
Project Report/March 2023

Repair of the Protected Historic Melan Arches of the Ammer Bridge in Echelsbach, DE

The Ammer Bridge, also known as the Echelsbach Bridge, is a road bridge on the B23 federal highway over the Ammer Gorge in Upper Bavaria, Germany. The protected history bridge was completed in 1929 as a Melan arch bridge with the largest arch width of 130 metres at the time. The arch bridge between Rottenbuch and Bad Bayersoien is 183 metres long and lies about 76 metres above the valley floor. The actual bridge could no longer be renovated economically due to massive material fatigue, but the arches were to be preserved and repaired for reasons of monument protection as well as the environmental protection of the bat colony living inside the arches. After the repairs, the Melan arches will be used as girders for the new formwork and will remain in place at a distance of one to two metres below the new bridge. A unique project.

After numerous previous renovations and a new structural inspection, it was decided to implement the large-scale project: demolition of the old bridge deck, construction of a replacement bridge for around 10,000 vehicles a day, but preservation and repair of the Melan arches.

For the planners, the damages such as extensive concrete spalling, hollow spots and corrosion of the reinforcing steel was due to the insufficient tightness of the concrete technology from the time of construction. There was insufficient concrete cover, moisture and harmful substances diluted in water had penetrated the building structure. When repairing protected historical buildings, planners and applicators have to choose products that preserve the architecture and appearance of the building and in parallel are technically suitable. They require mortar systems with special properties adapted to the construction task.

Based on the boundary conditions of the structure assessed by the planner's experts, they opted for the "Repair Principle W"*: Corrosion protection of the reinforcement using our repair systems **StoConcrete Repair Prime TS 203** and **StoConcrete Repair Prime TG 203**. The highly crack-bridging **StoConcrete Protect Elastic FB** (OS 5b / OS-D I) was also used as a

surface protection system. Cracks in the reinforced concrete were connected and sealed with the EP injection system **StoConcrete Inject IHS**.

The first step of the repair was the complete removal of the old coating up to a layer thickness of 5 millimetres and the removal of concrete from the damaged areas. On the exposed steel framework and reinforcement the mineral corrosion protection StoCrete TK was applied. The StoCrete TH bonding bridge followed and reprofiling done manually with the polymer-modified StoCrete TG 203 and with StoCrete TS 203 using the wet spraying method.

Both mortars were optimised for the statically relevant repair of concrete structures and at the same time have excellent workability. Both StoCrete TS 203 and StoCrete TG 203 can be processed vertically and overhead. The R4 mortars are subject to strict quality controls during production and are externally monitored.

The mineral coating system **StoConcrete Protect Elastic FB** additionally protects the concrete structure. It is statically and dynamically highly crack-bridging and serves as the OS 5b / OS D I surface protection required by the planning team. StoConcrete Protect Elastic FB is characterised by its low water absorption and watertightness of 3 bar. It is also weather-, ageing- and UV-resistant. The surface protection system has a high carbon dioxide impermeability, frost-de-icing salt resistance and alkali stability.

A replacement bridge was built above the protected Melan arches, which was opened to traffic on German federal road no. B 23 in November 2021.

Properties of **StoConcrete Repair Prime TS 203**

- CEM repair system, statically active, polymer-modified
- Concrete repair system for reinforcement of concrete structures using wet-mix process
- Repair mortar class R4 in accordance with EN 1504-3
- Increasing concrete cover
- Restoring passivity of reinforced steel
- High fire resistance
- Good thermal compatibility
- Low final creep value

Properties of **StoConcrete Repair Prime TG 203**

- CEM repair system, statically active, polymer-modified
- Hand-applied repair mortar
- Local, full-surface, and for edge reprofiling

- Fresh mortar has very good modelling abilities, good application over head
- High compressive strength and fire resistance
- Repair mortar class R4 in accordance with EN 1504-3
- Good thermal compatibility

Properties of **StoConcrete Protect Elastic FB**

- Coating build-up for the protection of concrete structures
- Protection for crack-prone concrete structures
- Cementitious acrylate-modified, highly elastic
- Excellent static and dynamic crack-bridging ability
- On vertical, sloping surfaces, and horizontal surfaces
- Surface levelling and sealing blow-holes and pores
- Low water absorption, high resistance against alkali, high UV-resistance
- High frost and de-icing salt resistance
- Resistant to salt spray
- Good weather and aging resistance
- Substrates: concrete, cementitious screed, StoCrete PCC mortar
- Application by airless sprayer and by spatula/trowel
- EN 1504-9 repair principles 1, 2 and 8 in accordance with 1.3, 2.2, 8.2; OS5b/OS-D I system in accordance with German RL SIB
- Tested system build-up with eternal monitoring
- Certified in accordance with DGNB Sustainability Data Sheet (quality level) and LEED

Properties of **StoConcrete Inject IHS EP**

- EP injection resin StoJet IHS 93
- EP injection system for force-transmitting filling of cracks
- For concrete and reinforced concrete
- Soaking and injecting of cracks
- High depth of penetration due to low viscosity
- High tensile strength
- Wide range of packers
- Approvals/standards: EN 1504-5 Concrete Injection, BAST** -approved

*"Repair Principle W": Concrete repair principle in accordance with German RL-SIB concerning corrosion protection through limitation of water ration in concrete | **German Federal Highway Research Institute

Who & What

Project: Brigde Ammerbrücke Echelsbach, Rottenbruch, DE

Investor: Staatliches Bauamt Weilheim i. OB, DE

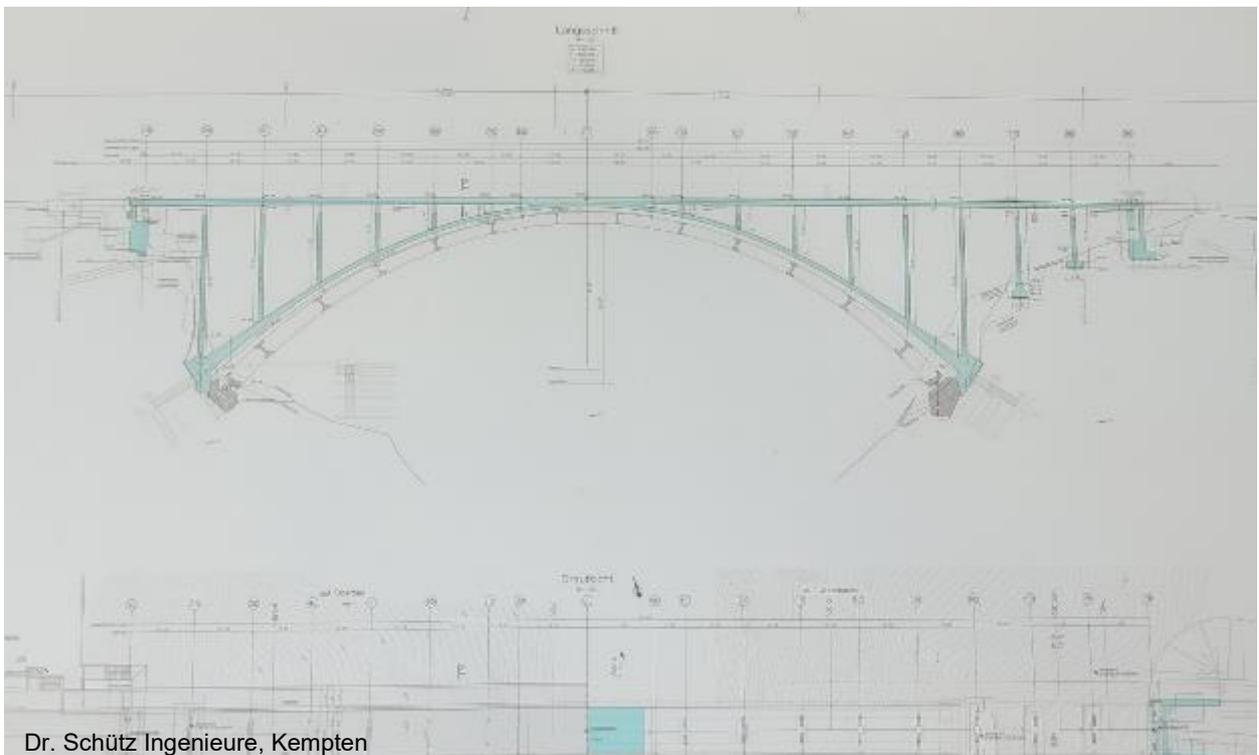
Planner:	Dr. Schütz Ingenieure, Kempten, DE Kolb Ripke Architekten, Berlin, DE
CU:	Strabag AG, DE
Applicator:	KBB/Meissl Oberflächen Produktions GmbH, Fischamend, AT
Realisation:	9/2021
StoCretec Competences:	StoConcrete Repair Prime TG 203 Corrosion protection StoCrete TK Bonding agent StoCrete TH 200 Repair mortar StoCrete TG 203 StoConcrete Repair Prime TS 203 Corrosion protection StoCrete TK Repair mortar StoCrete TS 203 StoConcrete Inject IHS EP EP injection resin StoJet IHS 93 StoConcrete Protect Elastic FB Scratch coat StoCrete FB Coating StoCrete FB

(Photos: Courtesy of Hermann Weiher, München, DE)









Dr. Schütz Ingenieure, Kempten

