

---

## Examination of Two Riveted Railway Bridges over the River Rhine

**Eugen Brühwiler**, Professor, EPFL – Swiss Federal Institute of Technology Lausanne, Switzerland

### Introduction

Riveted steel bridges were built over a period of more than 100 years up to the 1950s. Several of them are considered historical and should be preserved as heritage of structural engineering. Often, an important future service life may be identified such that, economically, it is not justified to replace a riveted bridge because of some arbitrary age criterion, as has been often done in the past. This contribution deals with the examination of two railway bridges in riveted wrought-iron and early steel construction. Both were built in the 19th century and span over the River Rhine. They are still in service accommodating the modern-day railway traffic of the Zurich suburban railway. Both bridges have been examined recently to verify the structural and fatigue safety for long-term future utilization while preserving the cultural values of the bridges. The standards valid in Switzerland for existing structures were applied:<sup>1</sup> updated railway traffic load models, updated data regarding the fatigue behavior of riveted joints and information from *in situ* deformation measurements were used to verify the structural and fatigue safety based on precise bridge-specific information.

### Railway Bridge over the River Rhine between Koblenz (Switzerland) and Waldshut (Germany)

#### Bridge Structure

The investigated bridge (*Fig. 1*) crosses the Rhine river in northern Switzerland to carry a one-lane railway line between Koblenz (Switzerland) and Waldshut (Germany). It was designed by Robert Gerwig and built in 1858–1859 by the German company Benckiser. It comprises riveted