Research on the Sustainability Design Concept of High-Rise Building

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Abstract: The feasibility of sustainability design in future high-rise buildings in urban centers was outlined. Several architectural plans with different degrees of environmental sustainability characteristics were analyzed and discussed. The concept of high-rise buildings based on sustainability was discussed and finally summarized. The basic principles that need to be taken into account when implementing this concept.
Keywords: Sustainability; Design concept; High-Rise building

1. INTRODUCTION

With the improvement of the economic level, the quality of life of people has been improved, and the demand for all aspects has increased significantly. With regard to environmental protection, more and more attention has been paid to the concept of sustainable environmental protection has also become a prerequisite for social development and urban construction. In this situation, the construction industry is also increasingly developing towards sustainable buildings. The sustainable building design, specifically speaking, is to link the actual ecological environment, consider energy conservation and environmental protection, and combine the design methods of traditional architecture to complete the sustainable building design and realize the harmonious development of man and nature. . If we consider from the perspective of economic development, sustainable building design not only allows buildings to meet energy-saving, low-carbon and environmental-friendly needs, but also brings people a comfortable material enjoyment while satisfying people's spiritual needs through the application of various Environmental protection technology means to reduce or even eliminate environmental pollution and promote the harmonious development of the city. It can be said that sustainable building design realizes the perfect combination of ecological environment and architecture, and promotes the harmony between human and nature.

2. SUSTAINABLE ARCHITECTURE DESIGN THEORY FOR HIGH-RISE BUILDING DESIGN OPTIMIZATION STRATEGY

With the rapid development of modern science and technology, many designers have practiced bionic form theory in many high-rise buildings with complex shapes and structures. For those complex and distorted architectural forms and challenges to conventional structures, they can use computer simulations to analyze reasonable structural shapes and how they can be more appropriate to the local environment, so as to design and build more sustainable ecological and innovative structures. .

The spiral building of the Nagoya Mode Academy designed and built by Nikken Design & Design Co., Ltd. drew on the double helix structure of DNA, matched with the spiral natural form, and the building height reached 170m. Taking into account the overall design requirements, the building envelope structure is a large glass curtain wall, and the use of three-dimensional frame splicing, and its flow system is a double open mode. The 3D structure utilizes more than 2,000 glasses of various shapes and angles, and conducts rigorous experiments in the wind tunnel. Finally, the best glass construction angle is selected. The glass designer for the curved surface adopts a slideable pane. The double open air circulation system, the outer window frame and the inner window are combined to enhance the indoor air quality on the premise of improving the utilization of air conditioning energy.

The site where the building is located is a transitional zone between the private space inside the building and the public space outside the city. As long as the various traffic spaces of the external city are connected through the building site and the interior of the building, the connection between the space of the city and the building can be partially alleviated. . The bottom space of a high-rise building can be divided into two parts: the podium and the basement. By cross-optimizing the two parts, the bottom space and the use efficiency of the site can be effectively improved, thus making the city and the building more efficient and Greater development potential. The Hong Kong International Commerce Center designed by KPF Architects is a 118-storey sustainable integrated building. Its sustainability is reflected in its design with the Kowloon Metro station, one of the largest transportation systems in Hong Kong. The building is well connected with the surrounding space and urban space and responds to the surrounding buildings and the urban transportation space. Contact it. Hong Kong's Global Trade Plaza has a large and complex three-dimensional transportation network. Through a computer-based sustainable building design strategy system and precise calculations, the commercial space inside the entire transportation network and the surrounding urban space are organized in an organized manner. The entire three-dimensional transportation network is With ICC as the center, people in surrounding buildings and public spaces can quickly reach their

destinations.

The theory of architectural shading can first be derived from the ancient Greek writer Zanofen. His book describes how to use the colonnade design to block the sunlight from reaching the interior of the building. The shade of modern buildings can be divided into window shade, wall shading, roof shading, green shading and other forms. Among these shading measures, window shading has undoubtedly played the most important role. Al-Hamra Tower is the tallest building in Kuwait City. The building is designed as a special space form that is folded into the interior. It can also reduce the heat radiation from the sun to different floors on the premise of enhancing the visual field within the building. In order to minimize the influence of solar radiation on the building, the designers adopted a clear material syntax. The southern wall was designed to be tall and heavy. In the design of the openings, the design of the building was followed by targeted design. This wall plays a major role in bearing, and it can also isolate the building from the harsh local environment, which greatly reduces the heat radiation from the sun to the interior of the building. And through the treatment of stone decoration, let the sun and the wall produce a solid and heavy security.

3. THE ROLE OF SUSTAINABLE BUILDING DESIGN IN HIGH-RISE BUILDING DESIGN

Energy conservation is the most important goal of sustainable building design. When carrying out sustainable building design, we can make full use of the environmental resources of the building site, make reasonable local materials, comprehensively consider various factors, and reasonably design the layout, shape, and volume of the building. In the actual construction process, the choice of building materials is also controlled very well, achieving the purpose of energy conservation.

The problem of getting along with nature has always been the most troublesome issue, and the concept of sustainable design has promoted harmony between man and nature. Applying the concept of sustainable design in high-rise buildings, abandoning traditional building methods and taking full account of natural environmental factors, not only reduces the harm caused by man-made work to the natural environment, but also integrates the natural environment and architectural design It provides a very good foundation for the harmonious coexistence between man and the natural environment.

With the development of economy, the construction industry is unreasonable to control the energy in pursuit of interest. The concept of sustainable design is the most effective and most important way for high-rise buildings to achieve energy conservation and environmental protection.

4. THE BASIC PRINCIPLES AND OBJECTIVES OF ECOLOGICAL HIGH-RISE BUILDING DESIGN

Eco-High-Rise Buildings When high-rise buildings are placed in the natural environment, this artificial building can interact with the natural eco-environment without causing a counter effect. In the concrete design, the impact of high-rise buildings as artificial products on the natural environment and the material energy conversion mode of high-rise buildings and natural environments should be considered. In the current situation of global lack of resources, under the goal of ecological high-rise building design is to emphasize the recycling of resources, that is, the five R principles. Revalue is re-evaluation, Renew is update, Reuse is re-use, Reduce is to reduce consumption, and Recycle is recycling.

Re-evaluation is the meaning of Revalue. The era of the industrial revolution was the era when human beings had the greatest destruction to nature. When human beings over-exploited and used coal mines casually, they had endless destruction to nature. This not only ruined the limited resources of nature, but also destroyed the environment of nature. Humanity's madness has been severely hit back by nature. Only then did humans realize the seriousness of destroying nature. Humans began to re-examine the past behavior and re-evaluate the past concept of existence.

Modern high-rise buildings have begun to emphasize the use of buildings, but in the actual operation of high-rise buildings, they are more often judged from the perspective of artistic vision, so as to ignore the impact of high-rise buildings on the surrounding environment, especially the ecology. Therefore, the concept of renewal, using sustainable development perspective to view high-rise buildings, we must rethink and re-evaluate high-rise buildings, in order to identify the design of high-rise buildings.

Renew is the meaning of Renew. The renovation of old high-rise buildings can reuse waste resources. Demolition and re-radiation of old and old buildings will bring necessary noise and waste of buildings. Whether it is construction or noise pollution, it will affect the surrounding residents, and it will also have a bearing on the natural environment. The impact not only wastes manpower, material and financial resources, but also means the beginning of a new round of building construction. In the construction of new buildings, it will generate the necessary construction waste and noise pollution, as well as waste new natural resources and Human resources and construction resources will not only increase the burden on human and financial resources, but will also have a certain impact on the environment. If we can maximize the effective use of existing buildings, we will be able to meet new human requirements through reasonable reconstruction, reduce the waste of resources and capabilities, and protect the environment. Reducing the reduction is the meaning of Reduce. In ecological construction, it can mean reducing the consumption of natural resources, saving energy, and saving materials. This can save the use of renewable resources, reduce damage to nature, and can also reduce the environmental damage to humans.

Reuse is the meaning of reuse and reuse. Among ecological high-rise buildings, reuse refers to the reuse of previously available resources, such as old equipment, old furniture, old parts, etc., which can be reused as long as they are available. This can reduce the demand for nature and maximize the maintenance of ecological

balance.

Recycling is the meaning of Recycling. There are many resources in the ecosystem, especially rare resources, scarce resources, and non-renewable resources, which cannot be degraded naturally. Such resources can be reused through recycling and recycling. Or reuse it by further processing. At the same time, it can also consider the use of building materials, treatment methods, and rational arrangements for recycling.

In the development of ecological high-rise buildings, it is not only limited to the reduction of negative environmental impacts, but also to the predictability of the design of buildings. The local climate and environment, the technical mastery ability at that time, the local cultural conditions and the local terrain are all factors that are considered in the design of buildings. It is necessary to consider and scrutinize the design of buildings to create creative inspiration and the surrounding environment. The full grasp of such a prelude can make the design of the building as if it were local native plants planted on the earth. Such a building can guarantee its sustainable development requirements. These things are inextricably linked with the design concept and are directly related to the merits of high-rise building design. In short, this is ecological architecture. It is to reduce the damage to the environment.

5. APPLICATION OF ECOLOGICAL ARCHITECTURE IN HIGH-RISE BUILDING DESIGN

In high-rise building design, the re-evaluation design technology of ecological architecture refers to the secondary evaluation and examination of high-rise buildings. In the past, the design control of high-rise buildings focused on the construction and use functions of buildings and the performance of external art forms. It did not regard environmental pollution and energy effects as the basis for design control. With the current changes in the design concept of high-rise construction, more and more designers are proceeding with design activities from the perspective of environmental protection. Specifically, in the process of determining the quality of high-rise building design, the elements of the ecological environment are integrated into it to promote the sustainable development of the construction industry.

The ecological architecture is applied to the principles of high-rise building design. As the name implies, it is to renovate some old high-rise buildings so that they can meet the needs of the current ecological environment construction design. For example, for some old high-rise buildings that are inconsistent with energy-saving and environmentally-friendly design requirements, energy-saving and environmental-protection controls cannot be implemented by using only demolition measures. This is because the demolition measures will not only produce a large amount of construction waste and noise pollution, but will also reduce the ability of the surrounding natural environment to withstand the use of the building. Moreover, from a practical point of view, when demolishing high-rise and old buildings, a new round of project construction must be carried out. This situation not only increases the cost of building design, but also deepens the noise pollution of high-rise buildings and the pollution of construction waste. .

However, the application of ecological architecture theory is to update and renovate old high-rise buildings in order to increase the efficiency of the use of building resources. Specifically, it is to use existing building resources, adopt energy-saving and environmental protection technologies, and adopt the transformation to achieve the standards set for the development of ecological high-rise buildings. This will not only save a lot of construction resources, but also provide protection for the ecological environment surrounding the buildings. In order to achieve the current goal of energy conservation and environmental protection, the high-rise building design and use process should use certain technical means to reduce the energy consumption of buildings. Specifically, it is to ensure that the basic functions of high-rise buildings are not affected, and design planning means are used to maximize the effect of the application of energy-saving and environmental protection technologies. In this way, the energy consumption resulting from the construction and use of high-rise buildings can be maximally reduced, and the impact on the surrounding natural environment can also be reduced.

This eco-architecture design control uses the remaining resources in the past during the design and construction of high-rise buildings. Such as the use of floor tiles in abandoned buildings in the decorative design of new buildings. In addition, electrical equipment removed from abandoned buildings is also used again to reduce energy consumption in the production and construction of new products. In this way, not only the energy conservation and environmental protection effects of high-rise buildings have been guaranteed, but the ecological construction effects of industrial production have also been improved to some extent.

The application of this design control concept is to strengthen the recycling of energy and resources in the process of high-rise building design energy-saving control, that is, by increasing the shortage of scarce resources, rare resources, and the recovery of natural non-degradable materials. For example, for high-rise buildings that consume large amounts of water, the design should avoid the use of disposable sewage discharge methods in the past to control possible environmental pollution and waste of water resources. Instead, during the design of the water supply and drainage system, the collection and treatment of rainwater and general domestic water is increased to use it as a toilet flushing and landscape water body. In this way, the water resources used in the construction of high-rise buildings have been maximally utilized.

6. CONCLUSION

To achieve the sustainable development of high-rise buildings and design sustainable ecological buildings that are consistent with sustainable development, we must conduct a comprehensive and detailed analysis and research on the energy loss of buildings. Only by

accomplishing the above points can we choose the appropriate sustainable building design strategies and methods for the design of super high-rise buildings according to local conditions. This article selected some representative excellent works from all parts of the world, conducted detailed analysis from various aspects, and summed up the bionic configuration optimization strategy, the integration of the site's optimization strategy, and the building's self-shading optimization strategy based on the concept of sustainable architecture. Optimization strategies provide ideas for future creation. We hope that more architects will use their creativity and imagination to develop new sustainable and sustainable architectural design concepts and traditional design methods to design and build more advanced science and technology today. Many sustainable high-rise buildings have made their own contribution to the sustainable development of the current society.

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