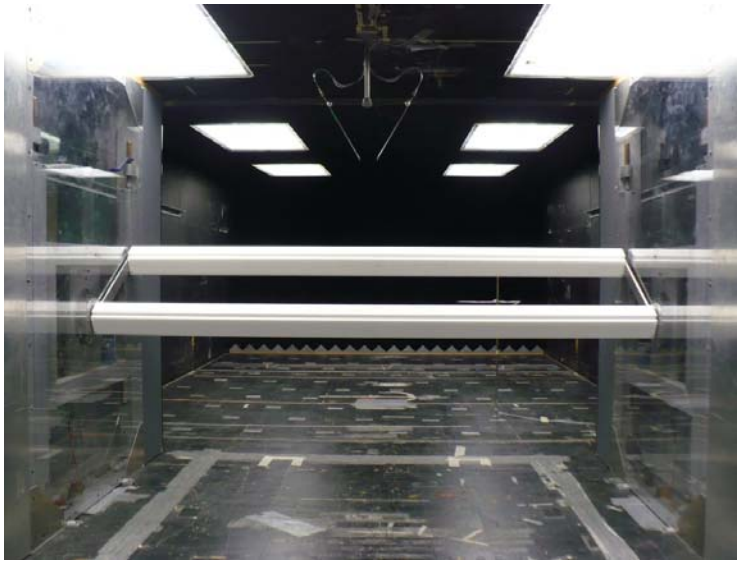
The Izmit Bay Bridge Tower, Turkey

Wind Engineering Study

Tower Full Aeroelastic Model



Tower Section Model

Client: IHI Infrastructure Systems Co. Ltd.	*Year Tested: 2012*	*Main Span: 1550 m*
Tower Height: 246 m	*Total Bridge Length: 3000 m*	*Section Model Scale: 1:69* *Full Aeroelastic Model Scale: 1:200*

The Project

The Izmit Bay Bridge is a planned suspension bridge located at the eastern end of the Sea of Marmara, close to Izmit and approximately 50 kilometers from Istanbul, Turkey. The bridge, which is part of a new, extended highway system which links the cities of Izmir and Istanbul, will be the world's fourth longest suspension bridge upon completion. The proposed bridge has a main span of 1550 metres, with side spans of 566 metres, and a total length of nearly three kilometers. The steel towers are 246.5 metres in height (to the underside of the saddles), with two levels of crossbeams above the deck elevation connecting each leg of the tower.

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

The Wind Tunnel Studies

The main objective of the testing of the wind tunnel models of the tower for the IZMIT Bridge was to establish wind load coefficients for the tower cross section for numerical analyses, to verify the aerodynamic stability of the tower and to determine necessary damping levels to suppress vortex induced vibrations, if present. The tower was examined using both the section model as well as the full aeroelastic model approach to wind tunnel testing.

The objective of the 1:69 scale section model wind tunnel tests was to measure the static force and moment coefficients for a complete range of wind azimuths on one leg of the tower, tested in the presence of a non-instrumented second leg of the tower.

The objective of the 1:200 scale full aeroelastic model tests was to verify the aerodynamic stability of the tower under different stages of construction and to determine necessary damping levels to suppress vortex induced vibrations. An evaluation of the response of the tower under realistically scaled turbulent boundary layer flow conditions was also a prime objective.

The Boundary Layer Wind Tunnel Laboratory

Western

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