The A. Murray MacKay Bridge, Halifax, Canada

Wind Engineering Study

Owner: Halifax Harbour Bridges
Date Tested: 1969-1970, 2002

Engineers: Pratley and Dorton Ltd.

Length of Suspended Spans 2427.8 feet	*Main Span* 1400 ft	*Navigation Clearance* 154 ft
Tower Height 315 feet	*Main Cable Diameter* 11 inches	*Deck Width* 51.1 feet

The Project

The A. Murray MacKay Bridge is a four lane suspension bridge across “The Narrows” in Halifax Harbour. This bridge was the first suspension bridge in North America to employ an orthotropic deck in its design and is consequently extremely light.

The Wind Tunnel Studies

A primary objective of the investigation was to identify the critical wind speeds for flutter instability and vortex shedding for the bridge while under construction and after completion. The investigation provided information for the design of the structure against turbulent wind.

The study consisted of: a dynamic analysis of the completed bridge, a meteorological study, 1 to 150 scale mechanical model to aid in the dynamic behaviour during erection, 1 to 40 scale section model studies for various under-construction configurations of the deck and a 1 to 320 scale full aeroelastic model of the completed bridge. The study was the first in the world to employ testing of a full aeroelastic model in turbulent boundary layer flow.

Fatigue Studies

Full Scale Monitoring of deck strains was undertaken in 2002 to stresses in the ribs of the orthotropic deck. The data obtained under typical traffic conditions was used in a fatigue analysis of critical components

The Boundary Layer Wind Tunnel Laboratory

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