



## Refurbishment of Franzensbrücke in Vienna- Retrofitting a historical steel arch bridge with composite plate in between limited timeframe, restrictive urban environment, and challenging structural requirements

Paul Herrmann, Klaus Hackl

HPIEngineering ZT GmbH, Vienna, Austria

Astrid Nageler-Reidlinger, Rudolf Hinterleitner

Mayer Ingenieurleistungen ZT GmbH, Vienna, Austria

Contact: [office@hpi-engineering.com](mailto:office@hpi-engineering.com) , [gf@il-mayer.at](mailto:gf@il-mayer.at)

### Abstract

The Franzensbrücke across the Danube Canal is a prominent bridge close to the city centre of Vienna. Built in the 1940s, it requires rehabilitation after 70 years of use. The structure shall be refurbished and upgraded to withstand traffic loads of modern EN standards in future. The urban environment, the strategic importance in Vienna's traffic situation as well as the historic materials and detailing are boundary conditions, which result in a challenging technical and logistic task.

**Keywords:** bridges; retrofitting; refurbishment; strengthening; structural assessment; steel structures; composite slab; corrosion protection; urban environment

### 1 INTRODUCTION

The Franzensbrücke is a major crossing of the Danube-Canal in the city centre of Vienna. It was built between 1946 and 1948, is approximately 20m wide and accommodates two tramway rails, four lanes for motorised vehicles and one combined walkway and bicycle lane on each side. The bridge consists of two stone arch structures above the quays on both embankments and a central steel arch structure of approximately 53m in the main span (See fig. 1). The central span is made of 9 welded arches with a propped bridge deck, consisting of steel cross beams, steel stringers and precast concrete panels.

A retrofit of the bridge became vital due to the bad condition of the concrete driveway. Within the retrofit design, an analysis of the “as- built” structure was done according to the Austrian standard ÖN B4008-2, which is used for assessment of historical bridges. This analysis revealed the need of reinforcing the historic structure for compliance with the most recent Eurocodes.

Due to the importance of the bridge in the urban infrastructure, the construction time is limited. A complete closure of the individual and public traffic is only approved for 13 weeks during the summer holiday. However, pedestrian and cyclist traffic should remain unrestricted during the entire construction period.



Figure 1. Franzensbrücke –Upstream view