

Model of the magnificent Expo site bridge put through its paces in Canada

Alamillo Bridge has Canadian Connection



Peter King, engineering professor at the University of Western Ontario, surveys scale model of the Alamillo bridge in wind tunnel environment.

If one approaches the site for Expo'92 from the northeast, one crosses over the spectacular "Paso del Alamillo" cable-supported bridge. This forms part of the elevated "Circunvalacion" Expressway running east-west across the north end of the island on which Expo is situated and crosses the San Jeronimo meander of the Guadalquivir River.

The unusual feature of the bridge is the raked back tower, 138 metres high, which supports the 200-metre span bridge by means of cables configured like harp strings. The deadweight of the roadway is supported by the cables which in turn are balanced by the dead weight of the tower leaning backwards.

The designer of this unique structure is Santiago Calatrava of

Spain; it is being constructed by a Joint Venture of Fomento de Obras Y Construcciones, S.A., and Dragados Y Construcciones, S.A.

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A significant Canadian contribution to this bridge was made by the Boundary Layer Wind Tunnel Laboratory of the University of Western Ontario, London, Ontario. This laboratory is a leading international centre for studying the effects

of wind on buildings, offshore structures and many other structures including long-span bridges.

Long-span bridges, because of their slender wing-like characteristics, are vulnerable to wind. Wind forces, both drag and lift, are major factors in determining the strength of the bridge in gale force winds. In addition, even moderate winds can make bridges vibrate if the shape of deck cross section is aerodynamically unsuitable. Pedestrians would easily feel vibrations—an

unsettling experience!

The model of the bridge tested at the University of Western Ontario was constructed in the scale of 1:135 and its stiffness and weight properties were scaled exactly to those of the bridge. Tests have been carried out in a representation of the site in the wind tunnel. The character of the wind itself, its turbulence and gustiness, as well as the increase in speed with height above the ground, was scaled accurately in the wind tunnel.

The Boundary Layer Wind Tunnel has recently been concerned with a number of major bridges in Europe and elsewhere. These include the Great Belt bridge in Denmark under construction. Its 1700 metre span will be longest in Europe.