



## Through constructions on arched bridges

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### Abstract

Due to the fact that the vault bridges in DB Netz AG's inventory are getting older and older, a consistent approach to these historic structures must be taken. Based on the systematically recorded and classified damages, a deck slab or a sealing with beam construction between the upper edge of the vault and the upper edge of the rails should be implemented. A complex fundamental renewal should be carried out on the structure, e.g. drying of the structure, sealing with a new drainage system and the creation of the required safety space. In order to effectively implement this concept, a comprehensive module is to be introduced in the regulations of the Deutsche Bahn.

**Schlüssel: historic arch bridge, through module, condition category, fundamental renewal, financing eligibility**

### 1 Introduction

Historic arch bridges are one of the most widespread construction types in Germany and have been in use in the railroad bridge construction for over 100 years. This characteristic cultural asset is an important part of the infrastructure and represents about a quarter of the entire bridge construction stock of Deutsche Bahn [1, 2]. Due to aging, this type of structure is often in a differentiated condition, so that appropriate revitalisations have to be applied. In addition to the alternatives of demolition and new construction, the research project "Roadway throughs on arch bridges" in cooperation with DB Netz AG as a research partner has an aim to further develop the retrofitting of existing arch bridges. The technology of construction of roadway throughs has been known for many years, but is implemented in many

different forms in the network of Deutsche Bahn [3, 4, 5]. Furthermore, the knowledge gained in the already implemented projects has not been systematically analysed so far. An immediate goal is the elaboration of a track slab module as an addition to the Deutsche Bahn RIL 804.

### 2 Railway arch bridges in the DB Netz AG inventory

The vault bridges of Deutsche Bahn have a share of approx. 24% of all railroad bridges. Figure 1 shows the regional development of the historical vault bridges of the German Railways to be rehabilitated in the next years. Significant damages e.g. from leaking joints or seals and aging as well as washout of building materials are a common cause for a reduction in load bearing capacity as well as limitations in serviceability [3]. Effective structural