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Inspection of Existing Bridges – Moving on from condition rating

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Abstract

It is widely accepted that safety and serviceability are primary concerns in bridge design. However, for the most of bridges' service life, these concerns are addressed indirectly by a qualitative measure, defined herein as condition rating, which is based upon observable damages recorded during inspections. Condition rating is at best, only loosely correlated to safety and serviceability. It would be more reasonable to address safety and serviceability in an inspection process directly, using the information on bridge performance obtained during the design and construction.

To address this issue, the reliability was chosen as a Key Performance Indicators (KPI) for existing bridges and a novel practical solution is proposed. It is based on survey of observation types (visible defects, measurements, etc.) used in Europe, which were examined with regard to their potential impact on reliability regarding safety and serviceability. The impact of these observations on reliability is also dependent on their type, location and intensity/extent as well as on bridge structural systems. The paper presents a methodology to assess reliability, which heavily relies on data from design and construction phase. It also proposes a set of data elaborated in design and/or construction phase that need to enter current bridge data bases to allow a rough reliability assessment of existing bridges.

Keywords: condition, decision making, KPI, inspection, reliability, existing bridges, Bayesian net

1 Introduction

There is a broad consensus that the benefits of road infrastructure for the society cannot be overestimated. The investments in road infrastructure raise the growth potential of a national economy, which is realized by efficient exploitation of the road infrastructure. The road infrastructure enables road users to be involved in various productive activities that yield private, public and social goods. Maintaining these benefits on the long run in economically efficient, environmentally responsible

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