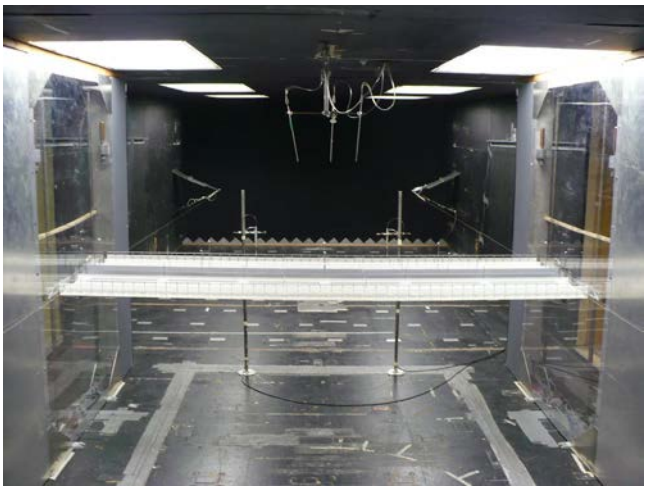
The Straits of Messina Bridge (Deck), Italy

Wind Engineering Study



Client: COWI A/S, Denmark	*Year Tested: 2010*	*Main Span: 3300 m*
Tower Height: 399 m	*Deck Width: 60 m*	*Section Model Scale: 1:80*

The Project

The proposed bridge is located between the island of Sicily and Reggio Calabria on the mainland. The bridge will feature a six-lane highway, two service lanes and a double-track railway. It is a steel suspension bridge with a central span of 3,300 m between the two towers and two side spans of different lengths and arrangements, for an additional 960 m to the Sicily anchorage and 810 m to the Reggio Calabria anchorage. The steel towers, standing at a height of 399 m to the cable saddles, each consist of two vertical legs linked by three cross beams. The deck has a total width of about 60 m and comprises a central double-track railway deck flanked on either side by a 3-lane road deck. The suspension system consists of two pair of steel cables, each with a diameter of 120 cm. The deck is suspended from the cables by a system of vertical steel hangers at 30 m intervals.

The wind tunnel tests were performed in the Boundary Layer Wind Tunnel Laboratory at the University of Western Ontario.

The Wind Tunnel Studies

A primary objective of the section model study for the deck section was to investigate the overall aeroelastic stability in high wind conditions and define the wind speeds associated with possible flutter instability and vortex shedding induced oscillation within the design criteria for wind. The investigation also served the purpose to define the dynamic response characteristics of the section to turbulent wind over a full range of wind speed and to provide information for the design of the structure against wind effects.

The section model test program included:

1) the measurement of steady state wind load coefficients for the deck while under construction and in-service; the measurement of Aerodynamic Derivatives; the measurement of Aerodynamic Admittance Functions

2) the measurement of steady state wind load coefficients at skew angles and for various traffic conditions; the measurement of wind profiles over the deck for various traffic conditions

3) the assessment of aerodynamic stability and the measurement of the response to turbulence

The Boundary Layer Wind Tunnel Laboratory

Western

The Boundary Layer Wind Tunnel Laboratory
The University of Western Ontario
Faculty of Engineering, London, Ontario
Canada, N6A 5B9 Tel: (519) 661-3338 Fax: (519) 661-3339
Internet: www.blwtl.uwo.ca E-mail: info@blwtl.uwo.ca

FSBR/ 50 /April 2020 / LK
Last Printed: April 3, 2020