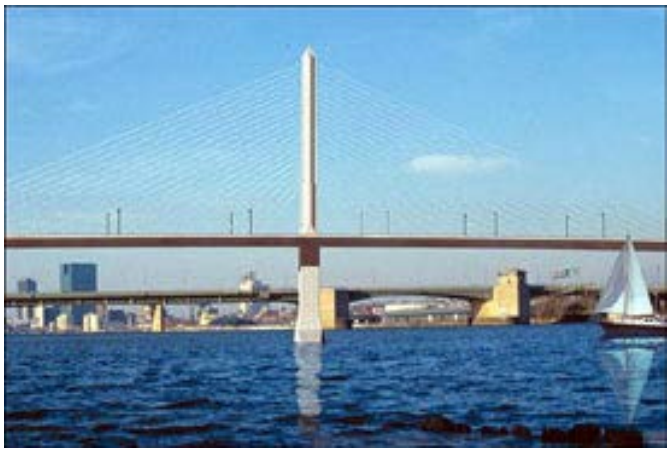
The Maumee River Bridge, Toledo, Ohio

Wind Engineering Study



Owner The Ohio Department of Transportation	*Design* Figg Engineering Group, Inc. Tallahassee, Florida	*Year Tested* 2000/2001
Length 8800 feet	*Main Span* 612.5 feet	*Shipping Clearance* 120 feet
Pylon Height 425.4 feet	*Stay Cables* 20 stays each span	*Deck Width* 129.4 feet

The Project

The new I-280 Maumee River Bridge will be a prominent addition to the Toledo skyline. The new bridge pylon will be twice as tall as the towers of the existing Anthony Wayne Bridge and comparable in height to the Owens-Illinois building, the tallest building in downtown Toledo. Design features of the bridge include:

- A single pylon with two equal length spans
- A single plane of cable stays in a fan array
- Glass incorporated into the pylon
- Pylon glass viewable from all four directions
- Coloured lighting of the pylon behind the glass
- A partially solid bridge railing.

The Wind Tunnel Studies

- A wind climate analysis was performed to define the wind characteristics in the Toledo region. The 100-year mean hourly wind speeds at deck height were 86 mph.

The Wind Tunnel Studies (cont'd)

- A 1 to 80 scale section model of the deck was tested in both smooth and turbulent flow conditions. The stability characteristics as well as the response to turbulence were evaluated.
- Equivalent Static Wind Loads were developed to assist in the design of the bridge deck, both in the completed and under construction condition.

Since the pylon is clad in glass over the upper 198 ft, a pressure study was performed on a model of the pylon. The model was constructed at a scale of 1:150 and featured 58 pressure taps over the glass surface. The possibility of internal pressure behind the glass cladding was taken into account in the tests.

- A full aeroelastic model of the entire bridge was designed and constructed also at a scale of 1:150. The full model was tested in turbulent boundary layer flow conditions, representative of those at the project site. Instrumentation on the model provided estimates of full scale structural responses that could be compared to design capacities.

The Boundary Layer Wind Tunnel Laboratory

Western

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