Spreading suspension cable at the Rhinebridge Emmerich, Germany

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Abstract

The Rhinebridge Emmerich of 1962 is a suspension bridge, with two 77 m high steel pylons, and 500 m long. The suspending cables consist of 61 parallel locked coil strands. The hangers are fixed to the suspension package by an iron cast saddle-clamp each. Corrosion products had spilled from the inside of the suspension cable at the lowest point. In order to investigate the corrosion of the cable in the interior, the suspension cable was opened under terms of running traffic using a special device with grippers. As a result, the strands of the cable could have been inspected all around. It was found, that the more than 50 years old strands are in very good condition. After documentation the strands have been cleaned, coated and lead back into the suspension package. The old saddle-clamp was fixed again and suspension cables were replaced.

Keywords: Suspension bridge, spreading of cable, saddle-clamp, maintenance.

1 Introduction

The Rhine-Bridge Emmerich in North-West Germany near the Netherlands transfers the Federal road B 220 across the River Rhine. It was opened to traffic in 1965, and consists of a steel suspension bridge and a concrete foreshore bridge at the left bank of the river.

The steel bridge is 803 m long. Two suspension cables are lead over two 77 m high steel pylons, retained by concrete anchoring bodies of 68,000 tons resp. 55,000 tons weights. The open length of the middle field is 500 m, the length of the two sides is 151.50 m each. This is followed by a 341 m long concrete bridge, so that the total length of the Rhine crossing is 1.227.75 m. The road consists of two lanes and two general-purpose tracks, in total 14.90 m wide. The width between the railings is 21.80 m.

The suspension cables consist of 61 locked coil strands of 51.8 mm diameter, which are arranged hexagonally and are protected by a cast PUR sheath. The 104 hangers are made of locked coil strands of 34 and 42 mm in diameter, each of which are double guided about cast iron cable clamps.

Figure 1: The Rhinebridge Emmerich

In August 2009, the strands of the suspension cable have been inspected. Two types of typical damage of the sheathing of the cables were noticed: Large holes on the top and damage to the edges, in particular the lower edge of the hexagon. The latter are often associated with the discharge of water and corrosion products. At the deepest point in the middle of the bridge the biggest liquid leakage had occurred and increased corrosion has been suspected (Fig 2).

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