

Railway bridges - Monuments in the network

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Abstract

Since the 1830s, the railway network has grown rapidly, connecting all regions of the German country. In order to overcome topographical obstacles such as valleys, rivers etc., many railway bridges were built in different construction periods. The individual structures are understood as elements of the dynamic development of the complex "railway" network. Railway bridges are constantly changing structures, as their functionality and preservation value must be secured through maintenance, repair and replacement due to increased requirements. During the beginning of railway expansion, especially in Saxony, a dense network was developed. The topography of a low mountain region led to a high number of arch bridges. This type of construction still makes up a high proportion of the existing bridges in Saxony today. The history of selected railway arch bridges from representative parts of the railway network in Saxony is shown and analysed.

Keywords: monument preservation; railway bridges; railway network; arch bridges; historical; maintenance; Saxony; railway network

1 Introduction

The first rail link in Germany was opened in 1835 between Nuremberg and Fürth. The first long-distance route between Leipzig and Dresden followed just four years later. During the beginning of railway expansion, especially in Saxony, a dense network was developed. The topography of a low mountain region led to a high number of railway bridges. Especially in the second half of the 19th century, a large number of masonry arch bridges was built. This is still the highest proportion of existing railway bridges in Saxony (30%).

During the long use of the bridges, the requirements increased, and continuous reconstruction measures were needed. Many of the bridges are protected as historic monuments due to their technical innovation and their cultural significance today. This protection often forms a challenge for the necessary modernization for further use in the network.

2 The railway bridges in the network

2.1 The development of the railway network in Germany

After the construction of the first railway, a rapidly growing railway network developed in Germany starting in the 1840s. At that time, Germany consisted of many individual states, in which different ways of financing the railway existed. In the south, there was the model of the state railway. The other regions preferred private investment for the expansion of the network [1]. As a result, many individual railways were created without coherent routes or planning. Between 1840 and 1860, the route network grew 20-times from an initial 500 kilometres to 10,000 kilometres and could now provide connections between almost all the major cities (Fig. 1) [2].