

Design of the Cable-Stayed Bridge Signature Span of the New Champlain Bridge

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Abstract

The cable-stayed bridge for the New Champlain Bridge Project (the “Project”) is the signature crossing. The asymmetrical structure features a 124 m back span and a 240 m main span. The 170 m high single-pylon consists of a tuning-fork configuration of twin masts. Inclined concrete tower legs and “W” shaped steel pier caps supporting the deck define the unique aesthetics of this bridge.

The focus of this paper is to provide a detailed description of the bridge including a discussion of the superstructure, main span tower, supporting piers and cable-stay system. It also describes the erection techniques used. Working alongside the Contractor, the design team made innovative use of pre-casting, modular segments, and non-traditional erection sequencing to meet the Project’s fast-track schedule of only 42 months, while overcoming the severe winters in Montréal.

Keywords: cable-stayed; bridge; Champlain; main span tower, stay cables, pier bents, superstructure, pier caps, erection.

1 Introduction

Spanning the St. Lawrence River between Île des Sœurs (suburb of Montréal) and Brossard on the Southshore in Québec, the New Champlain Bridge replacement is a part of a larger New Champlain Bridge Corridor Project. The focus of this paper is on the Cable-Stayed Bridge (CSB) as shown in Figure 1. The overall work scope of the 3.4 km New Champlain Bridge also includes the West Approach and East Approach structures.

The Project features up to four highway lanes in each direction, a central transit corridor for mass public transport with a provision for future light rail transit and a multi-use path for cyclists and pedestrians (Figure 2).

The CSB (main span of 240 m) is a signature element in which the architectural features were defined in detail in definition drawings that are part of the Project Agreement (PA). The 170-m-high single-pylon is composed of a tuning fork configuration of twin masts. Inclined lower tower

legs echo the inclined approach pier legs (Figure 3). The pier caps throughout the approaches form “W” shapes, defining the unique aesthetics of the bridge.

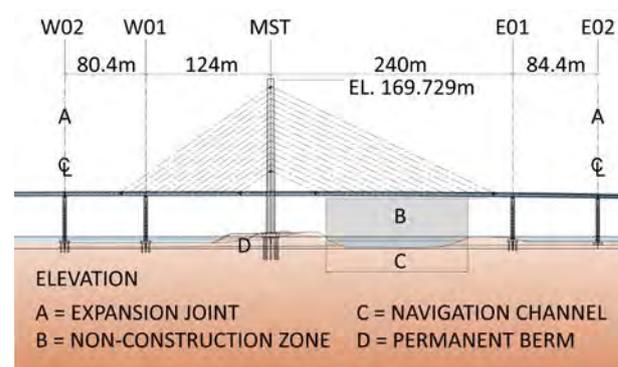


Figure 1. The cable-stayed bridge of the New Champlain Bridge

The design and construction considered the severe winter climate of the region and the navigational requirements of the St. Lawrence Seaway Management Corporation.