

Key points of landscape design for mountain highways

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ABSTRACT

On the basis of elaborating the attributes of highway landscape put forward the common principles of landscape design of highway in mountainous areas and other areas, analyses the characteristics of highway landscape in mountainous areas, and focus on the main points of landscape design of central isolation zone of highway in mountainous areas, tunnels, adjacent mountains, slopes, fortresses, toll stations and other landscape design.

KEYWORDS

landscape design; mountains; motorwayse

Highway landscape is an important type of environmental landscape. In the modern highway landscape design, it is necessary to build more comprehensive, integrated, human nature, personality design concept. The landscape design of mountainous highway roads has more geographical and regional cultural particularities than ordinary highway landscapes.

1 Highway landscape

Highways have the basic attributes of road landscapes, such as the sequential nature of the landscape, the ecological sequential nature, the sequential nature of the cultural landscape and the comprehensive nature of the landscape.^[1] Highway landscape is the extreme form of ribbon landscape. It has the characteristics of high-speed dynamics and relative closure. Highway landscape should meet both dynamic and static visual needs. Its landscape has a variety of classification methods, including the internal landscape within the boundaries of the highway and the external landscape outside the boundaries, the static node landscape and the dynamic node landscape: and the independent and complete attraction landscape and the ever-changing slopes along the highway, vegetation and other changes in the landscape.^[2]

2 Common principles of highway landscape design in mountainous areas

Various conditions of the highway landscape should be based on the following design principles and requirements: 1) Accessibility. No matter which form of landscape, should not hinder traffic for the purpose, even if the visual and psychological impact on the traffic should be avoided. 2) Safety. The setting and design of the landscape should not only not affect the safety, but also help to improve the safety. 3) Pleasantness. The planning and setting of internal and external landscape should satisfy the sensory pleasure and comfort of drivers and passengers. 4) Aesthetics. Landscape can have aesthetic, artistic, creative and other qualities, it is not appropriate to choose subjects that are easy to cause tension, oppression and even fear, not necessarily emphasize the visual tension. 5)

Geographical. As a mobile space, geography across the scale of the special landscape carrier, it is necessary and easy to show the regional culture. 6) Richness. Highway industrialization and standardization should be reduced as much as possible to bring monotony, reasonable and measured set up to make drivers and passengers excited, enjoy the excellent landscape and environment, relieve driving fatigue. 7) Coordination. Greening, facilities, landscape sketches, roads, space and people should form a harmonious whole. 8) Continuity. Both focus on variability, but also emphasize the sense of sequence, rhythm, rhythm of the landscape, sub-regional planning landscape passages, dealing with the transition area. 9) Scientific. Including the number of landscape nodes. Spacing and volume control, landscape colour analysis, material, structure selection, application of science and technology, etc. 10) Conciseness. Dynamic landscape form and facility identification should be simple, clear. 11) Participation. Drivers and passengers to relax, rest, watch the static landscape as far as possible to form interactive and participatory conditions. 12) Sustainability. The landscape needs to save maintain long-term stability, and can achieve self-sustainability, renewal and ecosystem balance.

3 Characteristics of road forms, environmental conditions and landscape carriers on mountain motorways

For highway landscape design, the plain area needs to deal with the problem of a single wide open space,^[3] desert area needs to solve the problem of sand prevention, greening and wildlife protection.^[4] Mountainous areas have more conditions and factors to be associated with, and need to transform unfavorable factors into advantageous conditions to build a mountainous characteristic highway landscape system.

The relationship between highways and the earth as a whole in the plains is one of attachment, while highways in mountainous areas and mountainous landforms are often a complex relationship of dislocation, integration, fit, conformity, break-in and even confrontation. It should minimise the damage of the road to the mountain natural environment and the existing environment, and protect and repair the natural environment by means of landscape. Excluding the consideration of economic and technical factors, based on the rich road-land and landscape view relationship, new requirements are put forward for the planning of road alignment and location. Firstly, it should enable drivers and passengers to enjoy the rich and beautiful natural landscape while travelling, and secondly, it should pay attention to the constitutive relationship between the highway and the entire mountainous natural environment framework, so that the viewers outside the highway can get a good landscape image when looking down, looking up, or looking at the level.

The slope and curvature of the mountain highway become bigger Andrich in changes, a large number of tunnels, bridges, slopes and fortresses are set up; there are climate characteristics such as freezing, fog and geological hazards such as landslides, These factors put forward special requirements for landscape design.

Due to the mountain highway compared to ordinary highway terrain, road facilities and the surrounding environment structure of the richness. Greatly enrich and increase the landscape space or landscape carrier.

4 Highway landscape design points in mountainous areas

4.1 Central Separation Zone

The greening of the central isolation zone has the effect of softening the hard environment of the

highway, adjusting the image of industrial standardization, enlivening the atmosphere, beautifying the environment. Preventing noise and dust, and absorbing exhaust fumes. The selected plants should not be deciduous, flowery, toxic and require frequent maintenance. Plants should be leafy; crow and branches should not occupy the driving space and block the line of sight. Plant form should be simple, clean, generous, neat. Many highway plant species single, and the size of the height close to the lack of rhythm and rhythmic changes, easy to form visual fatigue. Should be 10 minutes of driving about 15-20kilometres as a paragraph to replace the plant species. The colour and shape of plants can be changed appropriately. The colour of the guardrail can be changed moderately according to the site area, mostly using colocos. Plants such as cypresses and wannabes are preferred for highland areas. Generally single equidistant plants, plant height of about 150cm, not blocking the line of sight, every 20-30m with a small number of flowers or fruit plants, rendering and regulating the boring and dull driving environment.^[5] Isolation plants and facilities to consider anti-glare angle control between 8-15 degrees. However, in mountainous areas, there is a large change in slope, 150cm high plant belt is often on the slope of the vehicle in the loss of glare shielding function. In such lots, it is necessary to choose high screen-type plants through visual calculation and design, or to treat them with high grille sheets and semi-transparent shading panels. In the central barrier, a small number of simple landscape vignettes can be installed in conjunction with the greening.

4.2 Tunnel

The strong sunlight in mountainous areas requires the solution of both bright and dark adaptation for tunnel entry and exit. The problem of dark adaptation can be solved at the tunnel entrance by installing a continuous structure that gradually increases in size, the problem of light adaptation can be solved in the same way at the tunnel exit. Similar problems can also be solved by installing transparent roofs.

Tunnel portals should generally be treated with landscape decoration. There are reliefs, murals, carvings, calligraphy, greening, lighting guided landscape structures and other decorative methods. Chongzun high-speed Zunyi city tunnel entrance set up at the entrance of the section of the "memory of Qin'e-Loushanguan" poetry carving and Zunyi meeting site relief. Guibi highway tunnel entrances and exits using two rows of national relief decorative columns for traffic guidance. Some people set up a huge LED screen above the high-speed tunnel entrance, the practices questionable, it may bring tension or information interference endangering safety.

Inside the tunnel, it is generally not appropriate to make text, reliefs and landscape vignettes and other decorations. Some tunnels are decorated with ring shaped reflective film around the arch interval. Which can further make the driver clear about the curved outline of the tunnel, break the sense of depression and monotony of the tunnel, and increase the sense of spatial sequence. The top of the tunnel in Chongqing South Bank is decorated with simple LED light strips, which make the dull interior space of the tunnel become dynamic and fresh. In the very long tunnel internal widening, you can setup small number of three-dimensional landscape vignettes to ease the fatigue brought about by long hours of driving in the tunnel. Simulated trees and ground cover plants are set up at the nodes in the Qinling Long Tunnel of the West HanExpressway.

4.3 Proximity to mountains

The neighboring mountains next to the motorway are generally in a prominent position, and drivers and passengers can maintain a comfortable viewing distance, so it is appropriate to set up independent and complete Landscapes on the neighboring mountains, In the Renhuai section of

the Zunzhi Expressway, a series of modern sculptures have been set up in connection with the local wine culture. One of them is a stainless steel hollow wine altar sculpture, pouring out the flowers to symbolize the jade liquid and agar, and increasing the lighting changes at night. Its themes prominent, strong sense of form. Another sculpture modelling forholding a glass of wine in the void of the hand, in the process of turning the line will only be found, will form a stimulus to the driver, in order to avoid such problems need to carefully consider the landscape location and modelling design. Chongqing Dongxi Ancient Town in the highway setup by the traditional architectural landscape has the role of publicity and advertising. This kind of independent landscape should be few and fine, so that it becomes the embellishment and decoration of nature.

4.4 Slopes and bastions

Mountain slope sections are the most intimate landscape sections.^[6] There are various forms of slopes, including unilateral, bilateral and dislocated slopes, high-fill and deep-excavation slopes and low-fill slopes under the road, as well as cut and excavate slopes to form independent mountains, and so on. According to the conditions, some slopes are suitable for landscape treatment by three-dimensional vegetation network plus hydraulic spraying of grass; some slopes can expose structurally stable karst landforms; some slopes pursue the formal beauty of combining frame structure and greening, some need to be combined with man-made landscape. Chongzun high-speed Qijiang section of the slope in the mortar surface and then set up a semi-stereoscopic dinosaur skeleton, eliminating the large area of concrete berm brought about by the hard, stuffy sense of blockage, rich in decorative interest. In large slopes, it is not appropriate to set up large artificial landscape. Soil berms need to set up low landscape wall protection. Green-based slopes need to pay attention to trees, crowns, ground cover plants combined to form a three-dimensional landscape level. The landscape technique of exposing natural rocks and planting isolated trees on the surface of grassy slopes is worth promoting. Individual gravel mounds that are not suitable for greening can be screened by landscape walls. A planar landscape treatment is desirable for the fortress walls formed by the fall of the two-way road. Climbing plants can be used to soften and beautify, and shallow relief sculptures can be set up for decoration. If the theme of artificial landscape cannot be combined with the regional culture, it should choose people's popular themes, such as the Chinese zodiac and so on. Artificial landscape need to consider the simplicity of modelling. Because of the rapid process will produce visual deformation, modelling pattern designees to take into account the visual correction. Such as galloping horse relief, should be appropriate to elongate the body shape of the horse.

4.5 Toll booths

A motorway toll station is a functional building, but it is also an important gateway to show local culture. The space between the columns on the ground floor should meet the needs of car traffic and convenient toll payment. The steel structure aluminum plastic plate decorative modelling once used in large quantities in the toll station is becoming obsolete. The overall modelling style and elements of the landscape architecture of the toll station should be closely integrated with the local culture, style and development concept. Mountainous areas of national and regional cultural characteristics are generally more distinctive, should be fully reflected in the toll station building. Guizhou Zunyi toll station building drew on the Zunyi conference site building style, Anshun Pingba toll station using the Anshun Tunbao slate house material and combination of forms, Guizhou Kaili using the local miao wind and rain bridge heavy eaves building form, Yunnan Chuxiong toll station highlights Yi people architectural features and colour characteristics.

5 Conclusion

This paper is only a preliminary discussion of several local elements of the landscape of mountain highways, and there are a series of issues worthy of in-depth investigation, Such as service area architectural style, function and landscape improvement, the choice of location of the observation deck and facility design, roadside protection forest belt, lane separation green space, between ramps and the surrounding green space, gateway, flyover, sound wall, billboard design, lighting street lamps, traffic guidance design, ecological remediation and use of the construction site, the number of hardscape settings, volume and spacing design specifications, and so on. The landscape design of mountain highway is associated with rich and complex space, nature, sight, behavior, sensory, geography, humanities, ecology, science and technology, etc., which is a subject that requires comprehensive, systematic, scientific and cross-study.

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