

Aesthetic Design for the Shi-cong Viaduct

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Summary

Bridge aesthetics is both elusive and complex, and the lack of an effective and efficient determination for the major aesthetic dimensions of structures has made it impractical to conduct research on bridge aesthetics. Conventional design of viaducts does not question the goals of the selected plan and can mainly meet short term demands in traffic, taking carelessness of their other functions like aesthetics. According to the viewpoint analysis for viaduct aesthetics, this paper focused on the structural parameters for bridge aesthetic design, i.e. superstructure cross-section, span length, pier height and shape, and column numbers of pier bodies. Then four schemes were offered with aesthetic concerns for the Shi-cong Viaduct and Scheme 3 was finally chosen to be the very one in light of feasibility and aesthetics.

Keywords: Aesthetics; Viaduct; Viewpoints Analysis; Structural Parameters; Pier height.

1. Introduction

As a concept, bridge aesthetics is both elusive and complex, and it has been viewed as simply being the general appearance of the structure. Actually bridge aesthetics, to a large extent, is related to the fundamental dimensions of the human visual system, i.e. peripheral vision and dynamic viewing. However, these fundamental dimensions have received very little attention in structure designs. The lack of an effective and efficient determination for the major aesthetical dimensions of structures has made it impractical to conduct research on bridge aesthetics. Conventional design of viaducts does not question the goals of the selected plan and can only meet short term demands in a given context, and engineers always seek to satisfy the traffic functions, but take carelessness of their aesthetical functions. So a viaduct often becomes a simple traffic connecting system between two parts of a city.

This paper goes on to identify the characteristics of highway viaduct aesthetics and provide insight in the practical application of bridge aesthetics in the Shi-cong Viaduct. Some structural parameters and factors for viaduct design have been discussed for aesthetic consideration based on the viewpoint analysis. They are superstructure cross-section, span length for multi-span bridges, pier height, pier shape, and column numbers of pier bodies. Then the Shi-cong Viaduct was offered to testify all aesthetical consideration mentioned here and some conclusions were made for viaduct/bridge aesthetic design.

2. Viewpoint Analysis for Bridge/Viaduct Aesthetics

A viaduct can always be enjoyed by pedestrian (static viewpoints) and drivers (dynamic viewpoints), as indicated in Fig.1. In light of horizontal distance and speed, viewpoints of viaduct can be divided into two aesthetical types: “close” and “far”. As Hu Z.(2010) referred to, a “close” viewpoint means that the detailed structural appearance and scale are both significant, and a “far” viewpoint means that only the outline of a structure is emphasized. Moreover, driving speed is another major factor for viewpoint analysis. According to speed statistic, for 40km/h, which is the normal driving speed in cities in China, drivers focus on the view point 280m away, and the faster speed, the further