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Study on Planning of Urban Infrastructure Based on Ecologized Landscape Design

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Abstract

The ideology of ecologized landscape design must be maintained through the design of urban infrastructure, and the ecologized landscape infrastructure can enhance the overall quality of urban environment, arouse the innate connection between human and nature, communicate about the relationship between human and nature, so as to benefit the sustainable development of the whole urban landscape and further facilitate the harmony and prosperity of human and environment. At present, there are a large variety of infrastructure products, involving very complicated functions. Considering the needs of ecologized design, this paper centers on the features of infrastructure products in terms of function, structure and material, etc., and establishes the reasonable rules of ecologized planning, in order to lay the foundation for subsequently developing the favorable methods for the ecologized design of infrastructure products.

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Keywords- Infrastructure design; Harmony; landscape; Ecological design

1. Introduction

In recent years, the trend that domestic and foreign scholars combine urban ecology and urban construction with ecological engineering becomes more and more obvious. For instance, great progress has been made by applying urban ecology in road ecology [1], industrial ecology, urban ecology engineering [2], etc., while the practical activities are also very active, such as, urban ecological industrial park [3,4], urban ecological community [6], urban biodiversity protection and urban natural conservation. Ecologization of infrastructure is put forth under this background. The ecologization of infrastructure is an important part of urban ecologization and plays an important and significant role in the sustainable development of cities.

2. Overview of Ecological Design

Ecological design is people's reflection on the environmental and ecological devastations caused by the development of modern production technology since the 20th century. Facing the deteriorating living environment on the earth, people realize that it is necessary to explore and design a sustainable development path coordinating with the environment, and the design should be based on the respect for nature and ecology. Thus, the interaction between design and ecology results in the Ecological Design. [5] Ecological design is also called green design, life cycle design or environmental design. The ecological design of product is a new concept of product design, which appeared in the 1990s. It means to particularly focus on the environmental attributes of product (detachable, recoverable, maintainable and reusable, etc.) within the full life cycle of product, and take them as design objectives to guarantee that the product meets the requirements for functions, service life and quality, etc. while satisfying the requirements of environmental objectives. "3R" principles, i.e. reduce, reuse and recycle, are the basic principles of ecological design, and mean that the design of product should reduce environmental pollution and energy consumption, and realize the recycle, regeneration and reuse or reutilization of the product and its parts. Along with the accelerating process of urbanization in China, the design of infrastructure attracts more and more attention from people. As an important element of space environment, infrastructure is facing the severe tests of "ecologization" and "sustainable development". [6]

3. Necessity and Connotation of Ecological Infrastructure Design

Infrastructure originates from an English term "Street Furniture", which is directly translated as "furniture on the street", and there are also similar terms, such as, sight furniture, urban furniture and urban element. The infrastructure discussed herein mainly refers to the outdoor urban infrastructure. Urban infrastructure is the component and generator of urban landscape, so the quality of urban infrastructure directly relates to the overall quality of urban environment. At first, infrastructure affects the environment in some ways in all the stages of the full life cycle, including selection of raw materials, structural and functional designs, subsequent production, sale and use, and discard & disposal. Secondly, infrastructure provides services for people to make urban space friendlier and more suitable for human activities, facilitate the harmonious relationship between human and city, and benefit the protection of urban environment. Thirdly, ecologized infrastructure can enhance people's environmental awareness by means of its own function, artistic quality and correct guidance of ecological concept, so as to cultivate people's temperament of love for environment and love for nature and strengthen the communications between human and environment.

Ecologized design of infrastructure means to follow the guiding theory and basic principles of ecological design to plan the full life cycle of infrastructure and realize the harmony among "human—infrastructure—environment". For instance, a wooden public bench in an urban plaza may be made of Korean pine produced in Chang pai Mountain in Northeast China. The timber is transported by truck after a long distance to a place in Guangdong and then processed into the product. After that, it is delivered to the city, and placed in a plaza. After it is worn out, it is sent to a disposal place. In the full life cycle of the public bench, there is the consumption of material, water, energy and land. Its raw materials, connectors and other parts as well as process of service may have favorable or unfavorable impacts on the environment. All consumptions and unfavorable impacts on environment should be taken into account in the process of ecological design, such as: Is any renewable material adopted as the raw material of the bench? Is chemical adhesive avoided as much as possible in the connection? Does structural design facilitate disassembly and transportation? Can it be recycled and reused after being discarded? Can its layout guarantee the full play to the functions of the public bench? In all the stages of life cycle,

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