

## Replacing of a steel bridge by rotation around the longitudinal axis

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### Abstract

This paper deals with a unique replacement of three bridge spans across the Hracholusky dam in the Czech Republic. The replacement was done by a longitudinal launching of the new bridge structure to the old one, their connection to each other and subsequent rotation of the bridge system around the longitudinal axis for 180°.

**Keywords:** Hracholusky dam; steel bridge; replacing; rotation of bridges; erection

### 1 Introduction

In the west of Bohemia, an unusual replacement of bridge structures over the Hracholusky dam took place. The replacement of bridges began in 2018 and construction was completed in 2019. The method used in this case was completely novel. At first, the new steel structure bridge span (NSS) was launched on top of the old steel structure (OSS) at an upside-down position. Then both structures were connected and slowly rotated around the longitudinal axis for 180°. After the rotation, the new bridge was in the correct position and the old one was demolished. The process was repeated 3 times for all identical main spans of the bridge.

The idea of this method came from MCE Slaný, who also implemented it. The designer of the new bridge structures was TOP CON SERVIS s. r. o. And the structural analysis of the construction process was carried out by a team from CTU in Prague (the Faculty of Civil Engineering, Department of Steel and Timber Structures).

### 2 Technical data about structures

The original bridge was over 100 years old, also was badly damaged by corrosion. That was the main reason for replacing it with a new one. (Fig. 1). The bridge had five spans. The outer spans were

formed by stone arches. The three main steel spans were identical with a length of 57m. The riveted steel truss had a curved lower chord with an uplift around 6 m (the whole height of the bridge was around 10m). The bridge had an open-top deck with timber bridge ties. The deep Hracholusky valley was spanned thanks to a pair of stone piers about 46m high. On the banks of the valley were stone abutments that were adjacent to the outer arched spans.



Figure 1. – The view on the bridge in the Hracholusky valley, at the start of the reconstruction [1]

The new steel structure (NSS) is quite like the old one (Fig. 2). It's a welded steel truss with once again