



Periodic assessment of an old concrete road bridge based on operational dynamic bridge behaviour with regard to structural integrity and the remaining load bearing capacity

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Abstract

The aim of the investigation was the analysis of a concrete road bridge structure crossing the Elbe river and having been operated since 1924. In accordance to previous investigations from 2015 & 2017 in depth dynamic measurements were conducted in 2020 with regard to the remaining load bearing capacity based on a dense grid of accelerometer data and additional displacement measurements.

Keywords: Dynamic Measurement; FE Model Update; Structural Health Monitoring; Performance Assessment

1 Introduction

1.1 Scope of investigation

The scope of this investigation is based on similar assessment projects from VCE in the past, described in [1] and [2]:

- Analysis of operational condition, determination of effective structural resistance and remaining load bearing capacity with regard to ensuring the required bridge safety issues.
- In addition to characteristic operational loading conditions a tailored loading campaign was

performed using a set of bridge trucks crossing the bridge at defined weight and velocity levels.

- Analysis of structural degradation, evaluation of structural integrity (condition and mechanical behaviour of the load bearing concrete structure and the bridge bearings).
- With regard to the Czech standard ČSN 73 6209 [3] an analytical finite element bridge model was used already in the course of the baseline investigation in 2015 to provide a reference for structural and modal analysis in order to compare the current bridge behaviour with the expected, calculated one.