The Samuel De Champlain Bridge – A holistic approach to sustainability and durability

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Abstract

The Samuel De Champlain Bridge is one of the busiest bridges in North America. With over $20 billion Canada-US trade crossings annually, it is vital to Canada's international trade partnership.

Spanning the St. Lawrence River in Montreal, this lifeline structure faces unique hazards including extreme cold climate conditions, ice abrasion, ice-accretion on stays, de-icing salt attacks, wind, vessel collision, scour, and seismic activity, while meeting the required design life of 125 years.

This paper discusses the holistic approach adopted to achieve the project's sustainability and durability objectives. The project started with extensive environmental assessments, implemented design strategies to minimize environmental impacts, and employed a comprehensive durability plan and a structural maintenance plan. The Samuel De Champlain Bridge received the PLATINUM ENVISION® award for Sustainable Infrastructure Project.

Keywords: Cable-stayed bridge; sustainability; access gantry; durability; maintenance

1 Introduction

The new 3.4-km-long Samuel De Champlain Bridge in Montreal, Quebec, Canada is a key element of the larger $4.2-billion CDN Samuel De Champlain Bridge Corridor Project. The original Champlain Bridge was subject to rapid deterioration, and in 2013 the Government of Canada announced its replacement on a fast-track schedule. Notice to proceed was issued in June 2015, setting the total design and construction schedule at only 48 months. The bridge crosses the St. Lawrence River, bridging the Île des Sœurs (part of the City of Montreal) and Brossard. The bridge comprises three independent structures: a 2,044-m west approach viaduct, a 529-m cable-stayed bridge, and a 762-m east approach. Figure 1 and Figure 2 show the structure and its layout.

Figure 1. New Samuel De Champlain Bridge open to traffic (July 2019, INFC)

https://doi.org/10.2749/ghent.2021.1205
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