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## *Discuss the ecological city planning in urban planning and design*

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**Key words:** Ecological city, structural ecology, functional ecology

**Abstract:** With the accelerated progress of my country's urbanization, people's requirements for quality of life are increasing. Urban planning and design are not only to meet people's living conditions but also in line with the development of urban ecology, making people with harmonious natural development. The performance of eco-urban planning in urban planning and design in my country is increasingly prominent, and this paper analyzes from the perspective of ecological urban structural perspectives to explore how to achieve urban structure and function in the planning of ecological cities.

## **1. ECO-URBAN**

### **1.1 Eco-urban planning**

In 21st century, ecological city is not a strange word. It is the result that human continuous exploration of the city, reflecting a new urban concept and development model. So far, human beings have done a lot of research on the construction of ecological city, and have achieved a more profound understanding. Many ecological cities have also emerged in my country, such as Zhuhai at the southern end of the Pearl River Delta in China, Jinhua in the middle of Zhejiang Province, Huizhou, on the coast of the East China Sea, and Nanning, a cultural city with dynamic activities for ethnic joys in my country, etc. The economic, social and environmental development of these cities is coordinated with strong urban cultural atmosphere, which satisfies the material and spiritual needs of the residents, and adapts to people's work, life and residence. However, these ecological cities have also encountered many difficulties in the development process. From a new perspective, this paper will analyze the ecological city planning in urban planning and design, and at the same time put forward opinions and opinions, hoping to be helpful to relevant people.

### **1.2 Urban ecologization**

To put it simply, urban ecologization is to realize the stable and orderly development of the natural complex ecological system of urban society and economy. Urban ecology here is not only a biological category,

but also a concept of integrated and comprehensive development within the urban system, which includes social, economic and natural complex ecology. The ecological development of the city pays attention to the economic, social and natural development of the city and the overall ecological development, so as to realize the common progress, mutual promotion, symbiosis and co-prosperity of human and nature. To sum up, urban ecology is mainly manifested in social ecologicalization, economic ecologicalization and environmental ecologicalization. Among them, social ecologicalization is the core of urban ecologicalization and the concentrated expression of urban sustainable development. The economic ecologicalization is the development trend from industrial civilization to ecological civilization. It guides the harmonious development of man and nature by establishing environment-friendly economic development mode. And environmental ecologicalization is to establish a harmonious natural environment, economic environment and social and cultural environment by using the relationship between living things and their surroundings. In a word, the establishment of ecological city is the inevitable trend of urban development, and ecological city is the inevitable result of urban ecological development.

### **1.3 Ecological city structure and function**

Urban structure refers to the form and way of the interrelation and interaction of various elements of a city. Eco-city means a city in balance with nature, a complex ecosystem of nature, society and economy. Therefore, the construction of urban functions should be consistent with the urban structure, so as to create a city with urban functions, cultural functions, political functions, economic functions and ecological functions. In general, the structure and function of cities complement each other, and they interact and promote each other. The change of urban structure will lead to the adjustment of urban function, and the improvement of urban function will promote the integration of urban structure. However, only when a city is structurally "ecological", can it give better play to its economic, social, and life functions, so as to fully realize the value of the city to people. As a result, the city, ecology, nature, and people can live in harmony. Therefore, the design of urban structure and the performance of urban functions play an important role in urban ecological planning

## **2. URBAN STRUCTURE ECOLOGICAL**

### **2.1 Ecological partition division principle**

The first is to adhere to the natural attributes as the mainstay, and the social attributes as the supplement. The entire urban complex ecosystem includes three major categories. The first category is economic structure and resource utilization methods; The second category is social culture, values, and behavior; The third category is the geographic environment of the city. When dividing, we should take into account that the geographical environment and social culture of cities are difficult to change. Therefore, we should try to arrange the functions of the city reasonably according to the natural and cultural attributes of the city. The second is to adhere to the principle of integrity, which is determined by the independence of urban ecology. It should not only consider the ecological integrity of the city, but

also the ecological system of the city and the outer periphery of the city. The third is to persist in the diversification of the ecosystem. Usually, urban ecosystems need to be artificially transformed into artificial ecosystems. Therefore, we need to use a large number of technologies to ensure the diversification of urban ecosystems, thereby improving the stability of urban ecological functions.

## **2.2 Urban ecological function zone division type**

- (1) Important resources Protected Area
- (2) Natural landscape protected area
- (3) Anti-fouling anti-disaster area
- (4) Pollutant Disposal area
- (5) Industrial transportation area
- (6) Business Trade Area
- (7) Residential area

## **3. URBAN FUNCTIONAL ECOLOGIZATION**

### **3.1 Eco-industrial construction plan**

The ecological industry construction plan needs to adjust and improve the ecological industry construction plan in accordance with the goals of urban industrial development and the unique natural resources, financial resources, and human resources of the city, so as to optimize industrial construction and layout, thereby enhancing the city's industry competitiveness. Urban ecological industry planning is inseparable from the construction of ecological units. Therefore, the urban ecological industry planning should deeply analyze the characteristics and function construction of ecological units, determine the planning of inter-regional ecological industry construction, and at the same time focus on the industrial structure of key ecological units. The main way of ecological industry construction and planning is to develop circular economy, recycle resources efficiently, develop circular economy, so as to achieve ecological transformation of traditional industry, create ecological transformation and ecological construction of the park, and promote green energy strategy

### **3.2 Ecological people construction plan**

For the sake of future generations, ecological human settlements construction planning should be carried out from the long-term perspective, to establish a healthy and sustainable urban environment. We can fully absorb the feasible experience of foreign urbanization construction, and then combine the characteristics of specific cities, formulate a distinctive, executable, forward-looking ecological human settlements construction planning scheme, creating a safe, healthy, comfortable living environment for residents. Human settlements construction planning should adhere to the principle of human centeredness, which mainly includes land and landscape ecological engineering construction, water ecological engineering, energy ecological engineering, biological and diversity ecological engineering, waste treatment, architectural ecological engineering, human ecological engineering, ecological management construction engineering, industrial

ecological engineering construction, tourism ecological engineering construction, etc. Ecological human settlement construction is not limited to fixed forms and models, but diversified, economic and rational. It should follow the following principles:

(1) Ecological construction based on the functional positioning of the original planning area

(2) The invested capital, progress and comprehensive cost shall be based on the premise of ecological construction, or in the case of the developer's ability to permit, and should be able to obtain certain economic benefits, so as to maximize the economic benefits of the developer;

(3) The ecological engineering technology and equipment that can be applied to should be fully considered, and the sustainable development ability of developers should be also taken into account.

(4) Establish an executable engineering plan and carry out construction in accordance with it, aiming to effectively implement the ecological construction of the city and receive professional technical guidance.

### **3.3 Ecological traffic construction plan**

There are many problems in the construction of modern cities, such as traffic congestion, traffic environment pollution and other problems that are of great concern to urban residents, so ecological transportation construction planning became an important part of urban ecological planning. China is a country with a large population and a large population density, which have brought great challenges to urban transportation. Ecological transportation construction planning should first adhere to the principle of spatial integration, and integrate ecological concept, so as to make regional and urban planning reasonably combined in terms of region and space. Second is to take time as the principle to ensure the timeliness of transportation planning, ensure the maximum utilization of space resources, effectively improve the time efficiency and make rational use of the ecological concept. The last is the combination of functions, which can solve the ecological and economic problems in the city, thus eventually form an organic whole that restricts and affects each other. The main contents include: urban ecological transportation infrastructure construction planning; Urban ecological transportation; Urban public transport development planning; Construction of evaluation indexes of urban ecological transportation system.

### **3.4 Ecological garden construction plan**

On the one hand, the ecological garden landscape plays a role in greening the environment and beautifying the city. On the other hand, it also improves the urban ecological environment, improve the level of the city, and enhances the cultural grade of the city. The difference between ecological garden construction planning and general urban greening is that it can change the isolated and narrow park green space design in the past, and use modern technology to establish a multi-level and multi-functional artificial plant community based on plants, so as to achieve harmonious unity between city people and nature, so as to obtain certain ecological and social benefits and produce economic benefits. The main contents include: adhere to the combination of biodiversity and the concept of human text; unify biodiversity protection and ecological garden planning; establish an ecological garden system to fully protect the city's natural resources and

urban style, and establish an ecological city garden green space system; build an evaluation index system for ecological garden construction.

### **3.5 Ecological water region construction plan**

The construction planning of water ecological environment is not only reflected in the control of water pollution, but also to give play to the existing value of the water area for urban development, and promote the joint effect of water culture, water landscape, water health, water economy and water ecology. The planning of ecological water area construction should first determine the planning concept, including water economy, water culture, water health, water economy, etc. The establishment of the evaluation system of the current situation of water environment includes the evaluation of the current situation of terrestrial water system, Marine water system and wetland ecological environment, and the optimization of the spatial pattern of water ecology, and the construction of a harmonious ecological water network between man and water. Therefore, it is necessary to carry out the protection and management of water ecological environment, control pollution sources, strengthen the protection of drinking water, improve the security of water supply, strengthen the protection and restoration of water ecology, improve the city's flood control and drainage system and improve the capacity of water ecological civilization construction.

### **3.6 Ecological landscape construction plan**

Ecological landscape construction planning is a systematic project. According to the principle of ecology, in order to further optimize the pattern of regional landscape ecological system as a whole, for the purpose of through the landscape patterns and ecological processes, as well as the interaction of human activities and landscape, it is the spatial structure of regional landscape ecological system and mode is optimized, make the ecological landscape spatial distribution reasonable, ensure unblocked, material, and has a certain aesthetic value. Ecological landscape construction builds the relationship between color and landscape from the aspects of hue, brightness, and chroma. For example, warm colors and yellow give people a feeling of closeness, while blue and cyan give people a feeling of healing; and in terms of street scale, The impact of chroma on the landscape. The brightly colored billboards on both sides of the street will cause the sight to lose focus on the street and form an unstable landscape. The contents include: the planning concept, namely, the design of nature reserves to protect biodiversity, and the adjustment and modification of the current unreasonable pattern of nature reserves. On the basis of the existing natural landscape and cultural landscape, establish the ecological landscape with local characteristics and the integration of urban industrial development; the construction of landscape ecological support network; construction of ecological landscape evaluation index and assessment standard system.

### **3.7 Ecological, social construction plan**

With the progress and development of the industrial age, ecological culture has gradually penetrated into the industrial age, thereby affecting people's values. Construction of ecological culture embodies the people,

society and nature in harmony, which is a new concept of city development, at the same time it also embodies the people positive life idea, the concept of people's happiness, the behavior way, consumption idea and way of life into the construction of ecological culture, so the construction of ecological culture is the core of the ecological city construction. The construction of ecological culture mainly includes the publicity of ecological culture, the public propaganda language, carrying forward traditional historical culture; set up the concept of ecological civilization, recycle the use of resources, and cultivate the correct concept of consumption; enterprise ecological culture development plan, including clean production, green administration, circular economy, sewage and waste gas comprehensive treatment, etc.

#### **4. CONCLUSION**

Ecological city planning in urban planning reflects people's expectation of a better life, which is the inevitable trend of urban development. In a word, we should make in-depth research on eco-city construction in urban planning, and finally establish an efficient, harmonious, healthy and sustainable human settlement environment to bring benefit to the next generation.

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