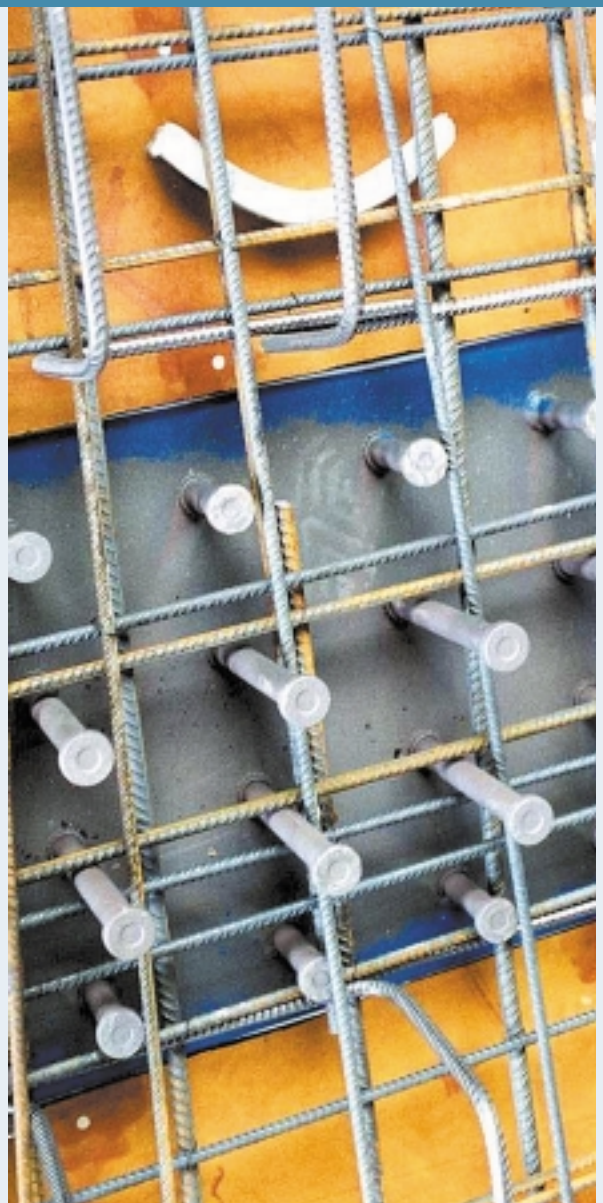
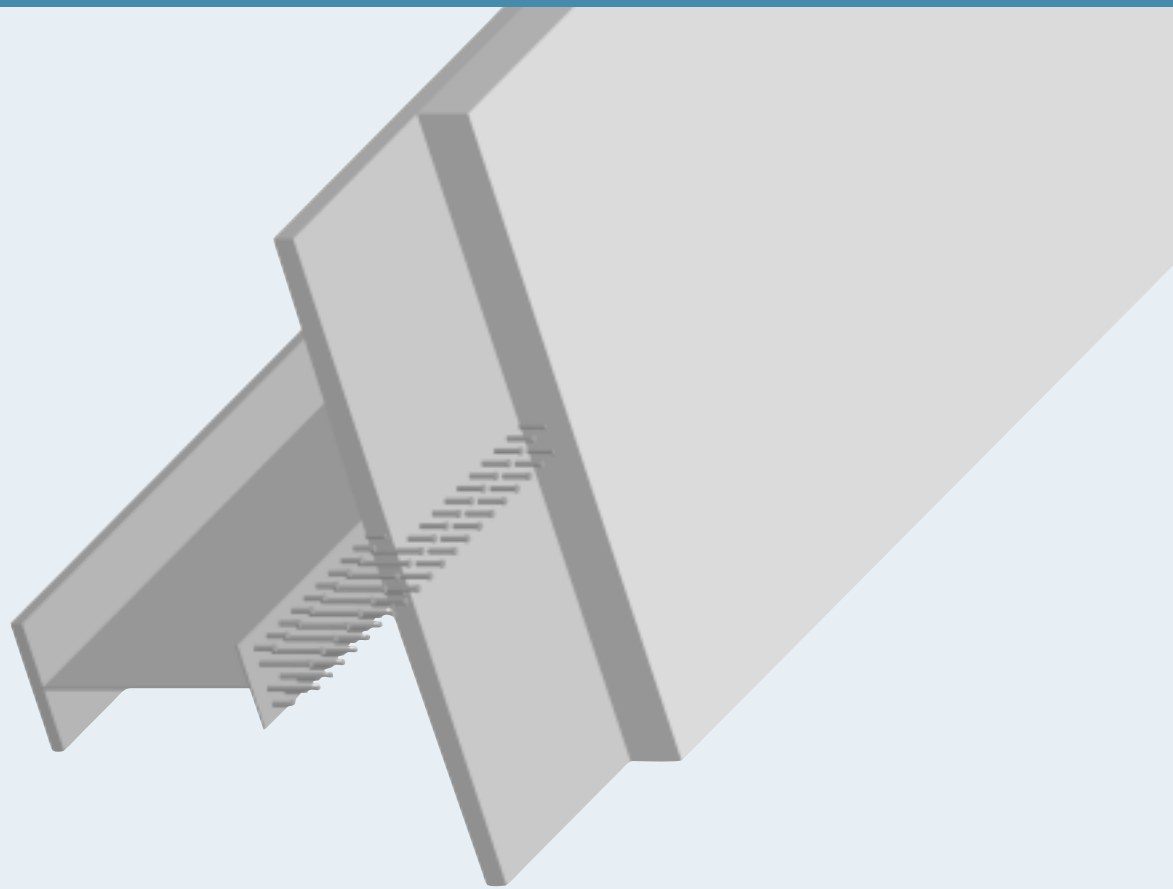
SCHMITT STUMPF FRÜHAUF UND PARTNER

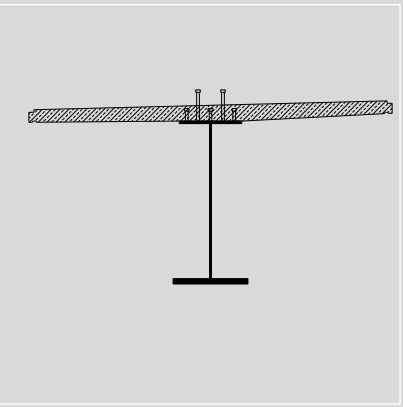
engineering consultancy

VFT® construction





Steel girder, concrete upper boom not yet added



Cross section of VTF
(shown without concrete reinforcement)

VFT girder at the prefabricated part works

Oberhartmansreuth viaduct, installation of VFT girders, bridge deck constructed later with formwork carriages

Completed double-span bridge over the motorway

VFT® construction

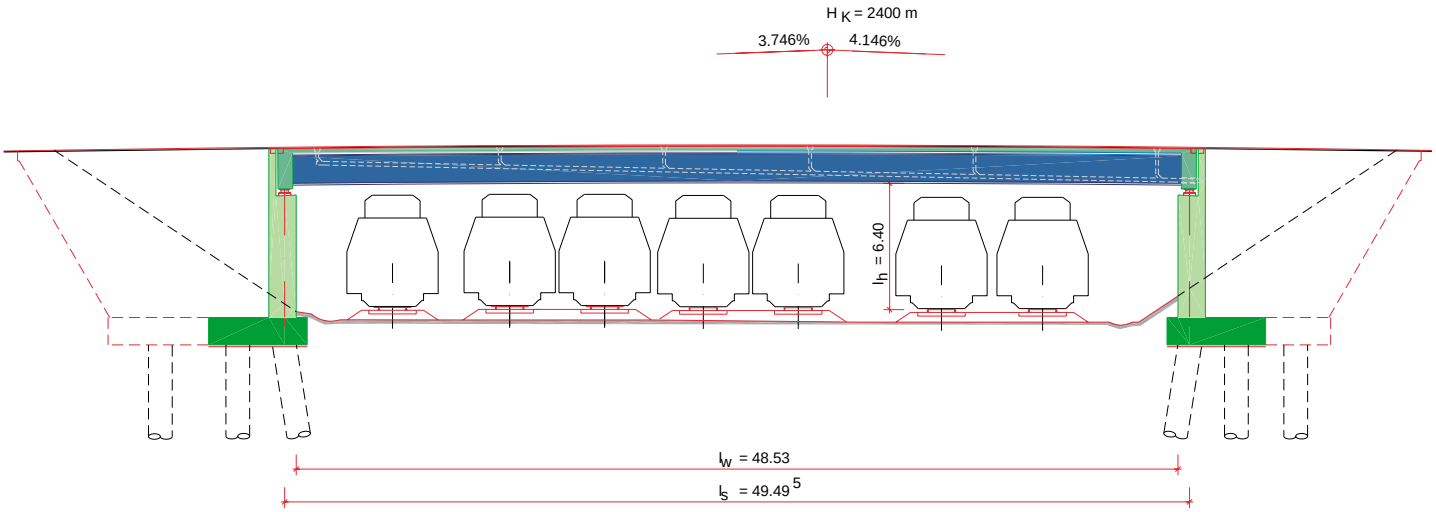
Composite constructions are currently growing in importance, since robustness, maintenance and suitability for testing are taking on a greater role in bridge building for economic reasons.

In conventional construction methods for composite-construction bridges, the loads of concrete formwork and construction concrete are only connected to the steel girders. Only the subsequently applied loads of the bridge deck and traffic act on the composite section.
During the construction phase, the behaviour of the steel girders is unstable, due to low horizontal rigidity; this instability must be compensated by integrating reinforcing braces. These reinforcements are time-consuming, expensive and obstruct traffic below during assembly.

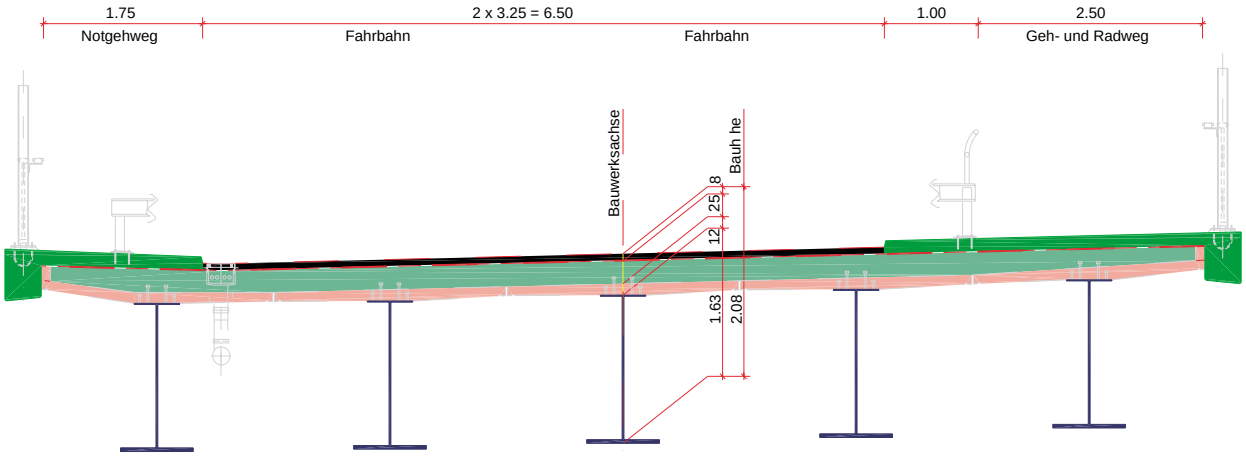
As a solution to these disadvantages in conventional composite construction, SSF has developed a type of composite girder that can be almost completely prefabricated in the factory. These have an upper boom which acts as an economical cross section under compression, as a shell element for the bridge floor slab and as a horizontal stabilising element. Construction and tilting braces are no longer needed for concreting the in-situ concrete plate. The amount of construction steel required is reduced considerably, since this is determined by the amount needed in construction and not the amount contained in the bridge structure.

In this combination, the demands of modern construction methods are met with particular success, due to the well-planned and economic use of steel and concrete materials.

The VFT® construction method is equally suitable for continuous girder systems and framework constructions. Simple connection rod links in the support area allow the girders to be coupled in the construction phase, in order to achieve a continuous effect. After the installation and reinforcing stages, the in-site concrete plate can be laid continuously and therefore more economically.



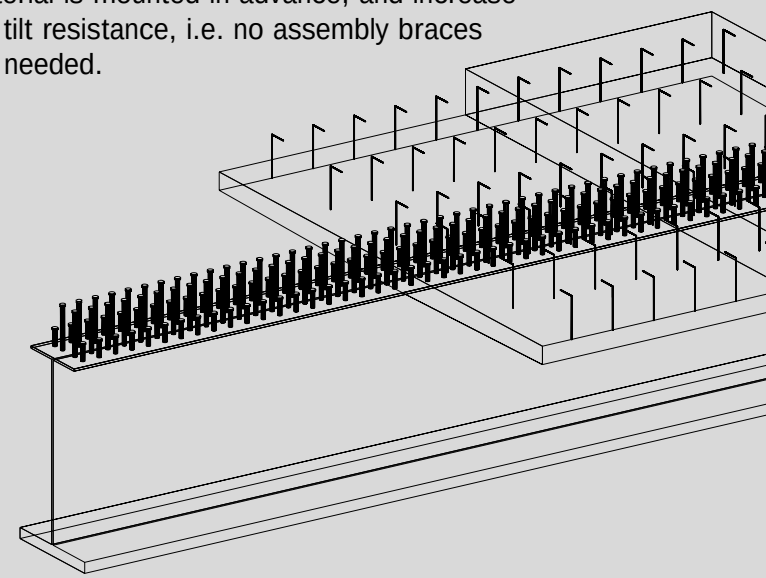
Longitudinal cross-section – single-span girder bridge over railway, span about 50 m



Regular cross-section with 5 VFT girders

Characteristics of the VFT® construction method

- The high quality of the finished structure keeps maintenance costs low, due to the strong design with easily accessible steel girders and a monolithic in-situ concrete plate.
- Extensive prefabrication of the girders reduces the amount of work on the building site, so that construction deployment is very economical with efficient construction times.
- The VFT girders can also be used in areas other than the conventional uses of prestressed concrete girders: in single-span and continuous systems, in frames and viaducts.
- The low weight of the VFT girders combined with high flexural strength opens up new dimensions in the span length of prefabricated bridges and allows the construction of slender and attractive structures.
- The concrete flanges that form the upper boom make buckling braces in the steel girders unnecessary, considerably reduce the amount of steel used in construction, since the composite material is mounted in advance, and increase the tilt resistance, i.e. no assembly braces are needed.



Installation of 50 m VFT girders over railway

References

Brandenburg
Motorway Administration

- National motorway A13 - BW 24Ü4
  Double-span girder bridge over federal motorway
  Span: 2 x 24.35 m

- National motorway A115 - BW 4
  Single-span girder bridge over railway
  Span: 23.50 m, Angle: 53 gr

- National motorway A11 - BW 34Ü2
  Framework construction over federal motorway
  Span: 35.00 m

- National motorway A12 - BW 19Ü1
  Double-span girder bridge over federal motorway
  Span: 2 x 34.20 m, Angle: 46 gr

North Bavarian
Motorway Office

- National motorway A72 - BW 179a
  Double-span girder bridge over federal motorway
  Span: 2 x 40.11 m, Angle: 45 gr

- National motorway A73 - BW 165-2
  Viaduct as five-span structure
  Span: 2 x 34.80 + 3 x 44.00 m

DEGES

- B247n - BW 10Ü
  Frame construction over B247n
  Span: 33.50 m, Angle: 100 gr

- B247n - BW 12Ü
  Frame construction over B247n
  Span: 33.50 m

PBDE

- Overpass at km 28,000
  Frame construction over railway
  Span: 35.30 m

- Overpass on ST 2225
  Five-span girder bridge over federal motorway / federal road
  Span: 23.4+36.6+2x46.5+31.0 m

Road construction office, Straußberg

- B198 Angermünde
  Single-span girder bridge over railway
  Span: 49.50 m, Angle: 90 gr

City of Dresden

- Schlachthof Bridge
  Continuous 13-span girder system
  Total length: 315.48 m

City of Munich

- Schmuckerweg
  Single-span system - Bridge over railway
  Span: 33.50 m

MixedMindArea, Matthias Grimm, Berlin 0 30 - 6 93 66 62

SCHMITT STUMPF FRÜHAUF UND PARTNER
engineering consultancy

Leopoldstraße 208
D - 80804 Munich
Tel.: +49 (89) / 3 60 40 - 0
Fax: +49 (89) / 3 60 40 - 10 0
e-mail:muenchen@ssf-ing.de

Schillerstraße 46
D - 06114 Halle
Tel.: +49 (3 45) / 21 14 - 0
Fax: +49 (3 45) / 21 14 - 80 0
e-mail:halle@ssf-ing.de

Schönhauser Allee 149
D - 10435 Berlin
Tel.: +49 (30) / 4 43 00 - 0
Fax: +49 (30) / 4 43 00 - 60 0
e-mail:berlin@ssf-ing.de

TRAFFIC SYSTEMS
RAILWAY CONSTRUCTION
BRIDGE ENGINEERING
ENVIRONMENT
INDUSTRIAL CONSTRUCTION
CONSTRUCTION ENGINEERING