Toward Repair and Redesign Old Aqueduct Bridges in Rural Areas

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Summary

Many of old aqueduct bridges located in rural areas are in need of repair and redesign. They still occupy some portion of countryside landscaping. However, most of them were only designed to fulfill their basic functions of carrying waters, which has not contributed to the landscape positively. Moreover, when each design case of aqueduct bridges that arranged continuously over a long path was individually treated, the appearance of the whole bridges had lacked aesthetic consistency. Therefore, it is better to provide a design guideline to improve aesthetics of old aqueduct bridges so that both structural and aesthetic concerns can be harmoniously considered when they are to be repaired or remodeled. The main objective is to develop a framework to repair and redesign of old aqueduct bridges for safety improvement and better landscape. Specifically this paper will address the followings: (1) the development of possible design alternatives for repair and redesign and (2) the development of decision making process to select a design alternative satisfying criteria of safety, aesthetics and economy. The development of design alternatives for redesign will follow general principle of bridge aesthetics and be represented according to structural system, pier height, pier shape in terms of design parameters while minor repair includes paintings and other ornamentations. Furthermore, the developed design alternatives will be reviewed with its landscape as a background to check the visual compatibility within the community context. It is expected that the proposed guideline will be utilized to develop a maintenance plan to revitalize old aqueduct bridges to improve overall landscape of rural areas.

Keywords: old aqueduct bridge, repair, redesign, context-based design, bridge aesthetics

1. Introduction

In the 1970s aqueduct bridges had been built for agricultural water supply over many places of the country. Such infrastructures over 30 years have led to unwanted effects including functional, structural, and landscape problems. However, most of maintenance activity was to address functional and structural problems while concern about landscape was given to a few cases. As the quality of rural life rises and the demand for rural tourism is dramatically increasing, the aesthetics of agricultural aqueducts become a rising issue to the local community and related policy makers. One way to enhance the landscape is to adopt the underground irrigation system. Even though, from mid to long-term perspective, the underground irrigation is desirable, but it is not realistic to change all problematic aqueducts to underground irrigation within a short time. Therefore, it is needed to develop a maintenance strategy to repair and retrofit of the aged aqueduct bridges during some intermediate stage toward sustainable rural landscape. This study has focused on the aesthetic bridge design approach that aims to enhance appearances of old aqueduct bridge structures considering its context background. Moreover, a stepwise decision making process proposed in this

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