Bridge Spanning Up to 2800m

Seungho LEE
Senior Reseacher
Chonbuk National Univ.
Chonju, Chonbuk, Korea
guide1th@chonbuk.ac.kr

Suk CHANG
Structural Engineer
Yooshin Engineering Corp.
Seoul, Korea
schang@yooshin.co.kr

Myungjae LEE
Executive Director
Yooshin Engineering Corp.
Seoul, Korea
y12680@yooshin.co.kr

Soon-Duck KWON
Professor
Chonbuk National Univ.
Chonju, Chonbuk, Korea
sdkwon@chonbuk.ac.kr

Summary

This paper presents preliminary results for developing a feasible design of suspension bridge of which main span length reaches up to 2800m. The design works have been performed in collaboration between Yooshin Engineering Corporation and KOCED Wind Tunnel at Chonbuk National University. From the preliminary wind tunnel test for feasible girder sections, twin box girder was finally adopted. After wind tunnel tests of various variation of twin box girders, final candidate was selected considering aerodynamic performance as well as construction cost. The aerodynamic stability of the girder section was confirmed from the full aeroelastic model tests. The present design of suspension bridge is optimized structurally and aerodynamically to ensure a safety and serviceability of bridge under wind action during the design life.

Keywords: wind tunnel test; suspension bridge; aerodynamic stability; super long span bridge

1. Introduction

As a part of “Super Long Span Bridge Research and Development Project” funded by Korean Government, a feasibility study and preliminary design of super long span bridge have been performed and some results are presented here. The project consists of developing two types of long span bridge, a cable-stayed bridge over main span of 1200m and a suspension bridge over main span of 2500m.

From the preliminary survey on bridge sites, it was found that there has been a plan to connect Namhae Island to Yeosu City that is located in south seashore of Korean peninsula, typhoon prone region at summer. Suspension bridge connecting main land and the island were completed at early 1970 in shortest path. A new bridge project is planned to connect the other side of the island. Main span length of the bridge project is estimated around 2800mm considering at geological condition and ship navigation at the strait. Present paper summarizes the details of structural and aerodynamic issues in the preliminary design of the suspension bridge with main span of 2800m.

2. Suspension bridge design

2.1.1 Outline of design

As shown in Fig.1, a prototype suspension bridge has been designed as a two-span suspension bridge with two approach bridges which are 270m and 550m long, respectively. The suspension bridge has a 2,800m-long main span and a 900m-long side span. A sag ratio is a ninth (1/9), and a

https://doi.org/10.2749/222137912805111591