The Long Span Bridge (Research), Korea

Wind Engineering Study

Client: Institute of Academic and Industry Cooperation, Mokpo National University		*Year Tested: April 2008*
Long Span Bridge (Research Study)	*Main Span Deck Width: 27.6 m*	*Section Models: 1 to 60 scale*

The Project

The plate girder bridge section model used for the development of experimental and analytical techniques has dimensions of 0.46 m in width and 2.13 m in length. Typical scaling of section models of this size is 1:60, which results in approximate simulations of full scale bridges 27.6m in width and 127.8m in length

This wind study is a research project in three phases for the development of a wind tunnel test technique for an aerodynamic stability analysis of long-span bridges. Separate wind tunnel tests and analysis for each of the three-phases were performed. The Phase 1 study describes a basic aerodynamic test of a section model. The Phase 2 study describes the aerodynamic tests to estimate the Aerodynamic Derivatives, while the Phase 3 study is concerned with the estimation of aerodynamic properties including the Aerodynamic Admittance Function, the Joint Acceptance Function and the coherence of the wind and aerodynamic forces.

The Wind Tunnel Studies

The aim of the three-phase study is intended to be used in the current and future investigations as a test-bed to develop improved experimental and analytical techniques

The Wind Tunnel Studies (Cont.)

for the aerodynamic investigation of Long-span Bridges through the following analysis and results:

1. Basic aerodynamic information for the deck section design.

2. Investigate the overall stability of the deck section in high wind conditions.

3. Investigate the behaviour with respect to vortex shedding induced oscillations of the deck section in smooth wind.

4. Determine the static force coefficients of the deck section in both smooth and turbulent flows.

5. Define the behaviour of the deck due to buffeting in turbulent wind.

6. Investigate the Aerodynamic Derivatives of the deck section in smooth and turbulent flow conditions.

7. Provide the Aerodynamic Admittance Function desired to facilitate the development of the analytical representation of the dynamic wind loads.

The Boundary Layer Wind Tunnel Laboratory

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