# Research on High-rise Building Design Based on Ecological Architecture

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**Abstract:** With the continuous development of economy and urbanization, the building level has been improved correspondingly. In this case, the number of high-rise buildings has greatly increased which not only brings better planning effect for urban construction, but also brings different living experiences for people. With the increasing demand for quality of life, the quality of high-rise buildings is also facing a major test, and the application of ecological architecture for high-rise buildings is a new breakthrough. Based on the perspective of high-rise building design, this paper analyses the application of ecological architecture in high-rise building design, and explores the effect of ecological architecture in high-rise building design.

## 1. Introduction

Residential comfort design, ecological environmental protection design and environmental friendly design are the main manifestations of ecological architecture in high-rise building design. The application of comfortable architectural design principles to achieve high-quality residential design, to meet people's requirements for high-quality residential. Eco-environmental protection design uses clean energy and reusable building materials to reduce the overall energy consumption of the building and improve the utilization of building materials. Environment-friendly design is based on the premise of harmony and unity of the main body of the building and the surrounding environment, to achieve the common beautification of the building and the surrounding environment. These three aspects are well presented in today's continuous depletion of non-renewable resources. It is of great significance to realize the sustainable development of the country and the harmonious coexistence between man and nature.

## 2. The Problems Existing in High-rise Buildings at the Present Stage and the Summary of Eco-Architecture

At present, high-rise buildings not only improve the utilization rate of land resources, but also bring about certain impact on people's life and work, and destroy the ecological environment. For example, first of all, the high-rise buildings will change the air and wind speed because of their extremely high height, which will change the local climate around them, and affect the lighting and air quality of the surrounding buildings. Secondly, the high-rise buildings need to use a lot of machinery and equipment to produce a lot of noise, such as air-conditioning units, air-conditioning units, etc. Elevators and so on, and because of the complex structure of high-rise buildings and wind action will produce a lot of noise, these noise will spread among the major high-rise buildings, and then seriously endanger people's normal life and work; finally, the outer decoration of high-rise buildings mostly uses glass, these glass will be used. Change the direction of light transmission and cause light pollution, which endangers people's health. However, the application of ecological architecture technology in high-rise buildings can effectively solve these problems [1-3].

Eco-architecture refers to the organic combination of ecology and architecture without destroying the ecological environment, taking full account of the natural ecological structure in the design of high-rise buildings, and then creating an artificial ecological system [4]. When applying eco-architecture in the process of high-rise building design, it is necessary to synthesize various natural factors, such as local climate, geological conditions, energy use, etc. in the construction of high-rise buildings. In eco-architecture, architecture, ecology and advanced science and technology

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are effectively integrated. To reduce the impact of high-rise buildings on the ecological environment, and integrate them into the ecological environment, thereby creating an energy-saving, environmental protection, safe and healthy living environment, and creating favorable conditions for the harmonious development of human and ecological environment [5]. The application of eco-architecture in high-rise building design conforms to the current sustainable development strategy of our country. In the process of high-rise building design, we must pay attention to the situation of energy consumption, minimize energy consumption, and increase people's psychological pressure by dense high-rise buildings. Therefore, we must be full of people in the process of design. Eco-architecture can recycle resources, protect the ecological environment, create a healthy and vibrant living environment for mankind, and promote high-rise buildings to achieve higher economic and social benefits [6].

## 3. Design principles

### 3.1 Optimal principle

On the premise of adhering to the optimum design of high-rise buildings, through comprehensive investigation, we can deeply understand the actual situation of the construction site, such as the geological conditions of the construction site, the climatic characteristics of the region and the orientation of the building, so as to ensure that the high-rise residential buildings can use the best solar and wind energy to achieve the foundation. We should also ensure that high-rise buildings are in a more scientific greening by optimizing greening design [7].

### 3.2 Scientific Principle

Safety and stability are the key links in the structural design of high-rise buildings. Therefore, great attention should be paid to the design of this link. Through accurate calculation of building structural parameters and optimization of design scheme, high safety factor of building design can be achieved. And with the help of science and technology led by the new environmental protection material song that the realization of ecological building concept implanted into the construction project, to achieve the billboard building under the guidance of science can ensure the scientific construction project [8].

### 3.3 Principles of Harmonious Development of Environment and Human Beings

In-depth understanding of all aspects of people's needs for informing stories, building comfort and convenience by means of scientific building means, better for building users to provide comprehensive services. Nowadays, the concept of ecological architecture has been accepted by the broad masses of the people. Through the extensive use of energy-saving technology, while meeting people's requirements for high-quality housing, the situation of highly harmonious development of human and natural environment is realized. For example, make full use of water resources in high-rise buildings, transform wastewater into usable water resources with the support of sewage treatment technology to reduce the consumption of water resources, improve the utilization rate of water resources, reduce the scope of water pollution, and promote the harmonious development of environment and people [9].

### 3.4 Principle of Self-adjustment

The most important thing is to establish a sustainable development system and ensure that the whole system is always in a green state when using eco-architecture to design high-rise buildings. In the process of "building decision-building design-building construction-building use-building demolition" of high-rise buildings, it is necessary to have such a system to support its specific operation. This system can ensure that the building can achieve one through self-adjustment and self-purification in the process of operation. The natural state of continuous circulation makes the building conform to the anticipated architectural purpose of ecological architecture all the time.

## 4. Design and Application

Fig. 1 and 2 are the plan and effect drawings of a high-rise building design under the ecological architecture. Three measures are applied in the design of the project, namely, spatial ecology, overall ecology and circular energy saving. The following three measures will be analyzed.

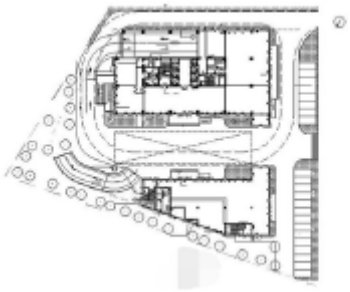

Fig. 1 Planning of high-rise building design under an ecological architecture

Fig.2 The effect diagram of high-rise building design under an ecological architecture

1) Spatial ecological construction

From the point of view of space construction, evaporation in climate-colored areas is large, especially in the upper and middle levels of high-rise buildings. Therefore, we should try to avoid and improve the links that consume more water in the whole construction. The vegetation mentioned above also has the function of water storage, and it can cope with the hot climate for the whole building. All aspects are a good means [10-11]. In addition to the construction of spatial ecology in color areas, there are cold areas, wet areas and so on. The construction of spatial ecology is well reflected in them.

2) Overall ecological construction

When using eco-architecture to construct high-rise buildings, the most important thing is to coordinate the energy of the buildings in the region from the overall point of view, and to ensure the harmony of the environment in the whole region by providing energy to the buildings through the natural environment or by reasonably transforming the energy between the two.

3) Construction of circular energy-saving

Cyclic energy conservation is a very important part of ecological architecture, and the corresponding system construction is also considered by every designer. First of all, waste utilization. Designers can use recycling energy-saving system to ensure that all forms of garbage generated in the process of building use can be effectively treated. Some reusable garbage can be recycled and reused in the building. Secondly, the energy cycle, high-rise building design should also take into account the cycle of various non-renewable energy, strengthen the use of solar energy, wind energy and other renewable energy, so as to avoid the endless consumption of non-renewable energy within the region. Fig. 3 Circle energy saving schematic diagram.

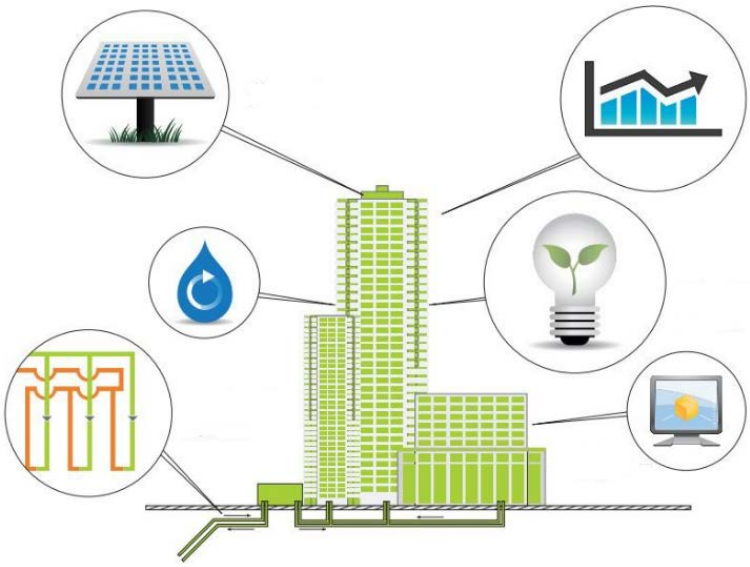

Fig.3 Circle energy-saving schematic diagram

## 5. Conclusion

The construction of high-rise buildings is not only the embodiment of China's comprehensive strength, but also the measure of social progress. The application of ecological architecture in the process of high-rise building design can effectively reduce the consumption of resources, maintain the stability of natural ecosystem, protect the natural environment, and improve people's quality of life. In order to realize the building concept of low energy consumption and eco-environmental protection in the construction industry, it is necessary to realize the harmonious development of high-rise buildings and environment by practicing the concept of eco-building, and provide good ideological support for promoting the sustainable development of building resources in the construction industry. This paper mainly makes a brief analysis of the application of ecological architecture in high-rise buildings in three aspects. From the perspective of the practical significance of ecological architecture in high-rise building design, it analyses the specific principles followed in design, and explores the specific application measures.

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