



Performance of existing concrete arch bridges

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Abstract

Numerous issues, including structural, environmental and economic indicators, that are to be considered in order to achieve efficient and effective performance of existing concrete arch bridge will be systematized and elaborated in this paper through the examples of several Croatian Adriatic arch bridges.

Keywords: existing arch bridges; performance indicators; structural; environmental; economic.

1 Introduction

Numerous existing Croatian arch bridges designed according to former design codes are in daily use and deficiencies and degradation during years of service have additionally reduced their designed reliability levels. Research on development of assessment procedures for existing arch bridges is developing through last few years in Croatia as a part of an extensive project to develop their appropriate maintenance strategy. In this paper, numerous issues that need to be considered in order to achieve efficient and effective performance of existing concrete arch bridge will be systematized and elaborated. The performance indicators may be grouped as structural, environmental and economic. They will be elaborated through the examples of several Croatian Adriatic arch bridges (Figure 1). Šibenik bridge spanning 246 m and Pag Bridge with a span of 193 m, constructed in 1960s by suspended cantilever method, are very similar in appearance and design. Pag bridge was reconstructed in 1999 with a completely new superstructure in steel. Krk

bridges, constructed in 1980 by an innovative procedure forming a trussed arch cantilevers, consists of two large reinforced concrete arches, of 390 m and 244 m span. To achieve exceptionally large spans it was necessary to reduce the dead load as much as possible.

2 Structural indicators

Structural indicators may be listed as geometry, details, material properties and dynamic criteria. Adequate data on geometrical and material properties and structural details need to be collected using documents overview, visual inspection and different inspection methods. To define a correct structural model of the existing structure, and to perform an appropriate structural analysis, additionally, the existing and desired levels of knowledge about the existing structure must be specified based on the bridge importance. Required knowledge levels may be obtained through an appropriate collection of data including location (critical cross sections) and extension of in-situ inspection methods.