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The diagnostic techniques for the assessment of the historical steel bridges

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Abstract

The paper describes some of the results and experiences of the detailed diagnostics of steel railway bridges that were carried out in the second half of year 2017. They included detailed inspections and diagnostics of 20 supporting structures an in total of 9 bridges. The scope of the surveys was to provide the necessary knowledge for the subsequent assessment of the load carrying capacity of load-bearing structures. The second part is focused on the diagnostics of the fatigue crack and internal inhomogeneities in old steel materials with suitable methods.

Keywords: Bridge, steel, diagnostics, NDT

1. Introduction

The industrial development in the beginning of the last century would not be successful without the transport infrastructure. At those days, many steel riveted bridges were built in the Czech Republic and all over the world. Those bridges are usually at the end of their service life; however, the lack of the financial sources forces the infrastructure owners for operating them much longer. Unfortunately, the bridges are often damaged significantly in various ways.

2. The general methodology

The standard and unified methodology was developed to inspect all 9 bridges during only 5 months. The main aim of the diagnostics was to prepare all necessary inputs for the assessment of the load capacity of the bridges.

The inspection was carried out with the help of the inspection platforms, inspection walkways, with the climbing methods and with the help of ladders.

The overview of the inspected bridges is given in the table 1.

Table 1. The overview of the inspected bridges

Type	Span
Truss, lower deck	L = 35,68 + 47,60 + 35,68m
Truss, upper deck	L = 18,90
Steel girder	L = 19,50
Langer beam	L = 100,00
Langer beam, skew	L = 42 + 81+ 42 m
Composite girder	L = 33 + 39 + 33m
Steel girder, upper deck	L = 20,52 + 20,52 m
Truss, intermediate deck	L = 58,00 + 58,00 m
Truss, upper deck	L = 38,0 + 38,0
Truss, lower deck	L = 72,0 + 72,0 + 72,0

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