The Dallas IH 30 Pedestrian & Cyclist Bridges, USA

Wind Tunnel Study

Owner: Texas Department of Transportation, The City of Dallas, Texas, USA
Date Tested: June 2012

Client: Santiago Calatrava LLC Switzerland.

Length of Main Span *1125 ft*	*Section Models* *1:40 Scale for the Arch & 1:50 Scale for the Deck*	*Full Bridge Aeroelastic Model* *1:125 Scale for the Complete Bridge*
Arch Height above Deck *280.8 ft*	*Arch to Arch Distance* *396 ft*	*Pedestrian & Cyclist Deck Width* *20 ft 4 in*

The Project

The proposed IH30 Pedestrian and Cyclist Bridges are situated on the Trinity River Corridor in Dallas, Texas. The twin structures are thrust arch bridges having main spans of 1125 ft. The arches are each 280.8 ft. above the deck at midspan. The 20 ft – 4 in wide concrete decks are supported by transverse floor beams at 10ft-5in centers, which are connected to two, 7 ft high channel-shaped Edge Beams.

The Eastbound and Westbound Pedestrian and Cyclist Bridges are mirror images of each other, separated by a center to center distance of 396 ft. The bridges flank four structurally separate highway bridge structures; the Eastbound Frontage Road Bridge, the Eastbound Main Line Bridge, the Westbound Main Line Bridge and the Westbound Frontage Road Bridge.

The Wind Tunnel Studies

A primary objective of this investigation was to define the dynamic response characteristics of the bridge to “smooth” and turbulent wind over a full range of wind speeds and provided confirmation of the design of the structure against wind effects.

The study consisted of:

- Section models of the bridge arch (1:40 scale) and deck (1:50 scale). Tests were performed in smooth flow to investigate the overall aeroelastic stability of the arch and deck, and in grid-generated turbulent flow to define buffeting response characteristics.
- A 1:125 scale full aeroelastic model study performed in the low speed side of BLWT2. Tests were performed in both “smooth” flow and in a turbulent boundary layer. Dummy models of the highway bridge structures and the mirror pedestrian bridge were included in the tests.

The Boundary Layer Wind Tunnel Laboratory

Western

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