Design and practice of Foshan first ring landscaping

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Abstract

1st ring landscape of Foshan is a great project of roadside afforestation in China because of its largest green quantities and great benefits. In this paper, we summarized the advanced design concepts and innovative design ways and the actual effect, so as to provide a reference for the roadside landscape design and construction of highway roadside.

Keywords: Foshan first ring landscaping; Greening engineering; Design and practice

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1. Introduction

Roadside landscape design and afforestation play very important roles in improving the eco-environment of road systems, enhancing the security of traffic systems, and beautifying the road landscapes. Roadside afforestation in the city is not only the part of urban landscape architecture, but also can enrich the urban civilization [1]. Although the landscape design and afforestation in long-distance highways have been well-developed [2-6], few efforts have been made on the landscape design and afforestation for the urban high-speed artery, a latest road system in urban China. In this case, this project was designed to experiment new design principle developed by us in application from the case of the 1st Ring artery of Foshan City, Guangdong Province, China.

As the backbone road of transport network, the 1st Ring artery of Foshan City links the downtowns of Foshan with suburbs of the city. The 1st Ring project adopts grade one highway standards and serves the functions of city’s expressway. The roadside adopts the engineering standards of urban main-road. The 1st Ring has the total length of 99.2 km, including fourteen-lane main and side road of 50.9 km and eight-lane grade one highway of 48.3 km. The investment is about 13.0 billion Yuan. The First Ring runs through three districts of Nanhai District, Chancheng District and Shunde District. The area within the ring is about 600 km².

2. Design Concepts and Principles

2.1. Concept of "two harmonies" and general idea of "different designs for different road sections"

"Harmonious road and urban environment building the large Foshan with habitat harmony" is the design concept of the First Ring. Here are two harmonies, the harmony between city and road and the harmony between man and nature. The main idea is to make Foshan First Ring match with the overall image of Foshan city and create a good ecological environment to make great contribution in improving people's living environment.

In order to save investment and make landscapes rich in changes and vitality, we designed the 1st First Ring of Foshan into 4 road sections, eastern, western, southern and northern fronts. Eastern front is the corridor demonstrating the urban scene to make visitors understand Foshan, so its road landscape is positioned as a key section, which requires a green gallery with cultural connotation, distinctive individuality and ecological nature. Therefore, the eastern front has the greatest area proportion, the largest number of trees among all the sections, combining with the traditional culture, art and architecture of Foshan City. The project makes the key section from Haiba Road Guicheng Overpass to No.325 National Road with the length of 28 km, where the priority is given to the section from Haiba Road Guicheng Overpass to Chencun and extending to Beijiao. Guicheng Overpass and Lishui Overpass are the landmark overpasses and also the key points of the design. The landscapes of western, southern and northern fronts are positioned as the general landscapes, where the tree species and size are selected according to the requirements for landscape reconstruction. The southern front is designed as the landscape of “a bright yellow flowers road”, the western front is designed as the “west rainbow” and the northern front is designed as the “golden road”, the colorful and bright landscape.

2.2. Consideration for road function and sustainable development

Taking into account of both the road characteristics distinguished from landscape design in general and the future investment in road maintenance, we proposed the following design principles: priority of safety in designing the landscape of the 1st ring artery; sustainable development with low investments for management and maintenance; importance of project priority; dynamic landscape with linear design; adaptation to local conditions for low cost.

3. Results and Outputs

By following the design concepts and principles, we designed the roadside landscape and structured the afforestation plan for the 1st ring artery of Foshan City. Here are the results and outputs from the project implementation.

3.1. Large green landscape of beautiful trees
The large greens were created by planting beautiful trees at the roadside the 1st ring artery of Foshan to ensure the broad vision for passengers and the high-speed for vehicles along the roads (Fig.1). For example, in the central median, a 3-5km of compound greenbelt was designed to diversify the combination of plantation, so as to give the passengers a deep and unforgettable impression. The interchange area was created as a huge space covered by large-scale tree array to create visual impact for the passengers.

Fig. 1. Interchange area covered by large-scale tree array
3.2. Turtle shell shape of strip and interchange area for good drainage

The central median, strips on both sides and pavements were designed in turtle shapes to ensure good drainage of rainfall to reduce the potential impacts of infiltration on the roadbed (Fig.2.), so as to ensure not only the safety of the roadbed but also the good visual effect. In order to prevent the death of seedlings caused by accumulation of water, the larger interchange of the 1st ring artery was designed according to the terrain vertically. This gave better landscape and drainage and eliminates the risks of sinking the seedlings in water.

![Fig. 2. Turtle shell shape of strip (left) and placation (right)](image)

3.3. High stability and eco-security of native plant community

We selected good plants or either native species or introduced varieties with long history of cultivation such as Chorisia speciosa, Spire Terminalia, Erythrina crista-galli, Brassia actinophylla, Cassia spectabilis, Golden syzygium jambos, etc. in afforesting the roadside of 1st ring artery of Foshan. Totally, over 60 species/varieties were applied to develop the beautiful landscapes. Natural-style plantation was applied to combine the plant species/varieties effectively to get beautiful landscapes, to improve the stability and eco-safety of artificial green space and to reduce the risk of pests and diseases.

3.4. Artificial wetland for surface runoff retention and treatment
Following the concept of "ecological design", we developed the compound system “vegetation control - detention pond - vegetation control – artificial wetland purification” for surface runoff treatment. The artificial wetland was designed mainly by considering the sewage treatment in the first 30 minutes, and the initial rainwater collection and processing is controlled by the artificial wetland. The ecological drainage was used to all inlet and outlet water, which not only lower cost, but also benefit to purify the pollution of the surface runoff. Currently, the artificial wetland along 1st ring artery of Foshan is working very well (Fig. 3). This shows a good proof of successful application of the artificial wetland in surface road runoff treatment and provides a solid theoretical basis for gradual extension of this technique.

Fig. 3. Effect of surface runoff treatment system

4. Conclusion

Landscape design for the roadside of 1st ring artery of Foshan is an innovation in roadside landscape architecture and also a sustainable development model of roadside landscape design in China. Firstly, the new concepts of landscape design based on ecological fundamentals were experimented to develop multi-level ecological compounds by emphasizing the eco-security, environment-friendly traffic and sustainable development, instead of traditional way of roadside landscape design for only traffic priority. Secondly, the innovative techniques including large green landscape of beautiful trees, turtle shell shape of strip and interchange area for good drainage, native plant combination and artificial wetland for surface runoff retention and treatment were used in the practices of roadside landscape architecture to produce quite good effect physically and great benefits economically and ecologically. In one word, Landscape architecture of 1st ring artery of Foshan is a good example of theoretical and technical innovation in roadside landscape design in urban areas. This can provide a solid theoretical and practical basis for the roadside landscape design and better management of highway roadside in urban China.
References:


