THE NEW BRIDGE OVER THE ST. LAWRENCE

Wind Speed Monitoring at the Existing Champlain Bridge

The real-time monitoring of wind conditions at the Champlain Bridge in Montreal is provided by the Boundary Layer Wind Tunnel Laboratory at the University of Western Ontario as a service to SSLC to aid in the construction of the New Bridge over the St. Lawrence. Existing wind instrumentation located on the North and South top chords of the bridge are used and supplemented by readings from Pierre Trudeau (Dorval) Airport. Wind Speed and Direction data are acquired from the Champlain Bridge anemometers and digitized at 10 Hz by the BLWTL data logger located on the bridge. The time history is downloaded at approximately 10-minute intervals to the BLWTL for analysis. The data is corrected for wind azimuth and potential shielding effects by bridge chord members and statistical quantities of relevant parameters are developed.

Alerts via SMS messaging

Should the wind speed data exceed pre-defined threshold values for Mean Windspeed and/or Gust Windspeed at any of the designated heights of interest, an SMS text message is sent to pre-defined recipients. The SMS message indicates the windspeed and elevation which triggered the alert. The recipient is directed to the default web page containing the windspeed data.

Data is presented on the following web-page “screens” on the BLWTL website that has been developed for the project.
Web interface: screen 1 - header

Toggle Units – directs to webpages displaying the following units for windspeed:
1. m/s (metres per second) – this is the default screen
2. km/h (kilometers per hour)
3. MPH (miles per hour)

Data Guide – this document

Support – send an e-mail to BLWTL Support staff.

Web interface: screen 2 – latest data from site anemometers

Maximum Mean Windspeed (2-minute average) obtained at Champlain Bridge site at an elevation above water of 52m occurring over a ten-minute interval

Maximum Gust Windspeed (3-second average) occurring over a ten-minute interval

Mean Wind Direction from True North (degrees) associated with the Mean Windspeed reading

Wind map with wind azimuth indicator

Indication that the wind measurements were obtained from the bridge for the ten-minute period ending on the denoted date and local time

Web interface: screen 3 – plot of the variation of windspeed with height

The data obtained from the bridge at 52 m elevation is converted to corresponding windspeeds at other heights using standard velocity profiles relevant for the site of the bridge. Vertical lines at the threshold values of 12 m/s and 15 m/s are shown on the plot for reference. The purple symbols are the wind speed estimates, while the teal blue symbols are the gust winds speed estimates. Should the lower threshold value be exceeded by the mean wind speed at any height, or if the higher threshold value is exceeded by the gust wind speed at any height, the lowest height that exceeds the threshold is shown in the alert message sent via SMS Messaging to designated mobile phone numbers. The height exceeding the threshold is shown in red.
Web interface: screen 4 – plot of the previous 2 hours of wind speed data

The purple symbols are the wind speed estimates, while the teal blue symbols are the gust winds speed estimates.

Web interface: screen 5 – plot of the previous 24 hours of wind speed data

The purple symbols are the wind speed estimates, while the teal blue symbols are the gust winds speed estimates.

Web interface: screen 6 – meteorological information using airport data

Maximum Mean Windspeed (2-minute average) obtained at Pierre Trudeau (Dorval Airport) at an elevation of 10m (usually obtained in the two-minute interval immediately preceding the hour).

Maximum Gust Windspeed (3-second average) occurring during the previous hour. NaN indicates that Gust Windspeeds were not recorded at the airport in this time period.

Mean Wind Direction from True North (degrees) associated with the Mean Windspeed reading.

Temperature reading from airport data and the change over the previous 4 hour period. Red values indicate a rapid change exceeding threshold.

Pressure reading from airport data and the change over the previous 4 hour period. Red values indicate a rapid change exceeding threshold.

Indication that the wind measurements were obtained from the airport for the hour ending on the denoted date and local time.