

Practical Design of Continuous Two Main-span Suspension Bridge in Korea

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Summary

Recent years, multi-span cable supported bridges can be considered as viable alternatives instead of bridges with very long span in certain bridge environments. However, only a few multi-span suspension bridges have yet been constructed. This paper presents the practical design of continuous two main-spans suspension bridge in Korea. The total length of the bridge is 1,750m with three pylons and two main-spans. The length of each main span is 650m and the side span is 225m in length. The pentagonal shape of stiffening girder is applied to secure the safety of aerodynamic stability. There are special design precautions to be considered in the design of multi-span continuous suspension bridge, such as the deflection of bridge spans and the cable slip at the middle pylon's cable saddle. To solve those problems, parametric studies were performed and the optimized section of pylon was determined. In addition, the state-of-the-art technologies such as a high strength cable with 1960MPa in strength are adopted. In this paper, the economic efficiency of designed bridge is also briefly discussed by comparing with the mechanical behavior of other types of bridge with similar environmental conditions.

Keywords: multi-span suspension bridge; two main-span; high-strength cable; concrete saddle.

1. Introduction

Before 2000 year, few suspension bridges were constructed in Korea. The construction of suspension bridge in Korea started in 1973 with Namhae bridge, whose main span is 404m, followed 30 years later Youngjong Bridge and Gawngan Bridge. After 2000 year, the number of suspension bridge has incredibly increased and the total number of 6 suspension bridges is under construction or practical design including Lee Sun-Sin Bridge with its main span of 1,545m.



Fig. 1: The aerial view of New Millennium Grand Bridge concept and the design characteristics of New Millennium Grand Bridge.

New Millennium Grand Bridge is the latest designed suspension bridge in five years and its construction site is located in Shinan-gun on the south-eastern coast of Korea. The bridge is a multi-span suspension bridge as shown in Fig 1 and this type of bridge is the first application in Korea.

This paper presents the basic design