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Artikel: Repair of the Todsburg Bridge (Fed. Rep. of Germany)
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11. Repair of the Todsburg bridge (Fed. Rep. of Germany)

Owner:	*Federal Republic of Germany*
Year of construction:	*1936/37*
Repairs carried out in:	*1983*
Under the supervision of:	*Heidenheim Motorway Authority*
Contractors:	*Weidle and Ludwig Fischer*

Introduction

The Todsburg bridge (Fig. 1) is located on the A 8 Autobahn between Stuttgart and Munich – one of the busiest sections of motorway in Germany. It stands between Stuttgart and Ulm at a point where the road climbs up into the Swabian Alb. For structural reasons, the two roadway sections are completely separate from each other. Some 30 000 vehicles pass over the bridge in each direction every day. By the beginning of the 1980's the concrete structure was in urgent need of repair – this stretch of motorway now being over 50 years old.

Description of the work

The concrete on the old arched bridges had suffered extensive damage over the years, particularly from deicing salt. This damage resulted – as is usually the case – from failure of the conventional bridge waterproofing system, which was unable to cope with the severe stress caused by traffic, temperature fluctuations and structural movements over the years. It was therefore decided that, in addition to the normal repair work, a new type of spray-on liquid polyurethane would be applied to form a waterproof membrane.

The principal advantages of this new system are as follows:

- Seamless, homogeneous waterproofing produced in one pass
- High elasticity and elongation at break even at low temperatures
- The waterproof membrane is bonded over the entire surface of the substrate, thus preventing any moisture infiltration
- Excellent crack-bridging effect
- High water vapour permeability prevents any build-up of moisture beneath the membrane.

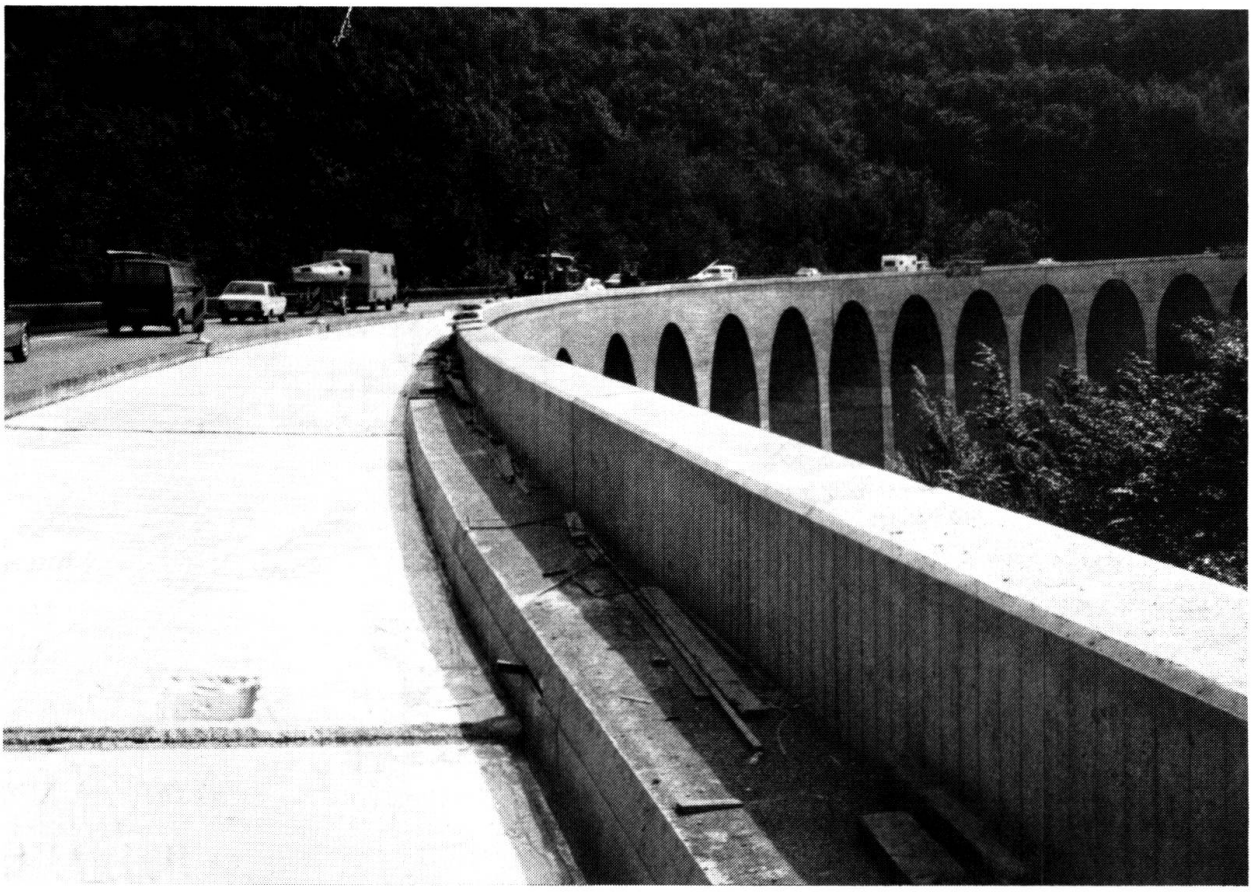

Fig. 1 The Todsburg bridge

The repair work involved the following steps:

1. Removal of the frost-resistant masonry and defective concrete from the bridge parapets
2. Tearing up the old bituminous layers of the roadway and the defective waterproof seal
3. Drilling away the defective concrete on the roadway platform
4. Where necessary uncovering damaged reinforcement, removing rust and applying corrosion protection

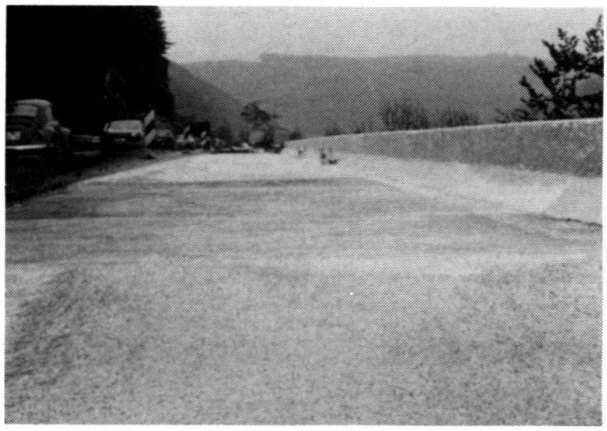

Fig. 2 The finished waterproofing membrane

Fig. 3 Working on reinforcements for the construction of the new parapet

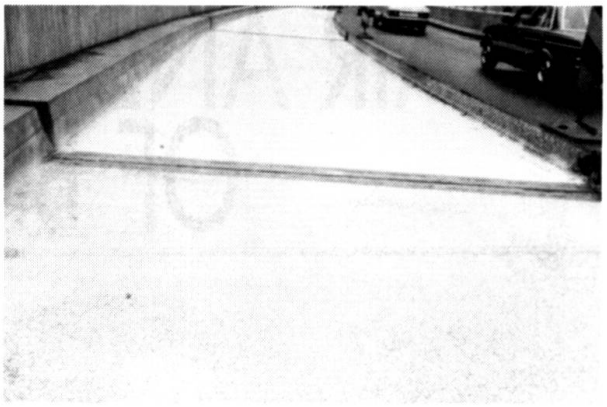

Fig. 4 The bridge complete with its new parapet before surfacing with bituminous mastic concrete

5. Cleaning the area with high-pressure water jets
6. Applying epoxy mortar to the roadway platform to level those areas where concrete had been chipped away
7. Applying a bonding agents (1-component PU) and covering with silica sand 0.7–1.2 mm
8. Spraying on the liquid plastic waterproof membrane to a thickness of approx. 3 mm (Fig. 2)
9. Applying a bonding agent to the plastic membrane and covering it with granules to improve the shear bond between the membrane and the asphalt layers (the bridge has a gradient of approx. 6% along its length, and 3–5% from side to side)
10. Reconstruction of the new parapet on top of the waterproof membrane (Fig. 3)
11. Applying the bituminous mastic concrete protective layer, the bituminous mastic concrete load-bearing layer and the wearing layer (Fig. 4).

The bridge has now been fully open to traffic for over 5 years since this repair work was carried out. As in many other structures, the new waterproofing membrane has proved to be an outstanding success. So much so that, in 1987, this liquid plastic waterproofing system received the approval of the Federal Minister for Transport as a new standard method of construction in the Federal Republic of Germany (ZTV-BEL-B 3/87).

(R. Hoscheid)