



# The assessment and condition survey of concrete prestressed bridges in the Czech railway network

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## Abstract

Over the last few years, a detailed survey of a large number of prestressed bridge structures, approximately halfway through their expected service life, has been carried out on the railway network in the Czech Republic. In addition to the detailed diagnostic survey, load capacity calculations have been carried out by a number of major consultancies. The majority of the structures were precast, however typical and atypical monolithic structures were also included.

The results of the evaluation, typical defects, concrete quality and strengths, condition of prestressing reinforcement, an overall condition found, and results regarding load capacity are presented in this paper.

**Keywords:** prestressed bridge, diagnostics, bridge assessment, deterioration, corrosion

## 1 Introduction

The condition of the concrete prestressed bridges is an important topic nowadays, as many of those bridges failed recently, because of the corrosion of the prestressing cables. The subject of the paper is to present the evaluation of the results of the project "Diagnostics and static assessment of railway bridges with load-bearing structure", prepared for the Czech railway administration. This project was divided into 2 stages, first 34 and then 29 bridges were evaluated. The companies involved in the project were Klokner Institute and Faculty of Civil Engineering of the Czech Technical University in Prague, Pontex Ltd., Inset a.s., SHP TS Ltd., and Mott MacDonald CZ Ltd.

## 2 Bridge typology

The first railway bridge with a load-bearing structure made of prestressed concrete in the Czech Republic was built in 1956 and is located in Prague. From that time, a significant number of prestressed bridges were built. Figure 1 shows that most of the bridges with prestressed concrete superstructure were built between 1960 and 1984, with the maximum number (47) built between 1965 and 1969. Thereafter, a decreasing trend in the number of prestressed concrete bridges constructed in each of the following periods is evident. In total, there are 166 bridges with a superstructure made of prestressed concrete in the Czech railway network.