Robert F. Kennedy Bridge, New York

Wind Engineering Study

Owner: Triborough Bridge and Tunnel Authority	*Design: Weidlinger Associates Inc*	*Year Tested: 2015*
Total Span Length: 2790 ft with main span of 1380 ft	*Deck Width: 98 ft*	*Deck Section Model Scale: 1 to 60*

The Project

The Robert F. Kennedy Suspension Bridge over the East River has a main span of 1380 ft. and two side spans of 705 ft. each. Its approach from Queens includes 22 spans of a reinforced concrete structure supported on a steel multi-girder system as well as 19 spans of a steel viaduct. The orthotropic deck on the suspension bridge is connected to the Randall's Island Junction Structure by a steel viaduct across Wards Island. The wind tunnel studies were performed to assist in the rehabilitation of the suspended spans of the bridge deck in order to meet current criteria.

The section models of the existing Robert F. Kennedy Bridge and various retrofit options were studied at the Boundary Layer Wind Tunnel Laboratory of the University of Western Ontario.

The Wind Tunnel Studies

The wind engineering studies for the Robert F. Kennedy Bridge include an examination of the wind climate at the bridge site.

A section model of the Robert F. Kennedy Bridge

The Wind Tunnel Studies (Cont.)

was designed and constructed at a geometric scale of 1:60. The design and fabrication of the deck section model facilitated the installation of various retrofit options which had been selected for the study.

The primary objectives of the section model study were to investigate the aeroelastic stability characteristics of the deck section with various retrofit options in high wind conditions and to define the wind speeds associated with possible flutter instability and / or vortex shedding induced oscillation. An aim of the investigation was also to define the dynamic response characteristics of the bridge deck to turbulent wind over a full range of wind speed. Analytical estimates of the critical wind speeds for flutter and the buffeting responses of the bridge to simulated site wind, as well as the equivalent static wind loads were studied using a 3-D multimode analysis, which integrates the findings of the experimental study with the dynamic properties of the structure.

The experimental work also includes a component to provide information on stability analysis for the vehicles while on the bridge deck from the vehicle model force balance tests.

The Boundary Layer Wind Tunnel Laboratory

Western

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