

Revitalization of the historical bridge over the Mała Panew River in Ozimek – the oldest chain suspension grey cast iron river-crossing on the European continent

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Abstract

Renovation methodology applied to protect the historical chain suspension bridge made of grey cast iron and erected in the years 1825-1827 over the Mała Panew river in the vicinity of Opole is presented and discussed in detail. This bridge crossing, of unique structure, is currently recognized as the oldest cast iron suspension bridge erected on the European continent (excluding British Isles). Special attention was paid to analyse the weakening of main bearing components induced by gradual degradation of the material properties during their extremely long service time. Replacement of several worn out and cracked links in the bearing chains proved to be necessary. As a result of the conducted works the bridge has been sufficiently strengthened and due to that protected against the detrimental influence of possible vibrations. All joints have been renewed and cleaned as well. Currently the bridge is accessible only for pedestrian traffic of limited intensity.

Keywords: cast iron; suspension bridge; renovation; revitalization; material weakening; load chains; cracked links.

1 Introduction

The royal “Malapane” steelworks in Ozimek near Opole was founded in 1793/1794, only 13 years after the Silesia province was conquered by the army of the king of Prussia, Frederick the Great. Already at the end of XVIII century it became known for making cast iron structural bridge elements. The first bridge erected of such elements, based on the Iron Bridge erected in 1779 in Coalbrookdale in Wales, made in these works in 1795, was intended for the estate of Laasan (Łazany) in the vicinity of Żarów in Lower Silesia, to facilitate convenient crossing of Strzegomka river. Other such bridges had been made here in the years 1798-1805 in order to fulfil orders placed at first by Berlin and subsequently by Potsdam. Breslau, a then capital of Silesia,

relatively early gained a bridge made in Ozimek. A bridge of this type, designed by Schinkel in 1815, was to be erected over the moat in the neighbourhood of Oławska Gate. However, prior to the erection of this bridge, already in 1822 in the vicinity of this location an analogous crossing had been built on the road leading to the capital Berlin, under a prestigious name of the Royal Bridge. In 1824, due to the changes in water levels on Mała Panew River, a need arose for a modern dam. It was to supply sufficient quantity of water to the Works to power mechanical devices. Two new bridges had to be erected over the channel leading to the Works. These were made of grey iron based on well known and tested structure. This investment included a bridge over the main current of Mała Panew river on the Graff Renard StraÙe, leading from Opole to Dobrodzień, and