

The Existing Champlain Bridge - Strengthening Measures

Andrew Griezic, François Pepin

COWI North America Ltd., North Vancouver, BC, Canada

Jean de Gaspé Lizotte, Gustavo Lasheras

Stantec, Montreal, QC, Canada

François Demers

Jacques Cartier and Champlain Bridges Inc., Montreal, QC, Canada

Contact: angg@cowi.com

Abstract

The superstructure of the 50 approach spans of the Champlain Bridge consists of a highly integrated system with seven deep precast post-tensioned girders, transversely post-tensioned diaphragms and cast-in-place infill deck slabs. Deterioration and signs of corrosion observed in many of the girder PT tendons led the corporation managing the Bridge to initiate a major girder strengthening campaign to ensure user safety and that the structure remains open to traffic. Six strengthening systems were designed to secure all 100 edge girders, each system having a specific rehabilitation purpose and designed to address multiple constraints. For each system, the main principles behind the design, its intended purpose (emergency or permanent repair) as well as the many considerations in developing each system are described.

Keywords: post-tensioning; concrete; girders; corrosion; deterioration; strengthening; rehabilitation; bridge

1 Introduction

Opened to traffic in 1962 to link the South Shore of the St Lawrence to Downtown Montreal, the Champlain Bridge is the busiest bridge in Canada with over 160,000 vehicles per day. With a total length of 3.4 km, the bridge consists of 50 simply supported approach spans, each about 53 m long, four truss spans and a cantilever truss main span. An aerial photograph of the Champlain Bridge is shown in Figure 1.

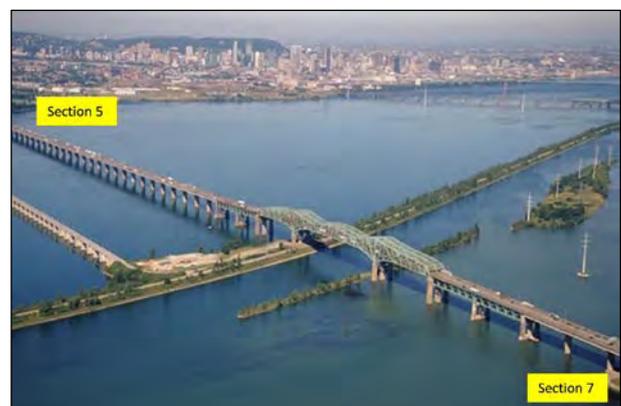


Figure 1. Photograph of the Champlain Bridge, main spans and approaches (Section 5 and 7)