



Ecological Architecture - A Perfect Interpretation of the Harmonious Coexistence of Architecture and Nature

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Abstract. This paper introduces the concept of eco-building from the background of the times, and provides a detailed analysis of the differences and connections between eco-building, low-energy building and sustainable building. The design principles of ecological buildings and their advantages are summarized.

Keywords: Ecological architecture · Ecotechnologies · Natural environment · Natural elements

1 Introduction

With the accelerated progress of urbanization in China, a tall building has come into being, and the huge scale difference caused by the building has brought people a sense of oppression psychologically. In the jungle made of reinforced concrete, the building brings people more cold and oppressive environment, and people begin to yearn for the friendly and comfortable scale of nature [1]. The concept of ecological architecture can not only solve people's urgent desire to see nature, but also solve a series of environmental damage and energy shortage problems brought by economic development. The connotation of ecological architecture includes two parts, one is ecological architecture and the other is ecological built environment, so that architecture and natural environment can develop in harmony [2].

2 The Difference and Connection Between Eco-Building, Low-Energy Building and Sustainable Building

2.1 The Concept of Ecological Architecture

Ecological architecture is to consider the building as a complete ecosystem, according to the local natural ecological environment of the building, using the basic principles of ecology, building technology science and the means of modern science and technology to reasonably organize the building and its surrounding ecological factors, so that the building and the environment become an organic whole, while having good indoor

climate conditions and certain bioclimatic regulation ability, so that people have a more ecological and comfortable living environment, so that people, the building and the natural ecological environment to form a virtuous cycle system. Eco-architecture is the study of architecture from an ecological point of view, thinking about how to adapt and integrate architecture into the natural environment in which it is located [3].

2.2 The Concept of Low-Energy Buildings

Low-energy buildings, also known as energy-efficient buildings, are buildings designed for low energy consumption after following the basic methods of climate design and energy conservation, and after studying building zoning, building orientation and regional wind direction, building spacing, solar radiation and external environment. Low-energy buildings reduce energy use and consumption, improve energy efficiency, and fully exploit the energy-saving factors in all aspects of the building, starting from the architectural design stage to the end of the whole building life cycle [4].

2.3 Sustainable Architecture

Sustainable architecture means that the concept of sustainability is carried through the whole building life cycle from the beginning of the building project, reducing the environmental load, making full use of the surrounding natural resources, achieving sustainable recycling of energy, and providing a comfortable and healthy living environment for the occupants [5].

2.4 Difference Between Eco-Building, Low-Energy Building and Sustainable Building

The design of green building is from the perspective of ecology, focusing on the development of ecological balance, considering the building and nature as a complete organic life form, using the method of natural environment law to design the building components, realizing the advantages of environmental protection, energy saving, comfort and other advantages in one green building design, coordinating the relationship between good people, architecture and nature, so as to promote the whole ecosystem and other virtuous cycle. Low-energy buildings are mainly focused on energy saving, and focus more on solving the building energy consumption problem from the level of technology and rational design. Sustainable buildings, on the other hand, are based on the concept of sustainability and focus on the sustainable use of energy resources throughout the life cycle of the building [6].

2.5 Linkage of Eco-Building, Low-Energy Building and Sustainable Building

Whether it is eco-building, low-energy building or sustainable building, the ultimate goal is the same: to protect the environment and reduce resource consumption and environmental pollution. Many concepts in eco-architecture and low-energy architecture belong to the system of sustainable building concepts, to achieve sustainable building development while saving energy, ecological buildings ultimately need to consider the organic ecological connection between the building and the built environment [7].

3 Principles of Ecological Architectural Design

3.1 Ecological Principle

The principle of ecology is to realize the harmony and unity of people, architecture and nature, and to talk about the harmonious development of the three. Ecological principle is the core view of ecological architecture, treating architecture as a natural organic life form, and all things in nature follow some kind of law to run, applying these laws and orders to innovation and transformation to architecture, realizing the same frequency change of architecture and natural elements, allowing architecture to perfectly integrate into the architectural environment, and realizing the harmonious coexistence of architecture and ecological environment. The building, a cold man-made structure, is rendered with the warm colors of nature and becomes an unobtrusive part of nature. Let people have a comfortable and healthy green living environment, and relieve people's psychological problems after being away from nature for a long time. The relationship between people, architecture and nature is a mutually reinforcing and inclusive one [8].

3.2 Principle of Environmental Protection

Ecological architecture is also called 4R architecture, 4R covers Reduce (reduce the use of building materials, various resources and non-renewable energy), Reuse (reuse old materials), Renewable (use renewable energy and materials), Recycle (use recycled materials to set up a waste recycling system), the definition of ecological architecture is the pursuit of waste-free, pollution-free, ecologically balanced building. The definition of eco-building is to pursue a waste-free, pollution-free and ecologically balanced building environment. In the pre-design stage of eco-building, we should fully consider the environment where the building is located, fully understand the geological environment, climate conditions, wind environment and the best orientation of the building, and carry out reasonable planning and design in the pre-construction stage. Consider more energy-efficient materials in building selection, or make use of old materials. In the process of building construction, minimize the consumption of renewable energy and fully exploit the renewable energy available around the building environment. The whole architectural design process should pay attention to the ecological concept and improve the degree of protection of ecology.

4 Advantages of Eco-Building

4.1 Ecological Architecture Allows the Integration of Architecture and Natural Environment

Today's rapid economic development and urban population explosion have resulted in crowded buildings, lack of green space, and tight land use in cities, which have begun to frantically expand their territories outward, squeezing the environment to the edge of the city and leaving behind only a towering and cold concrete behemoth within the city. Traditional architectural design not only destroys the environment, but also ignores the needs of people for the natural environment. The creation of ecological architecture uses

some unique architectural design techniques to integrate the building with the natural environment, introducing the natural environment into the building and bringing the residents closer to nature.

4.2 Ecological Architecture Facilitates Ecological Restoration

Ecological restoration is the repair and restoration of damaged mountains, water bodies, woodlands, wetlands, etc. Its fundamental purpose is the same as that of ecological architecture, both want to improve the environment in which people live and work, redefine the relationship between people and nature, and let people, architecture and nature achieve a harmonious symbiosis. Eco-architecture is to make the building a part of nature, to make the internal circulation of the building to be integrated with the general circulation of the natural system, and to make good use of ingenuity in the design of the building so that the building can play a role in restoring the damaged environment around it. Eco-architecture is created not only considering the building itself, but also paying attention to the habitat status of other creatures in nature, and many eco-architecture will provide a protected place for other creatures to live in.

4.3 Ecological Architecture Facilitates the Creation of Natural Dynamic Landscape

Dynamic landscape is the landscape as a dynamic system of change, so that it blends in nature, with the time or seasonal changes, water, sunlight, wind and plants and animals are dynamic landscape elements, these natural elements can change over time, dynamic landscape is dynamic, it will interact with people, in different moments to bring different sensory experience. Ecological architectural designs are often integrated with the surrounding natural environment, allowing ecological and non-ecological elements to work together to form a harmonious whole. The vertical greening and rooftop gardens often found in ecological buildings allow people to feel the seasonal changes of plants, creating different spatial moods at different times. With plants these ecological buildings will attract some animals, and the birdsong accompanied by the light and shadow leaking from the cracks of the leaves will often give people a multi-layered visual and auditory feeling, allowing the occupants to experience the process of landscape growth.

5 Conclusion

The concept of ecological architecture is gradually becoming more and more familiar and applied. The development of ecological architecture can not only improve energy utilization and solve the problem of environmental resource scarcity, but also avoid the isolation of buildings and make them part of the promotion of natural cycles. We need to have a complete knowledge of ecological architecture, distinguish it from other concepts, make more people aware of its advantages, and use reasonable technical methods for design.

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