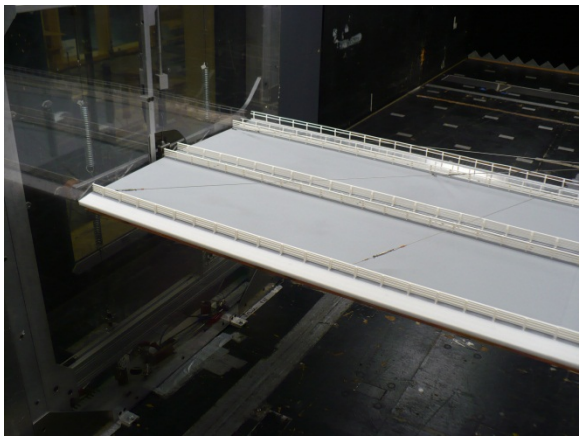
The Nipigon Bridge, Nipigon, Ontario

Wind Tunnel Study



Owner: Ministry of Transportation, Province of Ontario
Date Tested: August 2012

Client: McCormick Rankin Corporation, Mississauga, Ontario.

Cable Supported Spans *112.8 m and 139 m*	*Section Models* *1 to 50 Scale Section Models of Deck for Completed Bridge and North Half Under Construction Phase of Bridge*	*Deck Widths* *36.2 m for Completed Bridge and 20.1 m for the Under Construction North Half of the Bridge Deck*
Tower Heights *74 m*		

The Project

The Nipigon River Bridge spans the Nipigon River in Nipigon, Ontario on Highway 11/17 near the North shore of Lake Superior. A new four lane cable stayed bridge will replace the existing two lane, four span plate girder structure. The new bridge includes cable-supported spans of 112.8m and 139m. The 36.2m wide deck is comprised of concrete deck panels supported on transverse floor beams. The concrete tower is a double “H” system, with an overall height of 74m.

The replacement is planned in stages, with the east-bound lanes eventually occupying the existing bridge space. In order to maintain traffic, the bridge is constructed in two stages. Stage 1 includes the construction of the north half bridge while traffic is maintained on the existing bridge. Stage 2 has the traffic switched to the new bridge, while the existing bridge is demolished and the south half bridge is completed.

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:

- A 1 to 50 scale section model of the completed bridge deck. Tests were performed in smooth flow to investigate the overall aeroelastic stability of the deck, and in grid-generated turbulent flow to define the dynamic buffeting response characteristics of the section.
- A 1 to 50 scale section model of the north half bridge deck. Tests were performed in smooth flow to investigate the overall aeroelastic stability of the deck, and in grid-generated turbulent flow to define the dynamic buffeting response characteristics of the section.

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