

Sika at Work

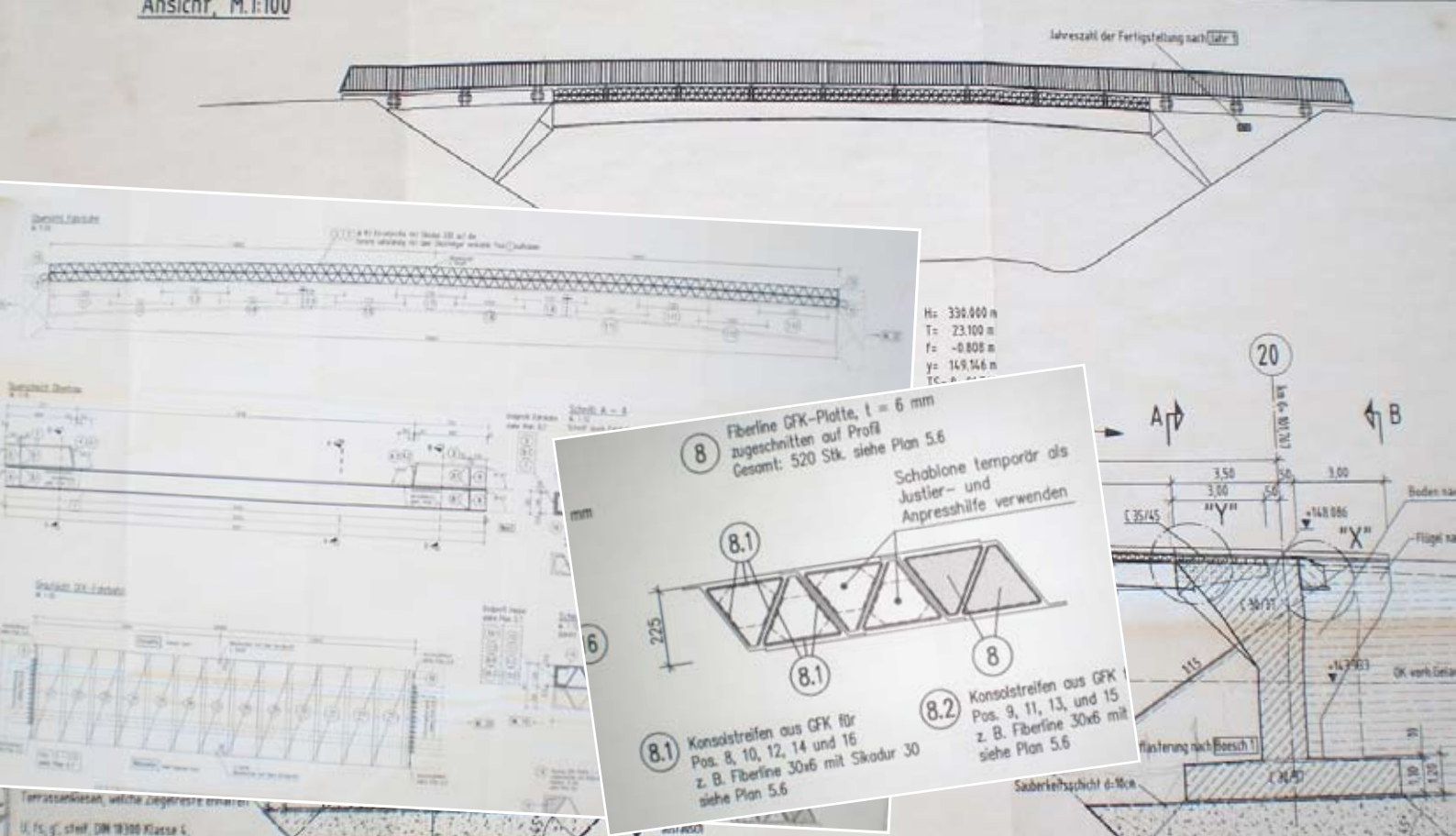


# Flyover-Bridge Across Highway 455 Composed of Glass FRP Hessen, Germany

**First Steel-FRP Road-Bridge in Europe**

Structural Bonding: **Sikadur®**





## Flyover-Bridge Across Highway 455 Composed of Glass FRP

### Project Description

This fly-over across Highway 455 in Friedberg, Hessen, Germany is a 27m long and 5m wide new road bridge which used Sika structural bonding material as adhesive for FRP Plates.

Today fibre reinforced plastic (FRP) composites are well known materials for such 'high tech' applications as producing Formula 1 cars, aircraft components, sports equipment and robotic arms. Plus they are also well established for structural strengthening in the refurbishment and upgrading of buildings and civil engineering structures.

### Project Requirements

The materials for this bridge must be robust and sustainable, have good ecological properties and still leave plenty of scope for design. Glass and carbon fibre reinforced plastics meet these requirements very well and they are suitable for use in the construction of very light and efficient structures. The comparatively high cost of these materials has hitherto prevented their widespread use in construction, but their unique properties together with the substantial weight saving potential are now making them increasingly competitive.

The lifecycle costs are also an advantage with this new type of bridge. It is quite often that already after only 15 to 20 years extensive maintenance work is necessary on conventional bridges. But the Friedberg FRP Bridge is designed to last for up to 50 years without repairs and almost no maintenance. To build the road bridge according to the ITKE and HLSV design, a load-bearing deck of glass fibre reinforced plastic (FRP) was bonded to the steel superstructure consisting of two main beams.



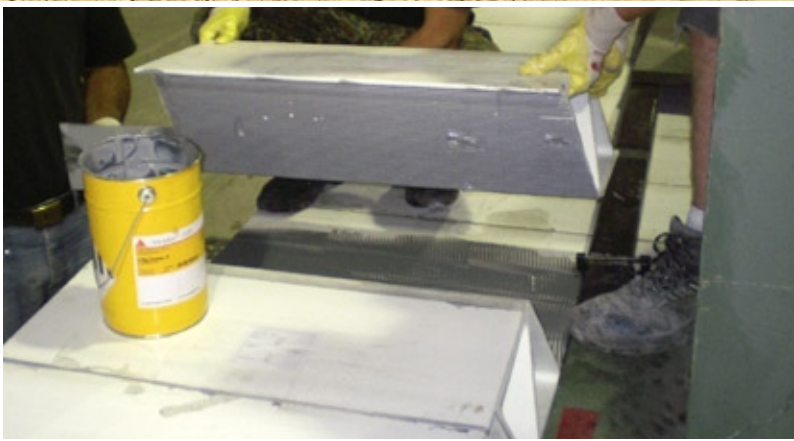


### Sika Solution

The main FRP components were produced by the pultrusion process as hollow oblong beams, that were assembled and bonded together on a single FRP plate to form the deck slab, which was then itself fully bonded to the steel structure. The sides of the bridge were cantilevered and also assembled from bonded FRP to form the base of the footpaths. Finally the prefabricated sections of the stainless steel parapet railings were also easily fixed and bonded along the sides of the bridge, the last sections being installed on-site at the end of the erection. In all of these situations, high-tech epoxy resin based adhesives from Sika Germany (**Sikadur® 30 DUE** and **Sikadur® 330**) were used to achieve a durable bond. The whole structure was therefore built off-site in an assembly hall. The superstructure only had to be erected and grouted to the prepared concrete abutments on the site, so the bridge was opened almost straight away and the road closure was reduced to just a few hours instead of many weeks or even months.

### Product used in the project:

**Sikadur® 30 DUE, Sikadur® 330** as Adhesive for FRP Plates





## Project Participants

**Owner:** HLSV, Wiesbaden (Hessen State Highway)

**Preliminary Design:** ITKE Knippers+Helbig Consulting Engineering, Stuttgart

**Detail Design:** KHP König Heunisch & Partner, Frankfurt am Main

**Check Engineer:** J. Steiner IG-Bauen, Karlsruhe

**Component Testing for ZIE:** ITKE, Prof. Knippers, Stuttgart

**FRP-Plates:** Fiberline, Denmark

**Structural Bonding:** G.Quadflieg, Würselen

**Construction period:** until 25<sup>th</sup> July 2008

**General Contractor:** LS-Bau, Gießen

**Sika Company:** Sika Germany, Dr. Horst Peters

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