



Experiences in infrastructure and bridge risk management

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Abstract

The paper presents the results of some experiences acquired in the past years in the field of Infrastructure and in particular bridge risk management. The assessment of the health conditions of existing infrastructures, on the basis of different levels of evaluation and different steps of analysis is presented. For some structures (i.e. Rio-Niterói Bridge, length 13,29 km) the work involved the definition and implementation of a Monitoring Plan for all the structural elements. Moreover, an activity of technical inspection was carried out in order to assess the health conditions of the structure. Many experiences were made on the analysis of complex road networks, in California, Italy and Brazil. The studies had the main purpose of assessing the vulnerability of the bridges of the whole road network and perform an optimization of the budget allocation and prioritization for annual programs of maintenance. The reported experiences were eventually analysed in term of cost-effectiveness and impact, in order to assess their effectiveness and the presence of potential alternatives, and to outline an optimal procedure of risk management.

Keywords: Concrete, Steel, Bridges, Inspection and Maintenance, Risk management

1 Introduction

Rapid increase in socio-economic activities in many modern urban areas is usually accompanied by an interactive development of highway transportation network. As the expansion process further proceeds and matures, however, situations become more common in which the public highway expenditure must be more targeted for not only routine maintenance but also for rehabilitation of the existing functionality or physically aging core of highway network from which the expansion originated [1].

2 Experiences of road network risk management

The need for a reliable risk management of the road network comes from several requirements.

First of all, it is necessary to guarantee a constant level of safety and performance of the road elements. Malfunctioning of civil structures often has serious consequences, the most serious is an accident involving human victims. Even when there is no loss of life, populations suffer if infrastructure is partially or completely out of service. The safest and most durable structures are those that are well managed [2].

Moreover, other factors have to be taken into account in road network risk management:

- Updating in structural codes;
- Presence of intrinsic weakness;
- Physical and chemical degradation of materials.

In order to assess the health conditions of the structures, several levels of evaluations and different steps of analysis can be performed.