The Woodall Rogers Bridge, Dallas, Texas

Wind Engineering Study

Client Huitt Zollars Inc.	*Engineer* Santiago Calatrava Valls S/A	*Year Tested* 2005
Length of Superstructure 1202 feet	*Main Span Lengths* 2 spans at 601.3 feet	*Deck Elevation* Approximately 50 feet
Pylon Height 447.2 feet	*Deck Depth* 11.35 feet	*Deck Width* 120.5 feet

The Project

The Woodall Rogers Bridge (currently known as the Margaret Hunt Hill Bridge) is a two span cable-stayed bridge over the Trinity River in Dallas, Texas. The bridge has two symmetric 601.3'-long deck spans to both sides of a 447.17'-tall arch-shaped pylon at the middle of the bridge. The cables anchored at the top of the bridge pylon are stayed to both sides of the deck cross section in zigzag pattern to maintain the torsional balance of the deck. Wind engineering studies for concrete and steel alternatives for the Woodall Rogers Bridge in order to develop the design loads for wind for the bridge while under construction and after completion.

The Wind Tunnel Studies

A meteorological study included the analysis of existing records near the project site.

The Wind Tunnel Studies (cont'd)

A 1:80 scale section model study was used i) for the development of static force coefficients; and ii) with scaled dynamic structural properties of each of the deck alternatives of the prototype. The section models were tested in smooth flow, as well as grid generated turbulent wind.

Tests of a 1:150 scale full aeroelastic model of the bridge in turbulent boundary layer flow included several stages of construction including the partially and fully erected, free-standing pylon. Construction tie-down configurations were examined. Large scale pylon section models were also used to evaluate the vortex shedding induces response at various levels of structural damping.

The full aeroelastic model tests of the completed structure confirmed the satisfactory behaviour of the bridge and were instrumental in defining the wind-induced responses at various wind incidences and boundary layer turbulence conditions.

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Western

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