The Chesapeake & Delaware Canal Bridge, DE, USA

Wind Engineering Study

Owner The Delaware Department of Transportation	*Design* Figg and Muller Engineers, Inc. Tallahassee, Florida	*Year Tested* 1990
Length 1650 feet	*Span Lengths* 3@150, 750, 3@150 feet	*Shipping Clearance* 138 feet
Pylon Height 334 feet	*Stay Cables* 16 pair per pylon	*Deck Width* 127 feet, 3 inches

The Project

The Chesapeake and Delaware (C&D) Canal Bridge is on State Route 1, a 46 mile highway in central Delaware. The bridge is of precast segmental construction, with the precast twin boxes, precast delta frames and single plane of cable stays, the striking features of this structure. The segmental boxes are connected in the main span though a 10 inch transversely post tensioned median slab and precast delta frames at the stay anchorage locations.

A prime objective of the studies was the assessment of the wind loads due to turbulent buffeting and to ensure stability in high winds. A companion study was performed for the steel alternate for the C&D Canal Bridge.

The Wind Tunnel Studies

The wind effects study consisted of the following:

- A site-specific meteorological study was performed to examine both Extra-Tropical and Tropical (Hurricane) wind climates.
- A 1 to 97 scale section model was used in the study to examine the response of the bridge to wind. Testing was performed in both smooth and turbulent flows to assure both the absence of any aeroelastic instability in common and extreme winds and to define the response to turbulent buffeting.

An Equivalent Static Load Analysis was performed, integrating the test results with analytical models of the under construction and fully completed bridge configurations.

The Boundary Layer Wind Tunnel Laboratory

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