Vigaun bridge

SSF Ingenieure

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Vigaun bridge

For the bridge in Vigaun a total length of 78.45 m over three spans was chosen. The bridge is in a straight line over the whole length. The radius measures 25 m at the west abutment. Behind the east abutment the structure opens into a higher grade road where it widens. The railway line crosses at an angle of 74 gon and requires a clearance gauge of 7.50 m. To minimise the development length of the viaduct, a longitudinal gradient of 10% is projected on the west side and 9% on the east side. The road is 4 m wide between the curb stones, with a gradient of 2.5% to the structural axis, on account of the slight width. The inversed inclination is advantageous for vehicles, pedestrians as well as cyclists.

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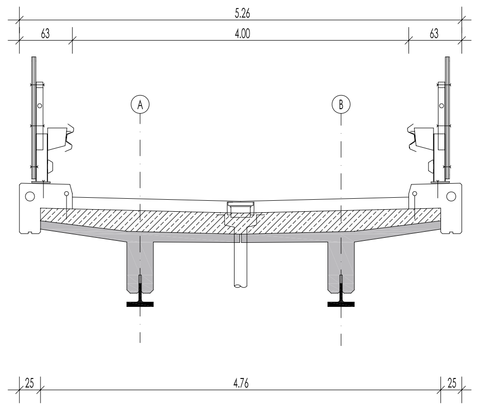

Steel girders

The steel girders are cut in the steel plant according to the dowel cutting line. The necessary camber of the tension-free workshop form is achieved with the three-point bending method. In the workshop, the front plates are welded to the ends of the rolled girders with DHY welds.

In the neighbouring coating plant, the steel girders were protected agains corrosion with the coating system for protection class S5 according to RVS.

2

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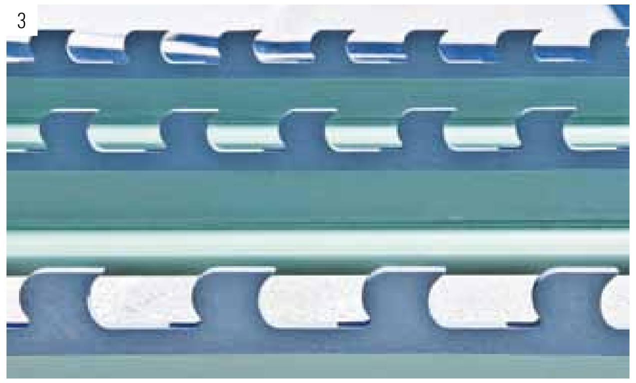
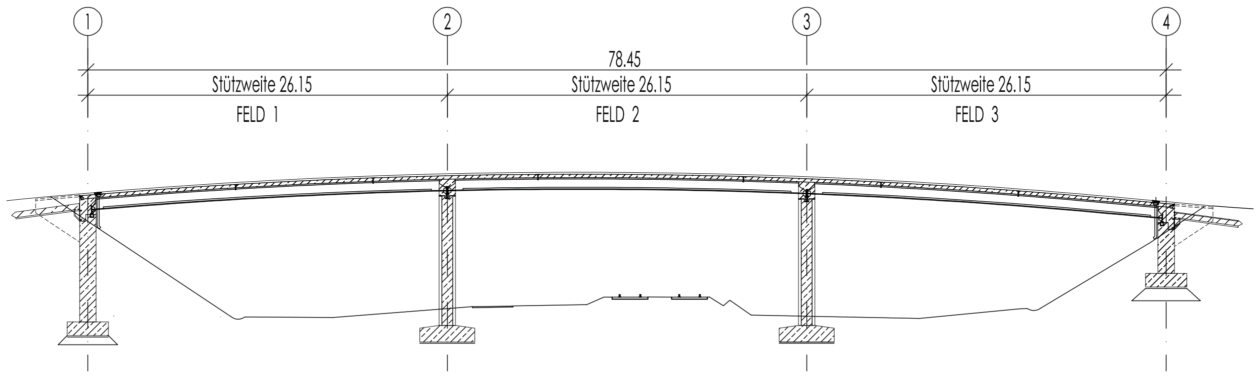


1 Cross section of Vigaun bridge
2 Oxy-cutting of the rolled girders
3 Corrosion-resistant girder after transport to the precasting plant
4 Longitudinal section of Vigaun bridge

4



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Concrete precast parts

The steel girders were transported by rail from Esch in Luxembourg to Ingolstadt in Germany. Minor damages on the anticorrosion coating were mended professionally by the steelwork company. The steel girders were then stacked outside the concreting hall with their tension-free workshop form. The steel girder acted as gauge for most convenient braiding of the FT reinforcement. Subsequently the steel girder with reinforcement cage was brought into the building and lifted into the prefabricated formwork for the precast concrete.

After casting the concrete, the prefabricated part underwent careful after-treatment to prevent shrinkage cracks. The web is very susceptible to undergo cracking as it can hardly contract against the rigid steel girder.
The finished VFT-WIB® girder was left stacked for an average 2-3 weeks on precisely dimensioned supports, stacked with the camber of the tension-free workshop form at the precasting plant, then brought to the building site in a convoy of low loaders.

Construction

The foundations, rising pillars and abutments were constructed parallel to the VFT-WIB® girders. Short steel girders were concreted into the working joints to the transversal girder for precise support of the prefabricated girders.
The Salzburg-Wörgl railway line was closed for 4 hours to lift the prefabricated girders into position over the track. The girders in span 3 were fitted on the day before the line was closed and the truck-mounted crane was then moved into position over the track for fitting the girders of the middle span and span 1.
After fitting the girders, the remaining gap between the head plates of the girders was cast over the pillars, the transversal girder reinforced and concreted. Then the in-situ concrete slab was added. Following the final jobs of work with caps, surface and safety barriers, the bridge was opened for traffic in October 2008 after a total construction period of 8 months.

Economic efficiency

The rolled girders including cutting, prefabrication and corrosion protection amounted to around € 2,100 per tonne free precasting plant, in spite of the extremely high steel prices prevailing in spring 2008, thus making them far less expensive than a comparable welded girder. Production of the entire bridge including finishing and without road construction work cost € 1,030 net per m² bridge. These are low production costs for a narrow bridge structure with high substructures.

Together with economic production, the narrow bridge also fits in well with the surrounding hilly landscape. It can be presumed that the framework system without bearings, the externally reinforcement offering very small corrosion protection surfaces and the sound construction method are likely to entail little maintenance effort on the bridge.

1 Steel girder in the concreting hall
2 VFT-WIB® girder at the precasting plant
3 Lifting of the VFT-WIB® girder

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