

Development and implementation of a new steel bridge edge beam for a cost-efficient replacement

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Abstract

Bridge edge beam replacements in Sweden imply high life-cycle measure costs during the bridge's life span. Moreover, the long duration of roadworks with a partial or full closure of the bridge causes significant user costs. The Swedish Transport Administration presented new edge beam solutions that could be better for the society in terms of cost. The purpose of this paper is to present the development and implementation processes of a new steel edge beam in a bridge project and evaluate its cost-efficiency. The design and planning phase is described addressing the challenges encountered and explaining the execution of the works. A life-cycle cost analysis is performed to compare with the standard concrete integrated edge beam. The steel edge beam results in a cost-efficient alternative for an edge beam replacement because of the lower life-cycle costs due to a faster execution of works and good working conditions.

Keywords: bridge edge beam system; steel edge beam; stainless steel; life-cycle cost analysis; maintenance; cost-efficiency

1 Introduction

The bridge edge beam system is a major concern among bridge managers in Sweden. The term bridge edge beam system is referred to a group of elements whose functions are carried out at the borders of the bridge, that is, the edge beam, the railing and the drainage system among others (**Figure 1**). The overlay and the membrane sealer can also be included since their life-cycle measures are executed in the same life-cycle plan as the ones of the aforementioned members.

The bridge edge beam system is exposed to harsh conditions because of weather, frost, splashed salt water and car collisions. Consequently, its

deterioration is accelerated, which results in, *inter alia*, steel corrosion, and concrete cracking and spalling. The Swedish Transport Administration (Trafikverket) has documented that up to 60 % of the maintenance costs of Swedish bridges are

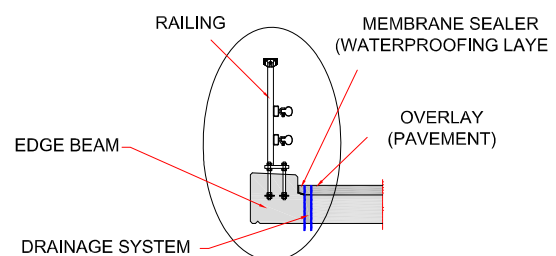


Figure 1: A typical bridge edge beam system