



An infrastructure management system for railway bridges: overview and application to a case study

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Abstract

A management system is a decision-making tool that uses mathematical models to predict the future condition of the infrastructures as well as to make recommendations to the project managers. Generally, an infrastructure management system shall include a system for processing and analysing data, predicting deterioration, proposing maintenance actions, forecasting costs, obtaining optimal solutions and defining strategies that considers the political and economic constraints. The focus on this paper will be the module regarding the definition of cost-models.

During its life cycle, bridges are exposed to several issues that can compromise their functionality. In this way, performing maintenance and rehabilitation actions and establishing cost models are very important tasks to keep the bridge functions according to the demands of the society. In the field of bridge engineering, the cost models can be used for different purposes such as the definition of optimum maintenance policies and project investment alternatives. Also, they are very important for the decision-making process once they cover several aspects related to the decisions about the system's performance and decisions that are influenced by social-economic aspects. Hence, the idea of this paper is to discuss different approaches of how the cost-models are evaluated over a life cycle of a bridge due different scenarios of maintenance and rehabilitation with an application to a case study.

Keywords: Infrastructure Management System, Degradation Models, Optimization Problem, Risk Analysis, Reliability Index

1. Introduction

Asset management of infrastructures consists on a set of principles and practices of financial, economic, engineering and other management applied to physical assets in order to provide the desired level of service in the most economical way

possible. This management considers all the asset life cycle, including project, building, maintenance and rehabilitation and demolition. Being the limit of budget an issue on these days and a scenario where all the infrastructures are almost concluded, it is of paramount importance to take wise decisions regarding maintenance and