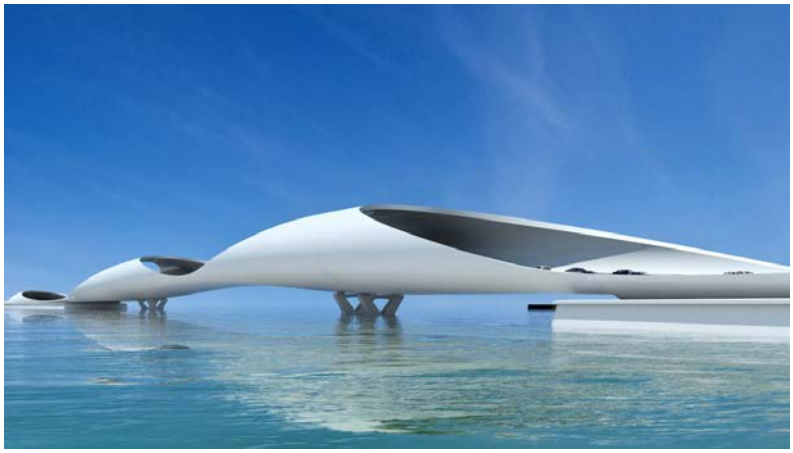
The Al Sharq Bridge, Doha, Qatar

Wind Engineering Study



Owner: Public Works Authority (ASHGHAL), State of Qatar	*Design: Santiago Calatrava Mideast LLC*	*Year Tested: April 2014*
Main Span Length: 560 m	*Main Span Deck Width: 40 m*	*Section Models: 1 to 75 scale*

The Project

The Al Sharq Bridge is located at the southern end of the bay adjacent to the airport and consists of three spans - a 280m central span and two 140m side spans. The structural form of the bridge is a steel tube structure which is fully circular / closed at the primary central support points and opens out towards the centre and ends of the bridge.

The section model of the Al Sharq Bridge was studied at the inlet to the high-speed section of BLWT II at the Boundary Layer Wind Tunnel Laboratory of the University of Western Ontario.

The Wind Tunnel Studies

A primary objective of the section model study is to investigate the aeroelastic stability of the bridge deck section in high wind conditions and to define the wind speeds associated with possible flutter or galloping instability as well as vortex shedding induced oscillation. The investigation also defines the

The Wind Tunnel Studies (Cont.)

dynamic response characteristics of the section to turbulent wind over a full range of wind speed and provides equivalent static loads, which are suitable for the design of the bridge structure against wind effects.

The study was consisted of a 1 to 75 scale section model of the bridge deck section. Static section model tests were performed to obtain the static coefficients. Dynamic tests were performed in smooth flow to investigate the overall aerodynamic stability of the deck, and in grid-generated turbulent flow to define the buffeting response characteristics of the section. Aerodynamic derivative tests were also performed to study the motion related aerodynamic force parameters. The static force coefficients and the aerodynamic derivative parameters were then used in the three dimensional wind buffeting analysis and in the development of the Equivalent Static Wind Loads for the bridge structure

The Boundary Layer Wind Tunnel Laboratory

Western

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