Research on the Application of "Compensation Effect" in the Design of Urban Super High-Rise Buildings Based on Big Data

Guangying Hu\textsuperscript{1,*}
\textsuperscript{1}Yunnan Technology and Business University, China, 650217

*Corresponding author e-mail: huguangying@yngsxy.edu.net

Abstract. With the development of urbanization, more and more super high-rise buildings are put into use. Big data research shows that in order to reduce the disadvantages of super high-rise buildings, meet the needs of people for the natural environment and relieve the physical and mental needs, more and more super high-rise buildings apply compensation effect in the design process. This paper first analyzes the adaptability of super high-rise buildings to compensation effect, then studies the composition of compensation mode of urban super high-rise buildings, and finally gives the design and implementation of urban super high-rise buildings based on compensation effect\textsuperscript{[1-3]}.

Keywords: Compensation Effect, Super High Rise Buildings, Urban, Big Data

1. Introduction
With the rapid development of urbanization in China, more and more super high-rise buildings appear in the city skyline. The super high-rise building not only alleviates the shortage of urban land, but also brings a series of problems. For example, super high-rise buildings will cause environmental damage, which is not conducive to long-term application. In addition, the super high-rise building lacks the integration with the external natural environment, which makes the users in the building feel homogenous and lack of natural characteristics. Therefore, in order to meet people's needs for natural environment and physical and mental relief, more and more super high-rise buildings apply compensation effect in the design process to meet the sustainable long-term architectural design concept. The design of urban super high-rise building based on compensation effect helps to compensate for the lack of natural environment, so as to improve the environment of super high-rise building and promote the harmony between people and buildings, and alleviate the problem of single internal function and monotonous use space of urban super high-rise building. Therefore, it is of great practical significance to study the application of compensation effect in urban super high-rise building design\textsuperscript{[4-5]}.

2. Adaptability of super high rise building to compensation effect

2.1. Compensation effect help to realize the environmental compensation of super high-rise buildings
The application of compensation effect design in urban super high-rise buildings can not only directly connect and exchange the super high-rise buildings with the external natural environment, but also help to reduce the demand for ventilation and lighting of super high-rise buildings, so as to realize the green design concept of energy conservation and emission reduction of super high-rise buildings. In addition, the application of compensation effect is also an important means to realize the ecological design concept of climate adaptability of super high-rise buildings. Figure 1 below shows the design configuration of super high-rise building based on environmental compensation effect. It can be seen that through environmental compensation, lateral lighting can be effectively realized, and free and open enclosure can be obtained at the same time. Not only that, the design of super high-rise building based on environmental compensation effect can improve the air environment while taking into account the space, behavior and physical factors inside the building. Therefore, super high-rise buildings have good environmental and spatial adaptability to compensation effect.

2.2. The development of modern building technology lays a foundation for the application of compensation effect in super high-rise buildings

With the development of modern building technology, great changes and changes have taken place in both building space and building configuration of super high-rise buildings, which creates sufficient conditions for the application of compensation effect in super high-rise buildings, so that the compensation effect can be applied in different forms in the design of super high-rise buildings, and constitutes its characteristics. In addition, the development of modern technology makes the compensation effect of super high-rise buildings develop to the vertical space direction, and the maturity of vertical and three-dimensional technology makes the design of environmental compensation of super high-rise buildings more free, which greatly expands the three-dimensional living space of urban super high-rise buildings.

3. The constitution of compensation mode for urban super high rise buildings

3.1. Compensation of space environment

In order to meet the different needs of the interior of the building, the interior of the super high-rise building is often designed into different functional modules. Although these functional module spaces can also meet people's daily needs, they are lack of humanization and harmony. In order to integrate different functional space modules in the building and realize the overall coordination, the design based on compensation effect in the super high-rise building can build a harmonious shared space. It is not only beneficial to relieve the physical and mental pressure of users of super high-rise buildings, but also to promote communication and exchange. In addition, based on the compensation effect application in the super high-rise building, the three-dimensional space system can be realized, and the multi-layer three-dimensional space layout can be constructed, as shown in Figure 2 below.
3.2. Compensation of behavior environment
Although super high-rise buildings effectively alleviate the tension of urban land, they also bring problems such as building internal development space construction, building internal space isolation and so on. These problems lead to the lack of sufficient communication and exchange between the internal personnel of the building, which is not conducive to the establishment of the behavior relationship of the internal personnel of the building. Based on this, the application of compensation effect in the compensation of human behavior environment in urban super high-rise buildings will help to promote the communication among the people in the building and the reconstruction of the working and living mode of the people in the building. In order to make the super high-rise buildings more integrated with the external environment and promote the communication between the users of the building's internal space, many super high-rise buildings adopt the compensation method of block stacking to form a diversified space shared by users. This kind of behavior environment compensation not only keeps the traditional communication mode of users and establishes their associated space, but also meets the emotional needs of users.

3.3. Compensation of physical environment
The introduction of physical environment compensation design to super high-rise buildings can improve the physical space of buildings, realize building energy saving, and realize the harmonious coexistence of building performance and ecological environment. The design of urban super high-rise building based on physical environment compensation constructs a large number of open spaces for the interior of super high-rise building, which can realize the interaction between the building and the external environment and the integration of the natural environment into the interior of the building. This can not only improve the internal environmental conditions of the building, but also relieve the physical and mental state of the personnel inside the building. In addition, the design of urban super high-rise buildings based on physical environment compensation improves the spatial quality of super high-rise buildings and realizes the long-term ecological effect of building environment. Under this compensation mode, the design can effectively change the traditional lighting mode, build the climate buffer inside the building, and form a comfortable thermal environment space. Its configuration is shown in Figure 3 below.

Figure 3. Design of urban super tall building based on physical environment compensation.

4. Design and implementation of urban super tall building based on compensation effect
The development of modern building technology creates sufficient conditions for the application of urban super high-rise building based on compensation effect, so that compensation effect can be applied in different forms in the design of super high-rise building, and constitutes its characteristic attribute. With the development of modern technology, the compensation effect of super high-rise buildings is greatly developed in the direction of vertical space, which improves the problem of space isolation and differentiation caused by the traditional design of super high-rise buildings, improves the design of public space, and makes the layout of public plane more free.

In addition, based on the compensation effect, the urban super high-rise building design makes full use of the vertical space of the building, improves the shortcomings of the traditional super high-rise building design, and gives the users inside the building a higher sense of humanity. And through reducing the core tube inside the super high-rise building, making full use of the overhanging space inside the super high-rise building, forming the opening space and the through space inside the building. In the overall layout design of urban super high-rise building based on compensation effect, the transition space inside the building is fully used for connection, and multi-level environmental compensation is created in the vertical space. By connecting the vertical nodes, the vertical connection is realized and the vertical node space is activated, and the internal vertical space and plane space of super high-rise building are further optimized. Through the functional construction of super high-rise building space, the functional adaptability of super high-rise building is realized, and the long-term ecological effect of super high-rise building is realized through compensation effect.

5. Conclusion

Big data research shows that although urban super high-rise buildings are more and more popular with the development of the city, the lack of integration of super high-rise buildings with the external natural environment will cause the loss of the internal ecological environment of the building, which is not conducive to people's long-term living and use. In the design process of super high-rise buildings, compensation effect is applied to meet the sustainable long-term architectural design concept. Through different compensation modes such as space environment compensation, behavior environment compensation and physical environment compensation, urban super high-rise buildings make full use of vertical space of super high-rise buildings, improve the design of internal public space of buildings, improve the internal environment of buildings, realize the functional adaptability of super high-rise buildings, and achieve sustainable development goals such as ecological environment protection.

References

[1] Wang Qing, Jia Beisi, Li Miner. Reflection on functionalist architecture and low-carbon architecture: a preliminary study on the theory and strategy of long-term Architecture [J]. Urban architecture, 2015 (31): 13-15.

[2] Xiao Bo. Architectural design and application of plant microclimate effect [D]. Xi'an University of architecture and technology, 2015.

[3] Sun Qingfeng. Research on spatial construction of urban commercial blocks based on spatial syntax analysis [D]. North University of technology, 2014.

[4] Wang Qing, Jia Beisi, Li Miner. Reflection on functionalist architecture and low-carbon architecture: a preliminary study on the theory and strategy of long-term Architecture [J]. Urban architecture, 2015 (31): 13-15.

[5] Deng Mengren, Kong Weitan, Guo Haoxu. Syntactic analysis of architectural space under the intervention of grasshopper -- Taking block type commercial buildings as an example [J]. South Architecture, 2017 (3): 94-100.