39th IABSE Symposium – *Engineering the Future*
September 21-23 2017, Vancouver, Canada

Special Accommodation for Structural Steel Coating of Burlington Bay Skyway

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Abstract

The northbound structure of Burlington Bay Skyway in Hamilton, Ontario recently underwent major rehabilitation. This included a component for the recoating of the structural steel in the 150 m-long overhead main span arch. The primary operational constraint was that traffic lanes stay open throughout construction. The additional gravity loads and wind loads from the scaffolding and environmental enclosures posed serious structural overload concerns. Extensive computer analysis and scenario testing enabled the development of a staging arrangement, structural strengthening scheme, high wind closure protocol integrated with rapid lane closure gates, and an overheight vehicle detection advanced warning system. This rehabilitation of the bridge commenced in Spring 2014 and was completed on time in Fall 2016 with no significant traffic delays or disruptions. Structural integrity was successfully maintained throughout construction.

Keywords: steel coating, truss strengthening, construction staging, advanced modelling, wind design, traffic management, scenario testing

1 Introduction

The historic Burlington Bay James N. Allan Skyway (BBS) is a high level structural steel bridge, comprised of two separate structures, each carrying four lanes of the Queen Elizabeth Way (QEW) over the Burlington Bay Canal. This pair of bridges is a critical link along one of Canada's busiest trade routes, connecting Toronto with the American border. The bridge carries approximately 150, 000 vehicles daily (in both directions). It is operated and maintained by the Ministry of Transportation Ontario (MTO).

The original structure was constructed in 1958 as a series of steel spans, designed to carry 6 lanes of traffic (three in each direction). It is 2.26 km in length, with a 150 m long main span over the navigation channel. At its highest point, the roadway is approximately 35 m above the water. The twinned structure was constructed in 1986 to accommodate excess traffic volume that could no longer be handled by the original structure. It is a cantilever-constructed box girder bridge and carries the QEW's southbound traffic. After the construction of the twin structure, the original steel structure was closed for several years in order to be retrofitted to take four lanes of northbound traffic. This included, among other work, reconstruction of the deck and strengthening of structural steel members.

https://doi.org/10.2749/vancouver.2017.2771
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