In the process of architectural engineering design, architects and designers should not only pursue the beauty of architecture, but also the safety and rationality of architecture. Generally speaking, we can divide the design of civil engineering, public building and commercial building into two categories. One is to give consideration to both structural design and artistic design of architectural engineering, but it is still mainly focused on structural design. Such buildings pay attention to the combination of economic and applicable functions and artistic functions. The other is that the architectural engineering design mainly pursues the artistic sense, more emphasizes the artistic design, and puts the architectural structure design in a relatively secondary position. In this kind of architectural design process, structural design is subordinate.

3. Problems in the Process of Coordination between Architectural Design and Art Design

In the process of architectural design, some architectural designers have the problem of blindly pursuing the individuality and novelty in the aspect of creativity, ignoring the relevant mechanical characteristics and technical principles of the architectural structure, affecting the rationality of the architectural structure design, thus causing great difficulties in the structural design and application of the building. As a result, the building bears additional load, earthquake force, horizontal wind force and other torsion and external force, and some structural instability problems appear. For example, compared with the related sections of rectangular, circular or polygonal buildings, the lateral resistance and bending resistance of the related sections of triangular buildings are lower.

In addition, some architectural designers lack the common sense of structural mechanics. In the process of architectural design, there are some problems such as neglecting the mechanical laws. For example, in the earthquake area, some elevators of high-rise buildings are set on one side of the building, but do not coincide with the stiffness center of high-rise buildings. Because of the large rigidity of the elevator barrel, it is difficult for the load center and the rigidity center to be close to each other as much as possible, which leads to the deflection of the structure, resulting in torsion and damage.

As the two links of architectural engineering design, art design and structural design play an important role in the structural stability and appearance art of architecture, and there is a relationship of coordination and restriction between them. In view of the coordination and

cooperation between architectural structural design and art design, this paper analyzes it with relevant cases.

Due to the large number and variety of machines and equipment, it is necessary to guarantee a large space in the workshop when designing the processing plant. Ensure that the beams inside the workshop are of sufficient height, and that no partition wall is allowed in the workshop. In order to ensure the safety of production, the necessary fire protection facilities should be placed inside the workshop when designing the processing plant. In the past, when designing the processing plant, it was generally chosen to use the curved frame structure and the corresponding specifications of the factory wall bricks. The top of the workshop chose to use the reinforced concrete thin plate beam structure. However, there are still some deficiencies in this plant structure. This kind of processing plant is large and uneconomical, and the plant engineering cycle is long. In view of the above problems, at present, light steel structure and steel structure workshop are mostly used in the factory building. This kind of processing factory has changed the disadvantages of traditional factory building design and can better meet the production needs of enterprises. The plant design should fully consider the production demand, in terms of functional layout, it should meet the convenience of transportation activities and production activities as much as possible, ensure the production efficiency, and create a better workshop environment for employees. The design of processing plant should take this as a reference, and focus on the convenient construction, structural economy and short construction period.

4. Coordination Path between Structural Design and Artistic Design

As two important links of architectural engineering design, structural design and art design affect the quality and aesthetic feeling of buildings to a great extent. The coordination between them has a very important impact on the overall planning of buildings. The relationship between them is coordinated and restricted. In the actual construction engineering design work, some architectural designers often pay too much attention to the pursuit of building shape, and put the structural design in the secondary position. This requires that the structural design comply with the concept of art design, which violates the principle of integrity and scientificity required by the architectural design, and to a certain extent, it lays a hidden danger for the safety and quality of the building.

On the one hand, a successful building should pursue the individuality and novelty of art design, on the other hand, it should fully consider the rationality and practicability of the building. It can be seen that the structural design of buildings has a very close relationship with the actual use effect. Especially in the design of high-rise buildings, because the main control load is the horizontal load, so the design requirements of wind resistance and earthquake resistance should be fully considered in the structural layout and structural selection. In addition, the architectural designer should also fully consider the factors such as the section size of structural members.

At present, in terms of technology, almost all kinds of architectural structures can be built. However, we should pay more attention to the measurement of structural efficiency in the design of architectural engineering, and pay special attention to economic benefits in the structural design and architectural design. The buildings with reasonable design have certain exterior expressive force, but the buildings that simply pursue aesthetic feeling and ignore structural principle are not practical. Architects should break the shackles of traditional architectural design ideas, on the basis of fully understanding the intention of architectural design, and constantly improve and innovate architectural design by using structural design principles. Architectural designers should not only pursue the aesthetic appearance of the building, but also design the reasonable structure of the building. The overall design of the building has a certain impact on the concrete structure design of the building, and the structural design level of the building will also restrict the overall design level of the building. Therefore, in the process of architectural engineering design, architectural designers should further coordinate and unify the relationship between architectural structure design and overall design. Only by closely coordinating the relationship between them can we design a successful architectural work.

References

- [1] Yuan Y. (2018). Analysis on the Current Situation and Optimization Strategy of Architectural Structure Design Safety. *Modern Property (mid ten issue)*, 13(10), 47.
- [2] Wang H.Y. (2012). The Perfect Combination of Architectural Art and Structural Design. *Building Materials and Decoration*, 15(32), 39-40.
- [3] Shi X. (2018). Analysis on Optimization of Architectural Structure Design in Housing Structure Design. *Sichuan Building Materials*, 45(05), 60-61.
- [4] Sun L.L., Li Z.G. (2011). Problems in Architectural Structure Design and Solutions. *China Science and Technology*, 10(6), 122.
- [5] Chen X.T. (2017). Analysis of Common Problems in Building Structural Design. *Jiangxi building Materials*, 39(2), 68 + 74.
- [6] He W.J. (2018). Optimization Strategy of Building Structure Design in Building Structure Design. *Green Building Materials*, 6(12), 77-79.
- [7] Bai W.M. (2017). Optimization Strategy in Architectural Structure Design. *Science and Technology Innovation and Application*, 9(7), 258.