



## Fast and easy dimensioning of filler beam bridges

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### Abstract

Filler beam bridge constructions with rolled steel sections, which are closely spaced and filled with concrete, meet all the requirements of railway bridges with small and medium spans. Since the late 1970s, various railway companies have established standard designs with design guidelines, supplemented with calculation tables that correspond to their own rules. Some of these guidelines had to be replaced by the introduction of the Eurocodes.

For this reason new design tables for filler beam structures in Germany have been developed, which enable the planner a fast and direct determination of all relevant cross-sectional data of single-track single-span bridges in the span range from 5 to 35 m - without costly calculations. The tables and the software, with which the tables were generated, will be shown in this article.

**Keywords:** bridges, composite, filler beam, predesign, software, design tables

### 1 Introduction

The filler beam bridge deck concept has been developed in France at the end of the 19<sup>th</sup> century for the railway infrastructure. It consists of a concrete slab with a strong longitudinal reinforcement made of rolled beams and transverse reinforcement of steel rebars [1]. The closely spaced steel beams and the reinforced concrete act compositely in longitudinal direction [2]. Main advantages are high load capacity, stiffness, easily executed constructions, aesthetics and easy maintenance.

Therefore, filler beam bridges have been used for many years with considerable success for the rail infrastructure. They are also suitable for use within high-speed lines. For some time this

construction is increasingly chosen for road bridges, since it leads to very slender structures and minimizes the traffic disturbances during the erection period.

Modern production methods allow rolled beams with heights up to 1138mm and flange thicknesses of maximum 140mm and steel grades up to S460M/ML [5]. With such girders it is possible to build filler beam bridges with high robustness and low maintenance, which meet the demand of our infrastructure of the future.

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