

The Existing Champlain Bridge - Overview of Issues – The Owner's Perspective

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Abstract

Montreal's Champlain Bridge was the first large scale use of prestressed concrete in Canada. A lack of understanding of corrosive effects from the long term use of de-icing salts has, over the decades, led to severe corrosion of the concrete girders. A poor drainage system and water infiltration through the pre-stressing anchors contributed to accelerating deterioration. A decision to replace the bridge was taken in 2011 only 49 years after its opening.

Today, the most vulnerable girders are instrumented and the owner, The Jacques Cartier and Champlain Bridges Incorporated, has installed steel trusses beneath the exterior concrete girders as a risk management strategy.

Keywords: Pre-stressed concrete; trusses; queen post; corrosion; risk management

1 Introduction

Montreal's Champlain Bridge was opened to traffic in June 1962 as Canada's longest and biggest bridge. The six lane structure spans some 3.5 km over the St. Lawrence River reaching to connect Montreal's South Shore to the Island of Montreal. The main span provides clearance for shipping through the St. Lawrence Seaway. The 50 approach spans leading to the steel cantilevered superstructure have a unique design and are composed of seven pre-stressed concrete girders that are post tensioned together transversally. The girders do not support an independent roadway deck, traffic runs on the asphaltic pavement placed directly over the top flange of the girders.



Figure 1. Champlain Bridge Main Span

The construction of the Champlain Bridge was the first example in Canada of a large scale application using pre-stressed concrete.

The generous use of road salt over the winter months and poor design features led to the demise of the Champlain Bridge. A decision to replace the bridge was taken in 2011 only 49