

Reliability-Based Site-Specific Live Load Models for the Gordie Howe International Bridge

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1 Abstract

This paper discusses the development of project-specific live load models to achieve target reliability levels for the Gordie Howe International Bridge. This new bridge between Windsor, Ontario Canada and Detroit, Michigan USA will have a main span of 853 m (2800 ft), a design life of 125 years, and will experience atypical traffic patterns as a result of customs inspection plazas required at both ends of the bridge. Due to these variations relative to standard practice, large databases of weigh-in-motion data and simulation studies were used to modify the live load models of both country's codes following the approach of NCHRP 683. The limit states addressed extend beyond the Strength 1 (ULS 1), to include high dead-to-live ratio combinations, and fatigue limit states.

Keywords: Gordie Howe International Bridge, site-specific live load, design life, target reliability, fatigue.

2 Introduction

The Gordie Howe International Bridge is a new border crossing connecting Canada and the United States. The project links Detroit, Michigan with Windsor, Ontario across the Detroit River. The bridge will have a main span of 853 m (2800 ft). The project is being delivered as a public-private

partnership (P3) administered by the Windsor-Detroit Bridge Authority (WDBA).

The bridge will be dual-designed for simultaneous compliance with the requirements of the Canadian Highway Bridge Design Code (CHBDC, [1]) and the AASHTO LRFD Bridge Design Specifications (AASHTO, [2]). Prior to the tender phase, a load study was performed to develop project-specific

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