Study on the Influence of Urban River Topology on Landscape Design

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Abstract

With the development of social economy and the improvement of people's living standard, new requirements are put forward, which can not only consider drainage and other issues, but also pay close attention to the harmony between man and nature. In the construction of city river according to the position and function of each river distribution difference, take measures in flood control and drought, rivers must follow the natural construction, and adapt to the characteristics of the human impact on the river, river construction to reduce to a minimum, to achieve harmony between man and nature. From the point of view of landscape ecological design to guide the urban river regulation work, in the realization of urban ecological environment restoration goals, but also for the city people to create a natural landscape. This paper introduces the basic functions of the city river, according to the basic principle of landscape ecology and points out the basic principles need to adhere to the transformation of the river in the city: system principle, sustainable principle, landscape transformation principle of prudence, the principle of economic rationality.

Keywords: City, topological structure, landscape design, influence

Introduction

With the continuous progress of human civilization, the needs of urban residents to the city's rivers become diverse, so the purpose of urban river management is no longer simply adhere to the basic needs of urban operation. Formed to abandon the process of rapid economic growth only pays attention to the efficiency and benefit of flood control engineering concept, focus on the restoration and protection of natural river ecological and natural environment, emphasizing the combination of landscape construction and ecological construction, become a hotspot for city development and water conservancy construction.

The natural state of the urban river is the same as that of other natural rivers, and the water body, the riverbed, the river bank, the upper and lower reaches and the left and right sides form an organic whole. But the city river is land, flood control, water supply and drainage and other factors, most of the river through artificial modification, so the city river system should possess the basic functions of flood control and drainage, landscape culture, ecological environment improvement etc..

The city rivers originating from the city or area of the river and the river flows through the city, including the history is artificial excavation, but after years of evolution has the characteristics of the natural rivers and canal. In the primitive natural stage, human beings choose to live in the fertile land of the river, and the rivers are used for simple agricultural irrigation and the source of water for daily life. With the formation and development of population growth and the function of city river continued to expand, and the continuous
development of water supply, flood discharge, in addition to the function of power generation, but also bear the city river embankment, green river ecological environment, tourism and entertainment, transportation, culture and education, disaster prevention and mitigation of landscape ecological service function.

It has been nearly a century since the natural river and river control program proposed by Germany in the early twentieth century to study the ecological environment of rivers in the world. With the development of the city, deteriorating living environment, awareness of the ecological environment of the river and the transformation process of gradually deepening: from river to river hardening treatment and then to restore the natural river, to the ecological protection and restoration of the river, to study sustainable landscape ecological environment in the river. The river research workers in various countries are taking a large number of advanced experience in many disciplines to study how to realize the sustainable development of urban river landscape.

![Figure 1. River channel topology and landscape design.](image)

**The Proposed Methodology**

**Urban river regulation and landscape ecology.** People's living environment is becoming more urbanized, and the design of urban river must ensure the safety of residents' living environment. At the level of city rainwater volume increases and the surrounding rivers rise, city river to have savings rainwater infiltration, regulation, diversion, flood discharge increase up into groundwater resources etc.. Not only reasonable flood control, but also to make use of the advantages of the river, the use of rain or flood water resources around the river, effectively adjust the city's water flow, reduce the risk of urban floods.

The city rivers have large evaporation, high river water capacity and river flow, wind flow, can increase the air humidity near the region, weakening the city heat island effect, provide comfortable living space for city residents. Surrounding the city's green river can absorb dust, automobile exhaust and other toxic gases, to achieve the role of air purification. At the same time, the green belt can also eliminate the noisy city noise to reduce noise pollution.

Social economic development has also led to the continuous reform of human civilization and the city is not only flood control drainage, but also to combine landscape ecology to design. According to the structure of river channel construction, the distribution of river channel can change the distribution of urban areas. River landscape, the landscape around the river can intercept some of the pollutants, reduce the loss of soil on the shore, improve soil and water conservation capacity, to ensure the exchange of water and groundwater, reduce the hydrological changes in the river.
Landscape ecological design concept. Following the law of natural development is the first principle of ecological design of urban river. The ecological landscape design of river city the main purpose is to meet the needs of people's lives and the survival of natural biological reproduction, in general do not destroy the natural ecological balance of the river landscape, combined with the knowledge of ecology, make full use of self-purification capacity of river ecosystem and self-adjustment ability, maintain the natural river patterns, building a with the development of eco city river landscape.

Urban river regulation not only to meet the requirements of flood control and drainage, but also to meet the needs of people's life, leisure and entertainment that must adhere to the principle of sustainable development in ecological river, to ensure adequate water rate and water capacity, ensure the water circulation, the natural ecological environment and improve the entire watershed, realize sustainable development of economy, society and environment comprehensive coordination. The development of the comprehensive planning of river area, industrial land use, at the same time, the vegetation space formed through the construction of ecological protection, but also can provide habitat for aquatic animal breeding, birds, let the city landscape become the aquatic ecosystem vitality.

Rational design of ecological river. River is the basis of urban ecological environment. For the management of the urban river, the natural appearance of the river bed should be simulated by artificial simulation. Ecological management is the trend of development in recent years, mainly the use of microbial, animal and plant life activities of the transfer and degradation, ecological restoration. This concept can promote the establishment of water ecosystem, aquatic animal and aquatic plants contributed to the growth and reproduction of space, but the cost is relatively low, less energy consumption, will not form two pollution, a large number of it has gradually become the development direction of modern city water pollution and water treatment.

In the repair and restoration of ecological river, the repair is not just a river, but the river basin in the comprehensive management of infrastructure and transformation. Play the city river, continue to supply water to the city natural environment and living environment, improve the city microclimate, the coordination of city river ecological system and the surrounding environment, to form a good landscape ecological system.

Problems in landscape ecological construction. Many cities do not meet the standards of river construction, when local rainfall is greater, it will harm people's lives and property safety. In the period of urban drought and flood, the lowest water level of the urban river can not be lower than the warning line, and many cities have not reached the standard of water level.

With the development of the city, the water pollution is becoming more and more serious, the urban environment is destroyed, and people's health is affected. Along with the economic growth, the development of industry and agriculture, industrial and agricultural sewage seriously damaged the urban river water quality. Many industrial manufacturing industries regardless of the ecological environment, for the sake of interest, without pollution treatment directly discharged into the river in the city, some industrial pollution contains toxic substances or heavy metals, serious damage to the ecological balance of the river, the river water quality influence. The ecology of the river has been destroyed, and the vegetation, fish, microorganism and so on are all polluted by the sewage, the ecological function of water flow is destroyed, and the landscape function is not enough, which is contrary to the river landscape design.

Response measures. Urban river design is improving people's living, leisure environment, but also pay attention to the effectiveness of flood control and drainage. The construction of city river mainly considers the river discharge velocity, erosion and soil and water conservation, in strict accordance with the city construction of river flood control standard of construction.
same time with the river, the layout of the entire city integration, increase vegetation construction around the river, the river stone revetment trees, the water permeable brick, soil and water conservation balance, and construction natural and harmonious ecological city.

In the prevention and control of water pollution, it is necessary to increase the intensity of prevention and control, the implementation of pollution control of urban pollution sources, the source of pollution to a local centralized treatment, to be discharged to meet the emission standards. For the contaminated water containing harmful substances, to take measures to deal with the isolation, and resolutely avoid the sewage against human health.

**Urban river topology.** Landscape ecology is a comprehensive discipline which studies the structure and spatial distribution of landscape units and their interaction with ecological processes. It emphasizes the interaction between ecological processes and scale development and maintenance, the spatial heterogeneity of the human impact on the landscape and its elements is the core of landscape ecology, the research process should pay attention to the following principles.

In the landscape system, each element or ecosystem can be regarded as a fairly narrow width of the patch, corridor, background or matrix, the basic model is the composition of the landscape patch corridor matrix model. In essence, the landscape structure is the result of the heterogeneous distribution of ecological objects in the landscape, and the movement of the ecological objects directly affects the change of landscape structure.

The heterogeneity of the process and the scope of the study of landscape transformation in the causal relationship between the human landscape heterogeneity through the transformation to enhance the value of the landscape, but in a certain range, increasing impact on the landscape heterogeneity is nonlinear, strong ecological flow and increase the stability of the system is more easy to damage. It is generally believed that the more complex the system, the stronger its stability, but the stability of the destruction of the more difficult to restore stability.

**Simple channelization of urban river.** River channelization refers to the linear shape of the river on the layout, the natural river will be transformed into a straight line or broken line of artificial river. The geometry of river cross section is regular, that is to say, the complex shape of the natural river is changed into regular geometric section, such as trapezoid, rectangle and arc. City channel has solved the problems of city flood control flood, but also cause water and riparian ecosystems are isolated, so that the river - the original riparian ecosystem, divided into rivers and riparian ecosystem independent. The river water and prevent the hardening of riparian soil physical energy exchange, ecosystem destruction of natural rivers, the structure and function of aquatic ecosystem changes, especially the natural riparian biodiversity decreased, leading to a rapid degradation of city river ecological system.

A large number of domestic sewage and industrial waste water are discharged into urban rivers without treatment, and the water ecological environment is destroyed greatly. At the same time, the pollution caused by rainfall caused by the non-organization of rainwater runoff. The rain runoff brings about a great deal of pollutants to the scour of the surrounding sediment in the road. In many municipal construction, rainwater drainage pipes and sewage pipes for the same pipe, and do not have the rain treatment process with a large amount of rain water directly into the urban river along the drainage pipeline, which has brought serious pollution to the urban rivers.

In the revetment landscape design, we must first ensure the safety, stability and durability. On this basis, the landscape design. Revetment landscape design is mainly reflected in the following aspects. Revetment is a unique linear landscape, which is one of the main elements of river landscape. The creation of revetment landscape should be based on the laws of nature and aesthetic principles, the design of landscape elements, such as plane, vertical and cross section
design, as well as revetment materials. Through these landscape designs to enhance the visual effect of the revetment, so that people in the protection of the multi angle view of the landscape, you can enjoy a pleasant view of the landscape, the landscape across the river, water landscape and bird's eye view of the landscape.

Conclusion

With the social progress and economic development, the requirement of urban river regulation is changing, and the landscape ecological design of water space has gradually become the hot spot of river channel design. Provides a set of basic principle different from the traditional water conservancy project River transformation and solution of landscape ecology city river management, can be achieved in city flood control, landscape reconstruction and ecological restoration targets through the process of landscape design, promote the artificial river treatment project is more close to nature, is conducive to the river ecosystem balance and stability, ensure the safe operation of city has stronger function, realize the coexistence of city and river. River landscape facilities include: railings, footpath, signs, chairs, trash and toilet facilities, night lighting, lawn lamp, water pump and the management of housing, these facilities should be designed to consider the consistency with the overall style of the river landscape.

References.


