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An Analysis of Bridges Performance in Southern Brazil Highways

Gean Marcos Baldessar Warmling, Mauro Lacerda Santos Filho, Adriana de Paula Lacerda Santos

Federal University of Parana, PR, Brazil

Contact: bwgean@gmail.com

Abstract

This paper presents the basic concepts of a Bridge Management System that can create a meaningful conservation and maintenance programs for the Brazilian Highway Public system. The methodology, based on a deterministic procedure aims to create a list of priorities towards a future program of maintenance of bridges. This document presents the introduction of a method that includes the content of the analysis. The application of the proposed procedure allowed the analysis of a batch of 308 bridges in the highways systems that cross the states of Parana and Santa Catarina, in the southern part of Brazil. The model considers several aspects that regulate the conditions of those bridges, considering traffic characteristics and maintenance history. The results bring the possibility to relate the actual condition of the structures within the performance that one expects the highway system to provide for the user. In order to complete the analysis, this paper presents a general classification of the bridges, by their performance, creating a very meaningful list of priorities to guide any maintenance program.

Keywords: bridge assessment; bridge management system; bridge performance.

1 Introduction

Considering the importance of Bridges for the Brazilian Highway System, it is very interesting for the Federal Infrastructure and Transportation Agency (DNIT) to develop an efficient mathematical tool to manage the conservation and performance of these structures.

In order to cope with this objective, the group of researchers and engineers from the Federal University of Paraná developed this tool, a management system for bridges based in a deterministic model. This system will allow the establishment of a list of priorities of the actual situation of bridges, helping to optimize government actions related with bridge maintenance.

The model developed by the researchers shows that it is possible to assess the bridge under the prism of structure conditions and operational requirements. The operational aspect considers the quality of ancillary elements and user's comfort.

Initially, this paper presents the model of performance, which is emphasizing the main characteristics. After that, the model presents its application in 308 bridges in the states of Paraná and Santa Catarina. The managerial tool classifies the bridges by performance. At that point, the model introduces a general classification as well as the classification, which separates structural and operational aspects.

In order to bring the conclusion of the model application, the authors classified the bridges by highway. The basic situation of the analysis, in this